

**Using the inputs into the inter-sessional meetings
of the 1972 Biological Weapons Convention to
enhance conceptualization of effectiveness for the
regime to control biological weapons**

Volume I of II

Richard Guthrie

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Department of Politics, Languages and International Studies
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Abstract

This thesis seeks to find greater understanding in how to understand the concept of ‘effectiveness’ in a regime such as that to control biological weapons which has at its core an international treaty, the 1972 Biological Weapons Convention. Previous work in this field has been highly theoretical and this thesis identifies: limitations in existing theories as applied to this regime; gaps between theory and practice; and limits to common perceptions of issues within the regime.

In order to create a new conceptualization of effectiveness, definitions for four dimensions — *Threat Ambition*, *Coherence/Engagement*, *Availability/Opportunity*, and *Resilience* — were developed to sit within a new framework of assessment for evaluating effectiveness within the regime to control biological weapons.

Limitations were also identified in policy analysis techniques focused on influences *towards* particular outcomes as these bring with them a severe analytical limitation as correlation does not equate with causation. However, an analysis of hindrances/obstacles to particular outcomes brings with it a means of analysis that allows for a separation of influences and identification in which circumstances certain influences may have been critical to a particular outcome. This is the inspiration for a new analysis tool — a conjectured generic idealized policy decision — which is then tested for the first time.

Triangulation between the two analytical techniques, the framework of analysis to understand effectiveness within the regime to control biological weapons [the top-down approach] and the conjectured generic idealized policy decision to see how the regime impacts upon national policy processes [the bottom-up approach], indicates both have potential for further potential as analytical tools.

Abbreviations, Glossary

AHG Ad Hoc Group — the BWC States Parties agreed at a Special Conference in 1994 to establish the ‘Ad Hoc Group’ to negotiate a legally binding protocol to the Convention that would have included certain measures to strengthen it, including verification measures. The negotiations were brought to a standstill in the middle of 2001 when the United States announced that they would not be able to accept any product that would result from the negotiations.

BINGO business interest non-governmental organization [see also NGO and PINGO]

BTWC *see BWC*

BWC The *Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and their Destruction* is commonly known by two names: the Biological Weapons Convention (BWC) and the Biological and Toxin Weapons Convention (BTWC). The Convention was opened for signature on 10 April 1972 and it entered into force on 26 March 1975.

CBM Confidence-Building Measure

CBW Chemical and biological warfare

CFSP Common Foreign and Security Policy [EU]

CNS Center for Nonproliferation Studies

CoW Committee of the Whole

CTBT Comprehensive Test Ban Treaty

CWC The *Convention on the Prohibition of the Development, Production, Stockpiling and use of Chemical Weapons and on Their Destruction*, is commonly known as the Chemical Weapons Convention or CWC. The Convention was opened for signature on 13 January 1993 and it entered into force on 29 April 1997.

ENDC Eighteen Nation Disarmament Committee

EU European Union

FAO Food and Agriculture Organization

FTR Free Text Retrieval

HPAI Highly Pathogenic Avian Influenza, commonly known as ‘bird flu’

HSP Harvard Sussex Program

IAEA International Atomic Energy Agency

IAP Inter Academy Panel for International Issues

ICRC International Committee of the Red Cross

ISU Implementation Support Unit — established by the Sixth BWC Review Conference

JACKSNNZ An informal grouping within the BWC (pronounced ‘jacksons’ and sometimes referred to as the Jackson-7) that first appeared in this form at the Sixth Review Conference in 2006 comprising Japan, Australia, Canada, Republic of Korea, Switzerland, Norway and New Zealand.

LRTAP Long-Range Transboundary Air Pollution [Convention]

MERS Middle East Respiratory Syndrome

MSP Meeting of States Parties

MX Meeting of Experts

NACD non-proliferation, arms control and disarmament

NAM Non-Aligned Movement

NGO non-governmental organization [see also BINGO and PINGO]

NPT The *Treaty on the Non-Proliferation of Nuclear Weapons* is commonly known as the Non-Proliferation Treaty or NPT. The treaty was opened for signature on 1 July 1968 and it entered into force on 5 March 1970

OIE World Organization for Animal Health (original title Office Internationale des Épizooties)

OPCW Organization for the Prohibition of Chemical Weapons [a body established by the Chemical Weapons Convention]

PINGO public interest non-governmental organization [see also BINGO and NGO]

PSI Proliferation Security Initiative

SALT Strategic Arms Limitation Talks

SARS Severe Acute Respiratory Syndrome

SIPRI Stockholm International Peace Research Institute

UNGA United Nations General Assembly

VEREX Group of Verification Experts [BWC]

VERTIC Verification Research, Training and Information Centre [previously the Verification Technology Information Centre until 1998]

WHO World Health Organization

WMD Weapon(s) of Mass Destruction

1. Introduction

There are international efforts to control biological weapons at a variety of levels, including sub-national, national and international. The characteristics of these efforts have to be identified. There has been considerable literature on the regime to control biological weapons and this needs analysing to discover whether there has been single or multiple approaches to analysis. If there are multiple approaches, are there particular lessons that might be drawn for analysis of effectiveness?

Biological weapons have been subject to prohibitions since before the basic mechanisms of disease were understood. For example, the taboo against the use of poison weapons is longstanding, such as the Manu code in Hindu law and the Saracen code of warfare in Islamic law which predate by centuries the earliest of the post-industrial revolution efforts at prohibition such as the 1874 Brussels declaration; all of which were enunciated before the germ theory of disease had been understood.¹ In parallel with these prohibitions, many of which have been simply declaratory in nature, there had been practical efforts to counter the acquisition or use of these weapons.

A major turning point was the signing of the 1972 Biological Weapons Convention (BWC)² which now lies at the core of the regime to control biological weapons; although, as will be illustrated later, the regime is far broader than the Convention. Since the resumed Fifth BWC Review Conference in 2002 there have been inter-sessional meetings which allow for engagement between the States Parties and others at expert and at political levels.

In the absence of a unified conceptualization of effectiveness across the regime to control biological weapons across governments or within academia, the inputs into these

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1. For an exploration of the taboo, see Catherine Jefferson, 'The Taboo of Chemical and Biological Weapons: Nature, Norms and International Law', DPhil thesis, University of Sussex, 2009.
 2. The text of the *Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological and Toxin Weapons and their Destruction* was negotiated over a three-year period in the Eighteen-Nation Disarmament Committee (ENDC) [renamed the Conference of the Committee on Disarmament in August 1969] which concluded an agreed text in 1971. On 16 December of that year, the United Nations General Assembly adopted a resolution commending the Convention to all states. The Convention was opened for signature on 10 April 1972 and it entered into force on 26 March 1975. The Convention is commonly known by two names: the Biological Weapons Convention (BWC) and the Biological and Toxin Weapons Convention (BTWC).

inter-sessional meetings provide a means to generate new understandings of what is desired as effectiveness by regime participants.

The basic thrust of this thesis is to identify what is understood already; identify the puzzle to be solved; ascertain the questions required to solve the puzzle; seek the information needed to provide an answer to the questions; and, having done all of these, reach some conclusions.

Chapter outline

The substantive part of this Chapter begins with an initial examination of what effectiveness actually means, leading into identification of the research problem to be tackled and some basic assumptions that underpin the research. This is followed by an outline of methodology used and description of the types of data available and how that data is handled; this section includes some background information on the author's involvement with relevant international processes. The overall structure of the thesis is outlined and the Chapter concludes with an exploration of the Research Problem and Research Questions

What is meant by effectiveness?

The Oxford English Dictionary does not include a separate definition of effectiveness but includes an entry for effective that contains the following two definitions:

Concerned with, or having the function of, carrying into effect, executing, or accomplishing

That is attended with result or has an effect³

Clearly, if an activity has identifiable objectives, the question of whether those objectives have been achieved is key to understanding whether that activity has been effective. However, if the activity has objectives that cannot be clearly defined — or has a clearly defined ultimate objective but difficult to define sub-objectives or other intermediate steps needed to reach the ultimate objective — a simple measure of effectiveness may be impossible.

3. As cited under the entry 'effective' in the *Oxford English Dictionary*, 2nd edition, (Oxford: Oxford University Press, 1989), vol V (Dvandva-Follis), p 80.

In the case of the subject matter of this thesis, there are some commonly understood objectives, such as non-use and non-acquisition of biological weapons. However, these objectives are not simply achieved (or not) in isolation, but they can be heavily dependent on other activities within the regime, such as whether restrictions are placed on the possible use of certain materials and technologies for hostile purposes. In this regard, effectiveness could be seen as dependent on implementation of regime obligations.

If the overall policy objective of the regime to control biological weapons that is simplest to define is to reduce any potential threat presented by biological weapons then does *any* progress in this direction count as effectiveness within the regime? For example, if this progress results from behaviour that would have taken place notwithstanding the existence of the regime, could the regime (in terms of international relations theory) be considered effective? In such circumstances the regime itself would have contributed nothing from the perspective of the study of international relations and so could not be considered to have been effective in those terms, notwithstanding that from the perspective of those wanting to control biological weapons, the measures taken had effectively controlled acquisition of biological weapons.

The work within this thesis is focused on issues of implementation effectiveness rather than theoretical issues of regime cooperation effectiveness.

Within any activity, there may be unstated or implicit functions that may be seen as contributions of effectiveness, such as the creation of a community dealing with a particular issue area or the use of one activity to solve other problems.⁴

The research problem outlined

As will be elaborated in more detail later, in an ideal world, there would be a relatively basic research problem to tackle within a thesis such as this, i.e., ‘is there a single, easily understandable and explainable, measure of effectiveness in relation to the regime to

4. During the 1990s, during an entirely separate project, the current author was able to interview John Edmonds who had been UK ambassador to the trilateral (UK-USA-USSR) negotiations on a nuclear test ban which had been taking place when the Soviets invaded Afghanistan. He explained that the negotiations continued, notwithstanding there was no hope of reaching a conclusion on the stated subject matter, as the regular meetings were found to be extremely useful for the participating governments to promote communication at a time of tension as it was the only forum at which the three governments were represented at a senior level without other delegations being present.

control biological weapons'. The answer to this question is itself very simple: it is 'no'. The regime to control biological weapons covers a broad spread of activities and therefore it is not possible to define a single measure for effectiveness.

The lack of a simple measure of effectiveness means that the Research Problem that this thesis seeks to resolve can be defined in the following terms:

How should success or failure, and therefore 'effectiveness', in a regime such as that to control biological weapons be categorised and assessed?

This research problem will be tackled through two research questions. The first of these is:

How can the concept of 'effectiveness' in relation to the regime to control biological weapons be broken down into separate dimensions in order to create a more rigorous framework of assessment?

Such dimensions would need to be defined so as to encompass all activities that might enhance the effectiveness of the regime. It might be that some possible activities might be regarded differently by different participants in the regime, so some might regard an activity as enhancing effectiveness while others believe that it does not. Any individual axis or dimension will include positive as well as negative developments. These are sometimes best expressed as successes or failures in such an axis or dimension.

This Research Question can be summarised as looking at regime effectiveness from a top-down perspective. A particular difficulty with this approach is that it doesn't allow for an analysis of the policy structures within governments. In order to have confidence in the top-down analysis it is necessary to examine similar issues from a bottom-up perspective which then allows triangulation of the results.

Therefore the second Research Question tackled in this thesis is:

Can analysis of policy processes within governmental structures identify whether activities within the regime to control biological weapons impinge upon such policy processes?

Triangulation of the results of the two research questions will allow for the drawing of conclusions as to how effectiveness of the regime is understood by the participants in the

regime to control biological weapons and provide an evidence base to substantiate these findings.

The Research Problem and Research Questions are discussed further later in this Chapter.

Basic assumptions underpinning this thesis

All research starts from a set of assumptions that frame the work of the researcher. Sometimes these assumptions are implicit, but there may be benefits in being explicit about them in this case. The assumptions outlined below are designed to frame the logic of the argument provided in this thesis. The assumptions outlined here are not designed to be formal research hypotheses and they do not have a one-to-one relationship to the research questions that are identified later. They are instead intended to guide thinking and to bring any underlying assumptions into the open. Indeed, it is important to do this to identify where assumptions may or may not be contested.

The initial assumption underpinning the issues relating to this thesis can be summarized as:

the potential use of biological weapons is something to be avoided if possible and the potential for use can be reduced by making acquisition of such weapons more difficult.

While this might be a perspective held by many, if not the majority, of people of the world in the early years of the twenty-first century, it is clearly not a universal view. Indeed, it can clearly be argued that anyone trying to acquire biological weapons does not hold this view.

As will be elaborated later, the events of 2001 created a significant juncture in the history of the regime. The main working assumption relating to this thesis follows on from this and can be elaborated as:

in the first decade of the twenty-first century many governments aimed to strengthen the regime to control biological weapons despite US efforts to downplay the treaty-based elements of the regime.

While this might appear at first sight to be a simple assumption, there are complicated aspects. While there was substantial activity by many governments on issues relating to biological threats, there is also implicit within this assumption a further assumption that there could be other reasons for these activities in some cases.

A third assumption relates to the nature of biological weapons themselves:

biological weapons have distinct characteristics in relation to their potentials for use, their acquisition and their political context; meaning that the policy responses to the threat of biological weapons should have distinct characteristics.

Biological weapons and activities to counter them have clear dissimilarities from many other areas of international policy. Potential threats posed by biological weapons are aggregated by many into a collection of potential threats identified as so-called 'weapons of mass destruction', for which there are a number of policy responses (see Chapter 2). However, biological weapons have distinct characteristics in relation to their potentials for use, their acquisition and their political context; this means that the policy responses to the threat of biological weapons should have distinct characteristics (see Chapter 4). However many within governments and within the external analytical communities conflate the WMD issues in considering policy responses. Moreover, as biological weapons are essentially tools for deliberate disease, the counters to them require the involvement of activities not usually involved in international policy organs (see Chapter 8).

The fourth assumption is one that is contradictory with traditional international relations theory:

governments may not act as unified actors in this policy area.

As will be illustrated later, many of the activities within the regime to control biological weapons are carried out by actors not normally involved with inter-governmental activities. It will be illustrated during this thesis that separate actors within governments have different influences on their actions and different expectations of possible outcomes (see Chapter 7). To put it another way, activities to control materials and technologies relevant to the control of biological weapons involves many more government departments than is usual in inter-governmental issues. It is quite reasonable to assume

that the influences on and perspectives of officials from ministries of foreign affairs may be different from those from ministries of health.

To strengthen the regime means the regime must in some way become more effective, but what does ‘effective’ mean? Indeed, what is understood by ‘the regime to control biological weapons’? If an understanding can be reached, in one form or another, on what is meant by the regime and by effectiveness, this then leads to a further assumption:

An assessment of effectiveness of the regime to control biological weapons can be made in one form or another

If no such assessment can be made, what are the guiding influences to policy and how can policy itself be evaluated? In working through this assumption, it would have to be established whether there was a single measure of effectiveness or whether any such assessment would have to be made in more than one dimension. Does an increase in effectiveness mean increasing intensity of existing measures or does it require additional activities to be carried out?

There is a final assumption relating to the passage of time:

The events of 2001 were a watershed for the efforts to control biological weapons. The rejection by the US of the draft protocol to strengthen the BWC followed by the use of the US postal service as a delivery system for powdered *Bacillus anthracis* forced governments around the world to consider how materials and technologies that could be used to make biological weapons should be controlled.

These assumptions will be revisited in the chapters and the conclusions section of this thesis.

The genesis of this thesis

This thesis is an examination of regime effectiveness, yet it started as an examination of how the European Union’s Weapons of Mass Destruction Strategy had evolved and how the EU was learning to face new challenges in this sphere. To fulfil this original purpose, a case study of the regime to control biological weapons in the period starting 2001 was selected. This case study would be evaluated against the body of literature known as ‘Regime Theory’. However, it became apparent as the work progressed that there were few existing practical tools to evaluate effectiveness in such a regime, all of which had

significant limitations or flaws in their application (see Chapter 6). The lack of a means to evaluate effectiveness created significant methodological limitations as to how the activities of the EU, its institutions and its member states could be analysed.

As time progressed, the work for the thesis ended up being dominated by the process of creating a framework of assessment to evaluate effectiveness to the extent that it became logical to make this methodology the primary focus of the thesis.

Methodology — How to grasp the concept of effectiveness?

As noted in the introduction to the Research Problem, in an idealized world, there would be a simple unified conceptualization of effectiveness. Yet, when official meetings of the states parties to the Biological Weapons Convention take place in Geneva, there can be over 100 States Parties in the room — in such circumstances, could there be a realistic expectation of a consensus understanding of what effectiveness is? Indeed, this lack of consensus goes to the heart of the difficulties of policy analysis in this field. The classic precepts of policy analysis start with coming to a single agreed definition of the problem; something that would be difficult for a BWC meeting to arrive at a conclusion on.

While this limitation applies to many areas of international policy that are subject to academic study, the regime to control biological weapons brings with it additional layers of complexity. While governments which attend meetings of the Biological Weapons Convention will intend to have a unified position on matters under discussion, it is clear that an official from a foreign affairs ministry will have a different perspective on some issues from an official in a health ministry or one from an education ministry. All of these ministries have been represented at different times at the meetings the Biological Weapons Convention. For example, during the period relevant to the thesis, the UK has included on its delegation officials from the Department for Environment Food and Rural Affairs, Department of Transport, Food and Environment Research Agency, Food Standards Agency, Health and Safety Executive, Health Protection Agency, Home Office, Office of Science and Technology, Veterinary Laboratories Agency [later Animal Health and Veterinary Laboratories Agency] in addition to the Foreign & Commonwealth Office, Ministry of Defence and the Department of Trade & Industry [later Department for Business, Enterprise and Regulatory Reform (from 2007), then Department Energy and

Climate Change (from 2009)] that would usually be expected to attend. (See Chapter 8, page 204 for a tabulation of this data.) Countries that have included ministry of education representatives on their delegations have included the Netherlands, Romania and Ukraine.⁵

It therefore follows that while an understanding of effectiveness could be obtained through usual literature research, this would have significant limitations as this is often focused on traditional international relations aspects. A more productive option would be to take advantage of an underused resource that would allow for a more comprehensive understanding of the conceptualization of effectiveness within governments and that is the wide variety of inputs that have been made to the inter-sessional meetings of the Biological Weapons Convention. However, these inputs need to be utilised within suitable frameworks of analysis.

The author's involvement with BWC and related processes

A further reason for utilizing the inputs into the inter-sessional meetings has been the extensive familiarity of the present author with the inter-sessional process, other BWC meetings and other related processes.

The author attended most days of the inter-sessional meetings in the period 2003-2005 as the Project Leader, Chemical and Biological Warfare Project, Stockholm International Peace Research Institute. The exceptions were the 2003 Meeting of Experts, the second week of the 2005 Meeting of Experts and two days of the 2005 Meeting of States Parties. The 2004 MX and MSP coincided with a project the author was carrying out on EU policy regarding control of biological weapons that was sponsored by the Netherlands Ministry of Foreign Affairs during the Dutch EU Presidency. The author's perspectives on the meetings were written up in the relevant *SIPRI Yearbook* chapters.⁶

5. This data has been compiled from the 'List of Participants' circulated at each meeting by the secretariat.

6. Richard Guthrie, John Hart, Frida Kuhlau and Jacqueline Simon, 'Chemical and biological warfare developments and arms control', *SIPRI Yearbook 2004*, (Stockholm/Oxford: SIPRI/Oxford University Press, 2004), pp 659–96; Richard Guthrie, John Hart and Frida Kuhlau, 'Chemical and biological warfare developments and arms control', *SIPRI Yearbook 2005*, (Stockholm/Oxford: SIPRI/Oxford University Press, 2005), pp 603–28; and Richard Guthrie, John Hart and Frida Kuhlau, 'Chemical and biological warfare developments and arms control', *SIPRI Yearbook 2006*, (Stockholm/Oxford: SIPRI/Oxford University Press, 2006), pp 707–31.

The author attended every day of the Sixth Review Conference (2006), the Seventh Review Conference (2011), and the inter-sessional meetings between them as well as the inter-sessional meetings in the period 2012-2015⁷ on behalf of the BioWeapons Prevention Project (BWPP) — a network of non-governmental bodies — for whom he wrote daily reports.⁸ The writing of the daily reports has allowed for unique insights into the process as most delegates who are active in any way with the BWC processes are keen to have their interventions and other activities recorded in the reports. This has allowed for a level of interaction and engagement with members of delegations unparalleled within the non-governmental community. Indeed, the instant feedback of interacting with delegates about what has been written regarding the events of the previous day proved extremely useful in trying to understand the various perspectives of delegations. The freshness of interactions on the day or within days that proposals were made was extremely useful. In an ongoing process like that around the BWC, there is always a danger of fading memories on particular details.

The author also produced *Briefing Books*, in association with former colleagues at the Harvard Sussex Program, for the 2006 and 2011 Review Conferences.⁹ As these were financed by governments active in the BWC processes — the Netherlands in the case of the 2006 edition and the United Kingdom for 2011 — this gave additional credibility to the author's activities in the eyes of many delegations.

It should be noted that the meetings at the focus of this thesis — the annual BWC Meetings of Experts — do not take decisions nor do they agree any form of consensus text other than an uncontroversial procedural report. The meetings are designed to be primarily exchanges of views, perspectives and experiences. The other types of BWC meetings held during the period under consideration do take decisions (Review Conferences) or agree consensus substantive reports (Meetings of States Parties); in neither case was the current author directly involved in any formal decisions or agreements. There would have been limits to what would be appropriate for a doctoral

7. Although these later meetings fall outside the direct scope of this thesis, the experience informed the writing of it.

8. The daily reports from the BWC meetings can be found at <<http://www.bwpp.org/reports.html>> and <<http://www.cbw-events.org.uk/bwc-rep.html>>.

9. The 2011 *Briefing Book* can be found at <<http://www.bwc2011.info>>.

thesis to be written on a decision-making process by somebody intimately involved in decisions within it.

In addition to BWC meetings, the author has attended numerous meetings connected with the Chemical Weapons Convention. These have included the Second and Third CWC Review Conferences in 2008 and 2013 respectively for which daily reports were produced.¹⁰ For the Third CWC Review Conference, the author was a member of the President of the Review Conference's informal advisory panel. A number of the annual CWC Conferences of the States Parties were also attended. As a number of personnel dealing with BWC issues also deal with CWC issues, this allowed for further useful interaction. As with the BWC, briefing books, known for the CWC as 'Resource Guides' for historical reasons too boring to outline here, were prepared by the author in association with former colleagues at the Harvard Sussex Program for the 2008 and 2013 Review Conferences.¹¹ As with the BWC books, these were financed by governments active in the CWC processes — the Netherlands, Portugal and the UK in the case of the 2008 edition and the UK for 2013.

During this period, the author attended a number of conferences, including many at Wilton Park and the February 2006 Tokyo seminar convened by the government of Japan to explore possibilities for the Sixth BWC Review Conference. The author was one of three experts engaged in 2009 by the European Commission to evaluate European Union expenditure to support effectiveness of the Chemical Weapons Convention.

There are inherent difficulties in ensuring there is sufficient academic detachment from processes in which a researcher is so familiar; a lack of detachment could lead to inadvertent bias. This is a similar risk to that which occurs in ethnographic studies. The analytical tools selected for the work within this thesis were specifically chosen to enhance objectivity. For example, the use of the compilations of suggestions at the Meeting of Experts reduces the risk of sub-conscious bias towards any particular political perspective within the meetings.

10. The daily reports from the CWC meetings can be found at <<http://www.cbw-events.org.uk/cwc-rep.html>>.

11. The 2013 *Resource Guide* can be found at <<http://www.cwc2013.info>>.

The frameworks of analysis

This thesis uses two frameworks of analysis through two approaches; the first top-down and the second bottom-up. Both use the inputs from the BWC inter-sessional meetings as the major data source.

One of the reasons for having two frameworks of analysis is due to the traditional boundaries between academic disciplines.

The tradition with studies of International Relations has been to treat states as ‘black boxes’ (or ‘billiard balls’) and to carry out studies at the level of analysis of international interactions. This simplification of the role of the state is legitimate in many studies in order to be able to achieve usable results in a required timeframe. However, the consideration of regime effectiveness, with its associated interaction between political entities and regimes, requires that this boundary between levels of analysis be breached, at least in part.

To take a hypothetical example, suppose a phenomenon or activity ‘A’ is to be examined in order to see how it influences ‘B’. In a straightforward case, any academic discipline that uses aspects of A as a unit or level of analysis can be used as a conceptual framework and B can be considered a black box. If, on the other hand, B has influence on A at the same time as A influences B, then considering B as a black box is likely to lead to misleading results. This may not be an issue if the chosen academic discipline uses aspects of B as a unit or level of analysis as well as aspects of A; but if A and B are not shared as a unit or level of analysis in the same academic discipline then this should be considered as a boundary condition and the starting point should be to examine the interaction from both sides and then compare the results.

If, for the purposes of analysis, this boundary between the national and the international is held as sacrosanct, a key point is missed as individuals involved in national policy formulation are also key players within regime processes. This crossover of individual participants is important in interactions between governments and regimes. In intergovernmental meetings, for example, members of national delegations take on key roles such as chairing plenary meetings and chairing committees. In regimes which

include an international organization, staff of that organization are often drawn from national delegations.

It therefore follows that a balanced consideration of influences that lead to policy and practical outcomes has to include investigation at both the national and the international level of analysis.

The top-down framework

The top-down framework of analysis derives from the elaboration of dimensions against which activities or proposals can be compared. As there is no unified conceptualization of effectiveness, such dimensions would need to be able to encapsulate any and all expressed observations of what might contribute to effectiveness within the regime.

The process of defining the dimensions was iterative with the proposed dimensions being refined as the task of comparing them with the inputs from the inter-sessional meetings and other literature.

Chapter 8 includes an attempt to develop understandings of aspects of the regime to control biological weapons which might enhance or diminish regime effectiveness. These aspects can be presented as dimensions for analysing regime effectiveness. For some of these dimensions it is possible to identify potential benchmarks or criteria for assessment of regime effectiveness. These dimensions, benchmarks and criteria are then tested against real policy suggestions put forward during inter-governmental meetings and assessed in relation to earlier writings on principles, norms and rules (i.e., obligations) identified in literature examining the regime.

The bottom-up framework

The bottom-up framework of analysis derives from the identification of obstacles to relevant national policy implementation.

As with the top-down framework, the process of defining the obstacles was iterative with the proposed obstacles being refined as the task of comparing them with the inputs from the inter-sessional meetings and other literature.

Chapters 7 and 9 propose and test a new method of examining obstacles to policy outcomes through the introduction of a conjectured idealised generic policy decision. This idealised generic policy decision may have policy analysis applications beyond examining national interactions with international regimes.

The inputs into the BWC meetings

The background to the Convention and the creation of the inter-sessional processes are given in Chapter 3.

As part of the BWC inter-sessional processes there were seven pairs of annual meetings in the period 2003-10 with each year discussing an allocated topic. For example the topic in 2004 was ‘enhancing international capabilities for responding to, investigating and mitigating the effects of cases of alleged use of biological or toxin weapons or suspicious outbreaks of disease’ and in 2008 was ‘national, regional and international measures to improve biosafety and biosecurity, including laboratory safety and security of pathogens and toxins’.

The Meeting of Experts in each year includes opportunities for BWC states parties to discuss the allocated topic(s) in a frank manner. The meeting secretariat prepares a collation of suggestions arising from the discussions which is published and this collation is then summarized in a *Synthesis Paper* that is presented to the Meeting of States Parties later that year. While the suggestions embodied in these documents will inevitably be biased towards the topics discussed in each meeting, collectively they represent the best compilation of indications of what BWC States Parties would consider to be policies or activities that could strengthen or enhance the regime — in other words, they are directly related to understandings of effectiveness.

The meetings in the periods 2003-05 and 2007-10 are known as the first and second inter-sessional processes, respectively as they are convened between the BWC Review Conferences, the sixth of which met in 2006 and the seventh in 2011.¹² Other than at the 2003 Meeting of Experts, the meeting secretariat has collated ‘considerations, lessons, perspectives, recommendations, conclusions and proposals put forward in presentations,

12. The Fifth Review Conference was convened in late 2001 but was unable to reach a conclusion so was suspended. When it was reconvened in 2002, it agreed the first inter-sessional process.

statements, working papers and interventions during the meeting'. This collation of suggestions was appended to the formal *Report of the Meeting* and later summarized into a *Synthesis Paper* presented to the Meeting of States Parties later that year. In 2003, the secretariat instead produced a 172-page compilation of statements and interventions in the Meeting of Experts.

Year	Meeting of Experts	Meeting of States Parties
2003	18-29 August	10-14 November
2004	19-30 July	6-10 December
2005	13-24 June	5-9 December
2007	20-24 August	10-14 December
2008	18-22 August	1-5 December
2009	24-28 August	7-11 December
2010	23-27 August	6-10 December

The reports of the Meetings of Experts¹³ are not only made available to participants in the meetings and to other officials of states parties, but are also made available online together with formal Working Papers submitted.

While the suggestions embodied in these documents are focused on the topics discussed in each meeting (listed below), collectively they represent the most comprehensive compilation available of indications of what it is that BWC states parties would consider to be policies or activities that could strengthen or enhance the regime — in other words, they are directly related to understandings of effectiveness. Although the meetings were of the BWC, many of the suggestions relate to the broader regime beyond the BWC itself.

13. The reports are: Report of the Meeting of Experts, BWC/MSP.2003/MX/4 (Part I), dated 18 September 2003, 10 pp; Report of the Meeting of Experts, BWC/MSP.2003/MX/4 (Part II) [Statements, Presentations and Contributions Made Available to the Chairman], dated 18 September 2003, 172 pp; Report of the Meeting of Experts, BWC/MSP/2004/MX/3, dated 11 August 2004, 56 pp; Report of the Meeting of Experts, BWC/MSP/2005/MX/3, dated 5 August 2005, 50 pp; Report of the Meeting of Experts, BWC/MSP/2007/MX/3, dated 3 September 2007, 30 pp; Report of the Meeting of Experts, BWC/MSP/2008/MX/3, dated 8 September 2008, 51 pp; Report of the Meeting of Experts, BWC/MSP/2009/MX/3, dated 16 October 2009, 42 pp; and Report of the Meeting of Experts, BWC/MSP/2010/MX/3, dated 8 September 2010, 38 pp. These documents are available via the UN online document server at <<http://documents.un.org>> as well as from the BWC Implementation Support Unit website at <<http://www.unog.ch/bwc>>.

The topics of the annual meetings

The topics under consideration in the various annual meetings have been as follows:

the adoption of necessary national measures to implement the prohibitions set forth in the Convention, including the enactment of penal legislation [2003]

national mechanisms to establish and maintain the security and oversight of pathogenic microorganisms and toxins [2003]

enhancing international capabilities for responding to, investigating and mitigating the effects of cases of alleged use of biological or toxin weapons or suspicious outbreaks of disease [2004]

strengthening and broadening national and international institutional efforts and existing mechanisms for the surveillance, detection, diagnosis and combating of infectious diseases affecting humans, animals and plants [2004]

the content, promulgation, and adoption of codes of conduct for scientists [2005]

ways and means to enhance national implementation, including enforcement of national legislation, strengthening of national institutions and coordination among national law enforcement institutions [2007]

regional and sub regional cooperation on BWC implementation [2007]

national, regional and international measures to improve biosafety and biosecurity, including laboratory safety and security of pathogens and toxins [2008]

oversight, education, awareness raising, and adoption and/or development of codes of conduct with the aim to prevent misuse in the context of advances in bio science and bio technology research with the potential of use for purposes prohibited by the Convention [2008]

with a view to enhancing international cooperation, assistance and exchange in biological sciences and technology for peaceful purposes, promoting capacity building in the fields of disease surveillance, detection, diagnosis, and containment of infectious diseases: (1) for States Parties in need of assistance, identifying requirements and requests for capacity enhancement, and (2) from States Parties in a position to do so, and international organizations, opportunities for providing assistance related to these fields [2009]

provision of assistance and coordination with relevant organizations upon request by any State Party in the case of alleged use of biological or toxin weapons, including improving national capabilities for disease surveillance, detection and diagnosis and public health systems [2010]

Analysing the suggestions

The compilations of the suggestions made in each meeting are substantial documents which are repetitive as some suggestions are made by more than one State Party; some others are no more than rhetorical debating points. In some cases the political nature of international diplomacy makes this inevitable. For example, if ‘Anywhere’ makes a statement, a member of that delegation may request that they would like to see a particular paragraph reflected in the suggestions compilation — notwithstanding that this paragraph boils down to a general statement — the meeting secretariat has essentially no choice but to accede to this.

With over a thousand suggestions being made, and therefore captured in the tabulation, it is beyond the scope of this tabulation to detail how every individual policy, activity or other suggestion enhances effectiveness in each particular dimension, merely to note that it does. However, sample entries from the tabulation are included in the relevant substantive chapters in order to illustrate the assessment under the dimensions and obstacles. A key point here is that the test being carried out for the top-down analysis is to evaluate the comprehensiveness of the proposed dimensions.

As noted earlier, as it took considerable time to collate and annotate these compilations of suggestions, there were ample opportunities to interact with practitioners to discuss possible subtleties of meanings of individual suggestions.

Additional sources

Aside from the contents of the official secretariat compilations of suggestions, there are other materials available during inter-sessional meetings.

At each of the meetings there is a chance (usually on the opening day) for delegations to make plenary statements. There is also a chance for non-governmental organizations to address an informal plenary session. In each case these statements can be wider-ranging than the topics allocated to the meeting and any points made that do not relate to issues on the agenda are not collated within the official compilation of the suggestions.

On the margins of each of the inter-sessional meetings there are side events organized by non-governmental bodies, national governments and inter-governmental bodies. These do not have to follow the strict agenda relating to topics under discussion in the plenary meeting room. Suggestions made within side events do not make it into the official compilations. However, as the author has been present at the vast majority of side events during the period, this thesis has been informed by them.

The Convention's five-yearly Review Conferences also have speeches made to them, working papers and background information documents submitted to them, and side events held on the margins. No official compilations of suggestions are made at Review Conferences. The author attended all days of the Review Conferences in 2006 and 2011.¹⁴

A number of countries have published policy papers on issues pertinent to the regime to control biological weapons. Examples include the UK's Green Paper on the BWC, published in 2002,¹⁵ and the US Presidential Action on strengthening biodefence measures signed in 2004.¹⁶ These have been used to inform the thesis.

In each case the information available has been used to ensure that the dimensions are comprehensive by checking that none of it falls outwith the dimensions collectively.

Document handling

Introduction

Documents from the BWC meetings, together with other relevant material, is held in a PDF library put together by the author. Documents within this library include:

- official documents produced by the meetings, such as reports, working papers, etc;

14. The author's *Daily Reports* from the 2006 and 2011 Review Conferences as well as from each of the Meetings of Experts and Meetings of States Parties since 2007 can be found at <<http://www.bwpp.org/reports.html>>. He also co-edited a *Briefing Book* for each of these Review Conferences. The 2011 edition can be found at <<http://www.bwc2011.info>>.

15. United Kingdom, *Strengthening the Biological and Toxin Weapons Convention: Countering the Threat from Biological Weapons*, Presented to Parliament by the Secretary of State for Foreign and Commonwealth Affairs, 29 April 2002, Cm 5484.

16. United States of America, *Biodefense for the 21st Century*, signed by the President, 28 April 2004.

- speeches and presentations published by those that have given them;
- press releases by participants;
- other relevant materials circulated within BWC meeting rooms and side events; and
- any other relevant materials identified such as official policy papers issued to national policy processes.

Finding documents

The two main ways of retrieving material in the Library is through using the search functions of the *Adobe Acrobat Catalog* index and *Lucerne* search software; each allows searches for any terms, or combination of terms, in any of the documents and their metadata.

Searching within files

The PDF library has a tremendous flexibility in allowing searches across any word in any document. This form of searching is known as ‘free text retrieval’ (FTR). FTR is extremely useful for words that do not crop up often, such as names of people and places. The great disadvantage of FTR is that it sometimes is not specific enough as searches will bring up results that are less useful as well as the sought after documents.

There are two systems of information that are added to documents in the Library to enhance searching that utilise the PDF standard metadata fields. The first is the creation of a consistent filenames protocol which allows immediate identification of the date and source of a document. The data in the filename is copied into the PDF document ‘title’ field. The second is a system of ‘topic codes’ added in the ‘keywords’ field of the PDF documents. However, any system of markers must be easy to use, both for initial indexing and for later retrieval.

Advantages and limitations from the methodological approach used in this thesis

There are both advantages and limitations to the approaches used within this thesis.

The key advantage is the breadth of coverage of input material. The annual Meetings of Experts allows for many chances for governments to raise issues. Moreover, as

governments are rarely unified actors (as in the third basic assumption identified earlier), the MXs allow entities within governments to highlight particular perspectives. This means that an aspect, such as an issue focused upon by a health ministry has a greater chance of being raised in an MX by an expert from that ministry than if that issue had to compete with others for space in a unified statement offered on behalf of a government as a whole. It is a reasonable assumption that issues related to implementation of the regime to control biological weapons identified within national policy processes would find an outlet at an inter-sessional meeting.

A further particular advantage is that the selection for the list of suggestions compiled by the secretariat is made with the agreement of the delegates in the room and therefore there is no risk of selection bias from the researcher.

A significant limitation is that the topics of the annual meetings were relatively specific, particularly during the first inter-sessional process; impact of this can be reduced by examining speeches — there were no restrictions on topics that could be raised in general debate speeches either in the Meetings of States Parties or at the Review Conferences. However, no formal compilations of suggestions were made during the MSPs or Review Conferences.

A further limitation is that there was some insertion of political or rhetorical statements within the selection of the suggestions at the request of the delegates that made them. This has been countered by identifying such statements and removing them from the analysis.

The structure of this thesis

Thesis structure issues

A conventional Social Sciences thesis follows a fairly predictable structure: Introduction — Review of the Literature — Methodology and Research Design — Data Analysis, Report Results — Discussion — Conclusion. There is some variation in where chapters relating to theory are positioned. For most topics that are entirely within the social sciences, such a structure is considered appropriate.

Within the Humanities thesis structures are more flexible, especially where studies are of an historical, philosophical or theoretical nature.

Perhaps the author that has explored structures of theses in greatest detail is John Swales.¹⁷ He identifies the conventional Social Sciences thesis structure as a ‘traditional’ PhD format. Swales highlights other thesis structures which he describes as being appropriate for relevant topics. For example, he describes an ‘article-compilation structure’ which assumes each of the substantive chapters has a certain level of self-containment along the Introduction, Methodology, Research, Discussion (IMRD) order within research articles and which follows the sequence: Introduction (definitions, justification, aims) — Literature Review (sometimes included in the introduction) — (General Methods) (optional) — IMRD — IMRD ... IMRD — Conclusions.

A further thesis structure he describes as a ‘topic-based structure’ which follows the sequence: Introduction — Literature Review — (Theoretical Framework) — Topic: Analysis-Discussion — Topic: Analysis-Discussion ... Topic: Analysis-Discussion — Conclusions. The advantage of this structure is that it is more able to accommodate subjects under consideration that cross traditional disciplinary boundaries.

In the end, a slightly hybrid form of the traditional thesis format has been adopted in order to best handle some of the material arising during research.

Disciplinary boundary issues

Traditional disciplinary boundaries can hinder a thesis such as this one.

Science tells us what we can know but what we can know is little and if we forget how much we cannot know we become insensitive of many things of very great importance. Theology, on the other hand induces a dogmatic belief that we have knowledge where in fact we have ignorance and by doing so generates a kind of impertinent insolence towards the universe. Uncertainty in the presence of vivid hopes and fears is painful, but must be endured if we wish to live without the support of comforting fairy tales.¹⁸

17. John M Swales, *Research Genres: Explorations and Applications*, Cambridge: Cambridge University Press, 2004), pp 314 + xii.

18. Bertrand Russell, *History of Western Philosophy*, (London: George Allen & Unwin, 1946), p 2.

Bertrand Russell was writing specifically about the contradictions between learned examination of the world through the application of scientific methods and the dogmatic belief represented by theology in all its forms. Theology is not the only realm in which dogmatic beliefs exist.

Dogmatic beliefs regarding boundaries between areas of academic research can hinder the development of new understandings. Rather than following dogmatic distinctions on areas of study, a thesis should be based on intelligent analysis drawing on data relevant to the Research Questions irrespective of the academic disciplines that the data arises from.

The logic within this thesis

The logic of the presentation of the issues and argument contained within this thesis is as follows.

The general sequence of argument outlined in the beginning of this chapter results in the organization of this thesis in the following chapters.

Chapter 1 ‘Introduction’ — this chapter is intended to fulfil a number of functions. First, to provide a description of the context and background of the subject matter of the thesis in order to illustrate why this area of study is of particular interest. The second purpose is to outline some assumptions that underpin the research that is to be done. This chapter also provides an opportunity to elaborate what this work seeks to achieve and where this work is intended to add value to existing understandings. Finally, the chapter includes an outline of the research problem and related research questions.

Chapter 2 ‘Context and background of the problem of biological weapons’ is intended to outline the context and background of the problems posed by biological weapons, including identifying why biological weapons have particular characteristics that make them distinct within the field of so-called weapons of mass destruction — a class of weapons itself distinct from other weapons. A starting point for this is to understand weapons of mass destruction as a whole, together with political understandings relating to them. From there it is possible to distinguish the particular context and background of the problems posed by biological weapons.

Chapter 3 'Efforts to control biological weapons' examines how efforts have been taken to control biological weapons and outlines the regime to control them, including a review of how this regime has been understood in the academic literature and in other documents in relation to the developments within the regime to control biological weapons. The chapter examines components of the regime as well as implementation of the regime. Obligations within the regime to control biological weapons are identified and discussed. Having established that earlier literature regarding the regime to control biological weapons does not contain within itself the answers to the challenges posed by the research problem, there is therefore a need to examine what other sources might be used to provide such answers.

Chapter 4 'Use of the concept of effectiveness within the regime to control biological weapons' examines interactions about effectiveness within the regime to control biological weapons, primarily within texts from international meetings relevant to the regime and within the text of the Biological Weapons Convention itself. The Chapter also illustrates why 2001 was a watershed; not simply for general international interactions relating to the regime to control biological weapons but in particular interactions relating to effectiveness. A further aim of this Chapter is to provide some basic quantitative results on the use of 'effectiveness' and related terms in documents from meetings of the Biological Weapons Convention.

Chapter 5 'Conceptual Framework' presents background to theory relevant to investigating the research problem and related research questions. This chapter indicates the relevance of particular disciplines to the subject matter of this thesis and illustrates why it is not possible to carry out this study within a single discipline. This chapter and the following two chapters were originally one large chapter but were separated to enhance the flow of the argument within this thesis.

Chapter 6 'Theories regarding international regimes' presents a review of literature in relation to Regime Theory as well as other theories of international relations and international governance. The concept of regime effectiveness and the different theoretical understandings that have been developed in this area are explored. The limitations of the use of Regime Theory and related theoretical work in examining regime effectiveness are examined.

Chapter 7 ‘Theories regarding national policy processes’ outlines previous approaches to understanding national policy processes. The limitations of approaches examining influences in favour of particular policy outcomes are explored. A new method of examining obstacles to policy outcomes is proposed through the introduction of a conjectured idealised generic policy decision. This chapter includes some overall conclusions relating to theories.

Chapter 8 ‘Creation of a new framework for analysing “effectiveness” in the context of this thesis’ proposes dimensions along which aspects of success or failure within the regime might contribute to or diminish regime effectiveness. The analysis leading to the creation of this framework includes an examination of how many dimensions of success/failure should be considered. These dimensions have associated variables that can be used as the basis for further analysis. The identified dimensions are examined in comparison with suggestions for strengthening the regime made during meetings of the BWC inter-sessional processes. The identified dimensions are also contrasted with identified principles, norms and rules (i.e., obligations) within the regime to control biological weapons. While this chapter is a system-level examination of regime effectiveness, an understanding of interactions between regimes and other governance systems allows for a more informed understanding of how regimes may be considered to be effective. Tabulations of the testing of the dimensions against policy proposals are provided in Volume II.

Chapter 9 ‘Analysing obstacles/hindrances to “effectiveness” within policy processes and regime contributions to diminishing or reinforcing them’ takes the conjectured idealised generic policy decision proposed in Chapter 7 and uses it to examine the context of the regime to control biological weapons. Using selected materials from the BWC meetings and elsewhere to analyse obstacles to regime effectiveness and how the regime might contribute to overcoming them becomes a tool to connect aspects of the two elements of the frameworks of assessment used within this thesis.

Chapter 10 ‘Conclusions’ draws together the themes developed within the thesis and includes sections on what novel aspects the research has brought forward, limitations within the research and possibilities of future research.

Volume II contains the tables of comparison of the proposed dimensions with suggestions made at the BWC Meetings of Experts for strengthening the regime to control biological weapons.

What is hoped to be achieved in this thesis

There are a number of aims of this thesis, which will be dealt with here from the general to the specific. The broad, general contextual aim of this thesis is to contribute to an improved understanding of the control of dual-use materials and technologies that might contribute to a biological weapons programme. Many of the conceptual and implementation issues that relate to the control of dual-use biological materials and technologies have some applicability in other areas of dual-use control. As relevant materials and technologies are widely spread across a number of industries in a considerable number of countries, many of which are both major producers and major consumers of dual-use materials and technologies. There is, therefore, a large number of relevant actors who may benefit from a better comprehension of what effectiveness of controls in this area means. As ‘Regime Theory’ is the framework within which arrangements to control dual-use risks and threats are often discussed, this body of theory was a logical starting point for this thesis. However, the limitations inherent in this body of thinking, once identified and elaborated, meant a new framework of assessment for effectiveness needed to be developed.

Inevitably, given the nature of a PhD project, the contribution of this thesis toward these general aims is likely to be modest.

Value added in specific areas

There are specific areas in which it is hoped that this thesis will bring particular added value.

The existing literature is weak on understanding regime effectiveness in general terms and on success or failure in a regime like that to control biological weapons in particular. Much focuses on how ‘robust’ a regime is, rather than its effectiveness. Much of the assessment of effectiveness relates to whether a regime enhances cooperation between states, rather than whether the regime is effective at achieving its objectives. Much

literature is focused on individual legal instruments rather than the broader regimes. Some analysis relies on highly contested techniques such as the use of counterfactual scenarios. Other analysis looks at regime effects in individual states involved in a regime. Taken with the new frame of reference resulting from the dual-use nature of the biological weapons problem, new measures for assessing effectiveness will need to be developed. This thesis contains some suggestions for new measures that may help future analyses of this and similar regimes.

The Research Problem and Research Questions

As noted earlier in this Chapter, the Research Problem that this thesis seeks to resolve can be defined in the following terms:

How should success or failure, and therefore ‘effectiveness’, in a regime such as that to control biological weapons be categorised and assessed?

This thesis will propose dimensions through which effectiveness can be assessed.

This thesis is based on the assumption that there is a real world out there and that human actions contribute to it, but that these actions are always within a context of arrangements and processes that are themselves human constructs.

This thesis is a multidisciplinary project and therefore it is not possible to draw from a single strand of literature. Issues of governance, law and norms — on international as well as domestic scales — as well as of scientific and technological developments enter any analysis of effectiveness of a regime such as that to control biological weapons.

Tackling the research problem

This research problem will be tackled through two research questions. The first of these is:

How can the concept of ‘effectiveness’ in relation to the regime to control biological weapons be broken down into separate dimensions in order to create a more rigorous framework of assessment?

The dimensions identified in Chapter 8 of this thesis are: threat ambition (the carrying out of activities or policies that run counter to the regime); engagement/coherence within the

regime; technology availability/opportunity; and resilience of the regime to adverse events.

It is possible to refine and test these dimensions by comparing them with two particular external bodies of text: proposals for strengthening and enhancing the regime that have been raised through the BWC inter-sessional processes; and analytical writings on the principles, norms and rules of the regime to control biological weapons.

The selected case study of the regime to control biological weapons thus becomes a ‘disciplined configurative’ study, as defined by Eckstein. As George and Bennett note:

A disciplined configurative case can contribute to theory testing because it can ‘impugn established theories if the theories ought to fit it but do not’, and it can serve heuristic purposes by highlighting the ‘need for new theory in neglected areas’.¹⁹

This Research Question has two sub-questions:

Can the possible benchmarks or criteria suggested for use within this assessment of regime effectiveness be related to the considerations, lessons, perspectives, recommendations, conclusions and proposals put forward in presentations, statements, working papers and interventions during meetings of the BWC inter-sessional processes?

Can the possible benchmarks or criteria suggested for use within this assessment of regime effectiveness be related to principles, norms and rules (i.e., obligations) within the regime?

The comparison with proposals for strengthening and enhancing the regime that have been raised through the BWC inter-sessional processes will be of particular significance. The proposed dimensions for evaluating effectiveness can be set against these suggestions to establish whether the dimensions capture all of the suggestions — if they do not, then modification to the existing dimensions or an additional dimension might have to be considered — and whether the dimensions can be used to indicate relative effectiveness of different proposals.

19. Alexander L George and Andrew Bennett, *Case Studies and Theory Development in the Social Sciences*, BCSIA Studies in International Security, Cambridge, MA: MIT Press, 2005), 331 + xv pp at p 74, citing Harry Eckstein, ‘Case Studies and Theory in Political Science’, in Fred Greenstein and Nelson Polsby (eds.), *Handbook of Political Science*, vol. 7, (Reading, MA: Addison Wesley, 1975), pp 79-138 at p 99.

The second Research Question tackled in this thesis is:

Can analysis of policy processes within governmental structures identify whether activities within the regime to control biological weapons impinge upon such policy processes?

This Research Question has a specific sub-question:

Can the selected policy analysis methods indicate how obstacles to policy development be overcome using the considerations, lessons, perspectives, recommendations, conclusions and proposals put forward in presentations, statements, working papers and interventions during meetings of the BWC inter-sessional processes?

The proposals for strengthening and enhancing the regime that have been raised through the BWC inter-sessional processes as used for the first Research Question collectively represent the best compilation of indications of what BWC States Parties would consider to be policies or activities that could strengthen or enhance the regime. Using these in a second manner to examine domestic policy processes allows for a better understanding of whether they contribute to regime effectiveness.

The initial intention was to examine in some detail the policy processes within a selection of states which might be considered useful examples to verify whether the regime was truly having an impact on decision making. However, the generic policy decision analytical technique appears to be sufficient, when compared with the author's previous experience in national policy processes, to render an accurate illustration of the relevant issues.

Triangulation of the results of the two research questions will allow for the drawing of conclusions as to how effectiveness of the regime is understood by the participants in the regime to control biological weapons and provide an evidence base to substantiate these findings.

2. Context and background of the problem of biological weapons

The regime to control biological weapons does not exist in isolation. Biological weapons form one category of ‘weapons of mass destruction’ (WMD) and understandings of the issues surrounding biological weapons are influenced by more general WMD issues. Moreover, as the study of WMD issues is dominated by the study of issues related to nuclear weapons, application of general WMD understandings to the field of biological weapons can lead to misleading results. The primary responses to WMD issues on an international scale has been through non-proliferation, arms control and disarmament (NACD) measures which contribute to the relevant regimes. It is only once these issues have been examined that it is possible to present existing understandings of the regime to control biological weapons in a proper context.

This chapter is intended to outline the context and background of the problems posed by biological weapons, including identifying why biological weapons have particular characteristics that make them distinct within the field of so-called weapons of mass destruction (WMD) — weapons that are themselves distinct from other weapons.

A starting point for this is to understand weapons of mass destruction as a whole, together with political understandings relating to them. From there it will be possible to distinguish the particular context and background of the problems posed by biological weapons in the following chapter.

Weapons of Mass Destruction

The term ‘weapons of mass destruction’ is commonly understood to encompass biological, chemical and nuclear weapons. In some contexts, including the context of this thesis, the term is also used in its broadest sense to include possible delivery systems for these weapons such as ballistic missiles. However, there are a number of distinctions between the types that should be elaborated in order to better understand them. In particular, an understanding of the distinctive nature of biological weapons will help reinforce this choice of case study.

History and context of the term WMD

Examining the history of the term ‘weapons of mass destruction’ is a worthwhile activity as it is an illustration of how ‘conventional wisdom’¹ can impede understanding of events as few researchers go back to the source materials.² However, it must be noted the use of the term has not been consistent.³

On 5 September 1947 the United Nations Commission for Conventional Armaments debated definitions of ‘weapons of mass destruction’. This debate arose in the third meeting of the Working Committee of the Commission which found it needed to clarify its terms of reference which were essentially to consider all armaments that were not weapons of mass destruction. The majority of the working committee was of the opinion that the best way to arrive at a definition of conventional armaments would be to start by defining weapons of mass destruction.⁴ Four days later, a resolution was adopted which read:

The Working Committee resolves to advise the Security Council ... that weapons of mass destruction should be defined to include atomic explosive weapons, radio active material weapons, lethal chemical and biological weapons, and any weapons developed in the future which have characteristics comparable in destructive effect to those of the atomic bomb or other weapons mentioned above.⁵

This resolution was not published as a formal UN document until July 1948, and it was formally adopted by the Commission a month later, hence this definition is often referred to as the ‘1948 definition’.

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1. There is so much mythology surrounding WMD issues that is taken by some analysts as literal truth that such research takes on an almost euhemeristic character. The statement, reportedly by Napoleon Bonaparte, that ‘History is a set of lies that people have agreed upon’ is apt in dealing with some of these issues.
 2. Another classic item of misleading conventional wisdom is that the United Nations was founded in 1945. While the Charter was indeed signed that year, the UN itself dates from 1 January 1942 and is based on the eight principles elaborated in the Atlantic Charter of 14 August 1941.
 3. One account of the history of the term WMD, particularly in the context of US Government activities, can be found in: W Seth Carus, ‘Defining “Weapons of Mass Destruction”’, *Occasional Paper 4*, Center for the Study of Weapons of Mass Destruction, National Defense University [Washington, D.C.], pp 49 + xii.
 4. Working committee of the United Nations Commission on Conventional Armaments, Summary record of the third meeting held at Lake Success, New York, 5 September 1947, UN doc. S/C.3/SC.3/SR.3, dated 6 September 1947.
 5. *Letter from the Chairman of the Working Committee of the Commission on Conventional Armaments addressed to the Chairman of the Commission on Conventional Armaments and enclosed resolution*, [letter dated 9 September 1947], UN doc. S/C.3/24, dated 28 July 1948.

Distinctive characteristics of biological weapons / deliberate disease

A biological weapon is one that works through the disease-causing or ‘pathogenic’ effects of organisms. Disease might be caused by the actions of a micro-organism itself or by the effects of substances produced by living things. Such substances are known as ‘toxins’.⁶ Toxins, being toxic chemicals, may also be counted as chemical weapons.⁷ Sometimes the production of a toxin happens within the host, for example in a disease such as anthrax.⁸

Biological warfare — whether by a state, a non-state group or as a criminal act — stems from any attempt to induce disease in an enemy. It has a history that goes back even before the discovery of micro-organisms or the development of germ theory, when diseased carcasses of animals would be catapulted into besieged cities and castles with the hope of spreading the affliction. In other words, biological warfare is the deliberate inducement of disease for hostile purposes — ‘deliberate disease’ in short.

For a number of decades the term ‘bacteriological warfare’ was used as bacteria were the only clearly identified class of microbes. When the science had become clearer, the usage ‘bacteriological (biological) warfare’ became common to ensure that there was no ambiguity that this included other microbes such as viruses and fungi. This term was adopted for use in texts such as UN General Assembly resolutions.⁹ Over time, this has simply become ‘biological warfare’.

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6. Some commentators make specific distinctions between biological weapons and toxin weapons. See, for example, Erhard Geissler (ed.), *Biological and Toxin Weapons Today*, (Stockholm/Oxford: SIPRI/OUP, 1986), pp 4-7.
 7. Some definitions have referred specifically to diseases caused by micro-organisms and toxins derived from them which would therefore exclude ricin (derived from castor beans) or other toxins such as snake venom. Use of this tighter definition has fallen out of favour.
 8. The disease anthrax arises from the production of two toxins by *Bacillus anthracis* in a mammalian host. However, these toxins are not suitable as weapons in themselves as they can only enter cells to produce their pathogenic effect if they are in combination with a particular protective antigen also secreted by *B anthracis*.
 9. It should be noted, however, that the adoption of this term was the focus of much argument on the sidelines of the General Assembly, with disagreements between the UK, USA and USSR. See, for example, Airgram from the US Mission to the United Nations to the Department of State (Drafted by Alan F. Neidle, David L. Aaron, and Richard L. McCormack on 21 December, and cleared by Peter S. Thacher, Committee I Executive Officer), 24 December 1968, Department of State, Central Files, DEF 18-6, marked ‘Confidential’ in the original text.

There has been a variety of additional terms used to describe biological warfare over the years, for example, ‘microbial warfare’, ‘microbiological warfare’ and ‘germ warfare’. These terms are essentially synonymous.

Pathogenic microbes used as biological agents have particular characteristics, not least because they are living organisms. This means that they can reproduce. For infectious diseases, anyone who is infected becomes a host within which more of the pathogen is produced. It also means that, compared with nuclear or chemical weapons, only a small quantity of active biological agent is required. For diseases such as smallpox, each host can infect more people, but for others such as anthrax, the possibilities for human-to-human infection is extremely limited.

It must be stressed that there is a great deal of difference between a biological agent and a biological weapon. For an agent to be used as a weapon it has to be distributed in such a way as to cause disease in the intended victims. Therefore a biological warfare programme is not limited to production of agents, but also to their methods of delivery. While effective dispersal of biological agents is not simple, it would be within the reach of the majority of states which have the technical capability to produce biological agents. In addition there are doctrinal considerations to be taken into account — is it worth producing a biological warfare capability without training forces in how to use it and without putting into place a decision-making process regarding the circumstances it might be used in?

In summary, the use of biological weapons — whether in warfare or as a terrorist or criminal act — is nothing more than the deliberate inducement of disease, possibly using materials and technologies that may also be obtainable for peaceful purposes. Countering this therefore includes questions of public health and reduction in the threat of all disease. There is much common ground in responses to outbreaks of disease, whether they stem from natural, deliberate or accidental (such as a laboratory incident) causes.

Non-proliferation, Arms Control and Disarmament (NACD) Regimes

Regimes to control weaponry, together with associated materials and technologies, fall within three overlapping types — non-proliferation, arms control and disarmament. As the overlaps between these three types can be significant, they are often referred to

collectively. There is no consensus on the precise definitions of these terms and policy implications. It should be noted that there are times when one or other of the terms is used, perhaps inadvertently, as a shorthand for all three types of regime.

The distinctions between non-proliferation, arms control and disarmament become significant when questions of effectiveness are evaluated. As will be noted in Chapter 6, in any system of assessment there is a requirement to have a benchmark of what could have been achieved in order to measure real progress against it (see page 164). It is therefore important to understand what the limits are in each of these types of regimes.

This section briefly examines the distinctions between these types of agreements and then examines some common elements such as verification and decisions on non-compliance.

To put the distinctions in the broadest context, it is a common simplification to consider that the concept underpinning disarmament is that the weapons are the problem and so must be eliminated, that underpinning arms control is that weapons are a problem to be managed, and that underpinning non-proliferation is one of concerns of the wrong weapons being in the wrong hands. However, as will be illustrated below, each of these descriptions oversimplifies the concepts such that important nuances are lost.

It is also worth noting that there are particular contexts within which these terms carry overtones. For example, the term disarmament has been very closely associated with the United Nations. Another example is the connection of the term non-proliferation with the NPT and its nuclear haves and have-nots, leading to an association with concepts of discrimination. This is further illustrated by the difference of opinion in the negotiations for the Comprehensive Test Ban Treaty (CTBT) over the role of the treaty as either a disarmament or non-proliferation measure. The holdout states (India, Israel and Pakistan) saw the treaty as a step towards nuclear disarmament, while the nuclear-weapon states (China, France, Russia, UK, and USA) saw the treaty as a means to bring the holdout states into the non-proliferation regime.¹⁰ This was the focal point of the disagreement

10. Richard Guthrie, 'Significant Multilateral NACD Agreements: the scope and challenge of implementation', in J. Marshall Beier and Steven Mataija, *Cyberspace and Outer Space: Transitional Challenges for Multilateral Verification in the 21st Century*, York Centre for International and Security Studies, 1997, pp. 41–52. The author was in attendance for the

over provisions in the negotiated text which remains a key issue in preventing that treaty's entry into force.¹¹

Non-Proliferation

The basic concept of the term proliferation is that of spread or development and therefore the concept of non-proliferation is to reduce the possibility of such spread or development. The concept derives from the biological sciences and was later applied to issues relating to the spread of weapons.

The *Oxford English Dictionary* provides the following example of usage from the *Daily Chronicle* of 2 December 1905:

The theory of the Imperial Cancer Research Committee that cancer is entirely due to the proliferation of cancer cells, and that to stop this proliferation would be to cure cancer.¹²

In its biological sense, the term proliferation embodies an implicit understanding that the proliferation spreads from something that exists. When the term was first achieving prominence in its use in relation to nuclear weapons, the proliferation was indeed also spreading from something that existed, whether 'horizontal proliferation' — the spread of nuclear capabilities to new countries — or 'vertical proliferation' — the development of more advanced capabilities within a country that already had nuclear weapons.

When used in relation to biological weapons the situation is slightly more complicated as there are no declared biological weapons programmes being carried out by any government in the world,¹³ although Syria did acknowledge that as part of its chemical weapons programme it had researched the properties of ricin, a toxin which falls within the definitions of both biological and chemical weapons.¹⁴ The concept of proliferation

penultimate week of the CTBT negotiations.

11. Indeed, India did not join the consensus for the adoption of the CTBT text in the Conference on Disarmament in 1996.
12. As cited under the entry 'proliferation' in the *Oxford English Dictionary*, 2nd edition, (Oxford: Oxford University Press, 1989), vol XII (Poise-Quelt), p 606.
13. This does not rule out the possibility of undeclared biological warfare programmes. The number of possible or potential undeclared programmes has been reduced by at least two in the last decade with the cessation of the Libyan research efforts and the removal of Saddam Hussein.
14. 'On 14 July 2014, the Syrian Arab Republic submitted a further amendment to its initial declaration submitted on 23 October 2013. In the amendment, the Syrian Arab Republic declared as a CWPF [chemical weapons production facility] a facility for the production of ricin. The newly declared

in this circumstance relates more to new countries acquiring a capability for biological weapons rather than the materials and technologies spreading from one country to another.

Some forty years ago, Robert Neild highlighted the differences between non-proliferation and disarmament with reference to the nuclear Non-Proliferation Treaty which was about to be opened for signature:

[the NPT] is not a disarmament measure. ... What it does is to invite non-nuclear countries, most of whom do not want to go nuclear anyway, to abstain from doing so, and to propose a system of restraints on the supply of fissile material which will make it harder than before for most non-nuclear powers to go nuclear. The main point, however, is that non-proliferation ... seems unlikely to be effective for long if the great powers do not do something to stop their arms race. Otherwise it will simply be a measure that confirms the nuclear dominance of the existing nuclear powers.¹⁵

Arms control

An arms control agreement is premised on the assumption that some of the participating countries possess, or have possessed in the past, the weapons or objects that are the subject of control. Arms control thus involves a slightly different approach to that of non-proliferation, notwithstanding that for a country that did not possess any items prohibited under a treaty, there would be little distinction between the effects of an arms control or a non-proliferation treaty on the internal activities of that country.¹⁶

The concept of arms control became highly theorised during the Cold War period, although this analysis often neglected or dismissed arms control efforts in the inter-war years. Most published work, much of which originated in the United States, was heavily focused on nuclear weapons and the Cold War superpower rivalry.

facility is subject to verification and destruction, although it is located in an area that is not under Syrian Government control. According to the amendment, the entire quantity of ricin produced was disposed of prior to the entry into force of the [Chemical Weapons] Convention for the Syrian Arab Republic.' Director-General, 'Progress in the elimination of the Syrian CW programme' [10th report], OPCW, EC-M-44/DG.1, 25 July 2014, para 4(b). The report is also reproduced as an annex to the UN Secretary-General's report contained in document S/2014/533, dated 25 July 2014.

15. Robert Neild, *What Has Happened to Disarmament?*, David Davies Memorial Institute of International Studies Annual Memorial Lecture, April 1968.
16. There may, however, be significant implications for the external activities or foreign policy of a country in this situation as there may be greater domestic political support for a treaty that treated all states equally rather than one that allowed some states to retain types of weapons or objects that are prohibited to others.

Two American analysts, Halperin and Schelling, established three critical criteria for successful arms control that are often cited: increased stability; reduced potential for destruction; and decreasing the cost of defence policies and postures. These authors noted:

We believe that arms control is a promising, but still only dimly perceived, enlargement of the scope of our military strategy. It rests essentially on the recognition that our military relation with potential enemies is not one of pure conflict and opposition, but involves strong elements of mutual interest in the avoidance of a war that neither side wants, in minimizing the costs and risks of the arms competition, and in curtailing the scope and violence of war in the event it occurs.¹⁷

Arms control can lead to a reduction in weapons, and therefore to partial disarmament. However, arms control measures can also include numerical ceilings on treaty-limited items that do not require any party to remove such an item from service or destroy it. This situation is more accurately referred to as ‘arms limitation’.

Disarmament

Disarmament can best be summarized as a case of arms control leading to zero for a particular class of weapon or other controlled item.

The concept of disarmament evolved during the twentieth century.¹⁸ In particular, in the decades immediately following the Second World War, the concept of ‘general and complete disarmament’ was predominant in international diplomacy. For example, UN General Assembly resolution 1378 (XIV), adopted on 20 November 1959, referred to an aim of ‘general and complete disarmament under effective international control’. However, this ambitious target proved impossible to achieve. The final efforts towards general and complete disarmament through the adoption of one international arrangement came with the agreement between the United States and the Union of Soviet Socialist Republics of the the McCloy-Zorin Principles¹⁹ which noted that ‘disarmament is general

17. Thomas C Schelling and Morton H Halperin, *Strategy and Arms Control*, (New York: Twentieth Century Fund, 1961), 148 pp at p 1.

18. See, for example, Victor Lefebure, *Scientific Disarmament: A Treatment Based on the Facts of Armament*, (London: Victor Gollancz, 1931), 320 pp; and Dick Richardson, *The Evolution of British Disarmament Policy in the 1920s*, (London: Pinter, 1989), 265 + vi pp.

19. The McCloy-Zorin Principles were a set of criteria for disarmament agreed by the USA and USSR and published on 20 September 1961. The Principles specifically included ‘elimination of all stockpiles of nuclear, chemical, bacteriological, and other weapons of mass destruction, and the

and complete and war is no longer an instrument for settling international problems' and called for phased reductions of weapons and an 'International Disarmament Organization' with wide inspection powers to carry out verification. Notwithstanding the agreement of principles, no treaty resulted from these proposals.

The move away from 'general and complete disarmament'

In the early 1960s, emphasis was moving away from general and complete disarmament to means by which parts of this problem could be solved. These means became known as 'collateral measures', the most famous of which is the 1968 nuclear Non-Proliferation Treaty.²⁰ Other collateral measures included proposals for a fissile material cut-off, prohibitions on nuclear testing, establishment of nuclear-weapon-free zones (including outer space and the sea bed), and a non-aggression pact between the two power blocs. Bans on biological and chemical weapons were also put in this group. Over twenty proposals for collateral measures were put to the Eighteen Nation Disarmament Committee (ENDC) in the early 1960s. Nonetheless, resolutions were still being passed by the UN General Assembly on general and complete disarmament, such as resolution 2602E (XXIV), adopted on 16 December 1969 which also added the phrase 'strict and' thus referring to an aim of 'general and complete disarmament under strict and effective international control'.

Of the still relevant collateral measures listed above, only the fissile material cut-off has not been achieved.²¹ Moreover, much of the early work on such a cut-off was predicated on the assumption that a nuclear-weapon-free world had already been achieved, for example:

cessation of the production of such weapons'.

20. While many commentators date the genesis of the Non-Proliferation Treaty with the adoption by the United Nations General Assembly of resolution 1665 (XVI) [the 'Irish resolution'] on 5 December 1961, this resolution was borne by a frustration that negotiations on disarmament measures were taking too long and that delays in disarmament could lead to widespread proliferation of nuclear weapons. It may be argued that the adoption of the Irish resolution was a milestone on the passage from 'general and complete' measures to 'partial' or 'collateral' ones.
21. The requirement for a non-aggression pact between the two power blocs could be said to have become irrelevant since the end of the Cold War. The Comprehensive Test Ban Treaty was opened for signature in September 1996, but is not yet in force. While prospects for CTBT entry into force do appear to be hampered it is worth noting that this sort of statement has been regularly made about several treaties. For example, 'It is by no means certain that the Non-Proliferation Treaty will ever enter into force' — Mason Willrich, *Non-Proliferation Treaty: Framework for Arms Control*, The Michie Company, 1969; the author was a former Assistant General Counsel in the US Arms Control And Disarmament Agency.

[This paper] assumes that an international agreement would have been reached that no country should manufacture or retain nuclear weapons, and that the Control Organization's duty would be to ensure that such an agreement was demonstrably being adhered to.²²

Common threads and particular issues

Systems of verification under NACD regimes

Most NACD regimes include some form of verification system or a means of raising compliance issues within them. As will be seen later, verification has been a controversial issue in the regime to control biological weapons. All successful systems of verification for international regimes share certain characteristics:

- they contain a coherent system of measures that complement one another;
- they gather relevant information on activities related to the instrument(s) being verified; and
- they are each contained within a framework that allows information gathered to be used as required, in a timely manner, to promote confidence and compliance with the instrument(s) being verified, or to indicate that non-compliance has taken place.

It is only when all of these are fulfilled that any verification system can satisfy the political and security concerns of its participants.

Historically, verification systems have been regarded in a similar way:

A system of safeguards cannot be adequate unless it possesses the following characteristics:

- (a) It is technically feasible and practicable;
- (b) It is capable of detecting promptly the occurrence of violations;
- (c) It causes the minimum interference with, and imposes the minimum burdens on, any aspect of the life of the individual nations.²³

The Chemical Weapons Convention contains its own verification arrangements through its Organization for the Prohibition of Chemical Weapons (OPCW). The NPT

22. United Kingdom, *The Technical Possibility of International Control of Fissile Material Production*, ENDC/60, 31 August 1962.

23. United Nations Commission for Conventional Armaments, August 1948. *Note*: in this period the uses of the terms 'verification' and 'safeguards' are almost indistinguishable; almost all verification proposals are based on calculating material balances and inspection. However, as organisms can reproduce and die, material balance as a technique has limitations in the biological field.

requires States Parties to have safeguards arrangements with the International Atomic Energy Agency (IAEA). Neither the BWC nor the Geneva Protocol has any formal verification and compliance mechanisms or institutions associated with it.

Breakout issues

The elimination of an entire class of weapon brings with it particular problems. The potential for one state to be able to possess a prohibited weapon after all other similar weapons have been destroyed is of greatest concern with regard to any form of disarmament. Breakout could take one of two forms: (i) the concealment of existing weapons during the disarmament process; and (ii) the manufacture of new weapons.²⁴ This is of particular concern where possession of prohibited weapons could lead to a strategic imbalance, such as in processes of nuclear disarmament.²⁵ It is worth noting that, as the nuclear-weapon states (as defined within the NPT) have all foresworn the possession of the other forms of weapons of mass destruction, these states would have a greater concern that a regime for nuclear disarmament is complied with.²⁶

A second decision for a state wishing to breach its treaty obligations and implement a breakout capability would be to choose whether to carry out prohibited activities at an undeclared facility or to carry out prohibited activities under the cover of declared, peaceful activities.²⁷

24. As there has been no formal case of biological disarmament under the BWC the concealment of existing weapons might be thought of as less likely. However, two countries, Iraq and Russia (and prior to that the USSR), have made formal acknowledgement in one form or another to having carried out activities that are considered by most analysts to be contrary to Article I of the BWC at one time or another.

25. For a discussion of the implications of breakout see Robert Neild, 'Cheating in a Disarmed World', *Disarmament and Arms Control: An International Quarterly Journal*, vol I, no 2, Autumn 1963.

26. It has been clear that there has been considerable interplay between weapon of mass destruction types in the policy formulations of the nuclear-weapon states. For example, it is not just coincidence that the UK renounced chemical weapons at the same time as its nuclear weapon programme reached a certain level of maturity. This form of reasoning may also have been a factor in the renunciation of chemical weapons by India in 1997. It was certainly a factor in the UK's termination of its offensive chemical programme in 1956.

27. For a discussion on how this choice might be made by a non-compliant state and how verification regimes can make either form of breakout far more difficult, see Douglas J MacEachin, 'Routine and Challenge: Two Pillars of Verification', *The CBW Conventions Bulletin*, 39, March 1998, pp 1-3.

Verification is a key element of disarmament arrangements and normally has an enhanced role in any such arrangement compared with non-proliferation and arms control arrangements:

major states will not disarm and remain disarmed without adequate verification that other states are doing the same. Any government therefore which is sincere in seeking an honest and lasting agreement on disarmament will accept as well as require adequate international verification that obligations are being loyally observed. Since this cannot be one-sided, willingness to accept adequate international verification is the real test of the sincerity of any government about disarmament.²⁸

The above words were written as the last global discussions on a WMD-free world were coming to an end. At the time, the major states of the world were looking at the issue of 'general and complete disarmament', of which a world free of WMD was a major component. The issues relating to disarmament were similar as the world moved on to controls relating to specific types of weapons.

The increased verification efforts required for increased disarmament (and therefore the smaller number of weapons of a particular type) is illustrated by the 'Wiesner curve':

The level of intensity of inspection to monitor a disarmament agreement is in some way proportional to the degree of disarmament. In other words, the more completely weapons of all kinds are eliminated the greater will be the necessity for an inspection system sufficiently sensitive to discover small discrepancies in the size of remaining forces.²⁹

Decisions on non-compliance

All major post-war multilateral non-proliferation, arms control and disarmament treaties have mechanisms to use the United Nations Security Council as final arbiter as to whether any case of non-compliance with treaty obligations has occurred. However, without a clear understanding of what should be done in the case of non-compliance, any NACD

28. Sir Michael Wright GCMG, *Disarm and Verify: An Explanation of the Central Difficulties and of National Positions*, Chatto & Windus, 1964, p x. The author was British Delegate to the Test Ban and Disarmament Conferences 1958–63.

29. Jerome B. Wiesner, 'Inspection for disarmament', in Louis Henkin (ed.), *Arms Control, Issues for the Public*, Columbia University/Prentice Hall, 1961, pp 112–40. See also his article 'Comprehensive arms-limitation systems' in Donald G. Brennan (ed.), *Arms Control, Disarmament, and National Security*, George Braziller, 1961, pp 198–233. For a more recent interpretation of Wiesner's work, see Allan S. Krass, 'Nuclear verification in the post-Cold War era', in John B. Poole & Richard Guthrie (eds.), *Verification 1993*, VERTIC/Brassey's, 1993, pp. 69–76.

regime is fundamentally weakened.³⁰ An unanswered question is what should happen if key states in an alleged treaty violation are permanent members of the Security Council with a power of veto.³¹

In the case of the BWC, complaints of non-compliance with the Convention can be made to the Security Council under Article VI and assistance provided under Article VII if the Council decides there has been a violation of the Convention.

NACD regime conclusions

It is clear that NACD regimes have long been seen by political authorities as having to be effective in order to have support — hence the resolutions on ‘effective’ or ‘strict and effective’ international control. Yet there is rarely any detailed description of how these authorities understand effectiveness.

As noted in the introduction to this section, the distinctions between the concepts of non-proliferation, arms control and disarmament become significant when questions of effectiveness are under evaluation as in any system of assessment there is a requirement to have a benchmark of what could have been achieved in order to measure real progress against it (see also page 164). It is therefore important to understand what the limits are in each of these types of regimes.

Where a regime to control a type of weapon falls within more than one of these categories, the balance of activities in each of these areas must be reached. A particular example of how such a balance can change is provided by the Chemical Weapons Convention as the destruction of declared stocks of chemical weapons approaches its treaty-mandated deadlines. One CWC state party presented its view of this in 2008:

The relative importance of an effective industry verification regime and strengthened non-proliferation measures will grow as the chemical weapons destruction campaign progresses and the disarmament goal of the Convention is achieved.³²

30. The classic description of this is contained within: Fred Charles Iklé, ‘After Detection — What?’, *Foreign Affairs*, January 1961, pp 208–20.

31. Ironically, Iklé’s work dates from a time that most NACD efforts were bilateral rather than multilateral, with both sides being permanent members of the UN Security Council.

32. Republic of Korea, *Proposal for enhancing the efficiency and cost-effectiveness of Other Chemical Production Facilities inspections*, OPCW document RC-2/NAT.7, dated 8 April 2008.

There are significant limits to traditional thinking about success or failure in NACD regimes. For example, each of the three criteria identified by Halperin & Schelling for successful arms control (see page 50) — increased stability, reduced destructive power and cutting the financial burden — has some relevance to the modern regime to control biological weapons, but even collectively they are a poor measure of effectiveness of this particular regime in its current context. For example, how should this set of criteria place a value on capabilities to stop sensitive materials and technologies falling into the possession of non-state actors?

Efforts to control Weapons of mass destruction

So-called ‘weapons of mass destruction’ (WMD), and the materials and technologies that contribute to them, have long been the subject of control efforts, many of which take the form of (or contribute to) international regimes.³³ The term ‘weapons of mass destruction’ is commonly understood to encompass biological, chemical and nuclear weapons. In some contexts, including the context of this thesis, the term is also used in its broadest sense to include possible delivery systems for these weapons such as ballistic missiles.³⁴

While the different types of WMD were dealt with separately for the bulk of the 20th century, they were brought together for a number of policy purposes at the end of the century. William Walker notes that following the end of the Cold War:

inhibiting the diffusion and preventing the use of all of the weapons of mass destruction would henceforth be deemed essential to international order. This conclusion came from both realist and idealist directions: realist in that power balances were now considered threatened by the acquisition of any of these weapons since each potentially attained deterrent value; idealist in that the goal of complete nuclear disarmament was now contingent upon chemical and biological disarmament, given that nuclear weapons were ostensibly needed to deter CBW attacks.³⁵

33. For example, a national export control effort is a contribution to a regime, but is not a regime in itself. It is, however, a non-proliferation effort. The need for a distinction between these terms will become more apparent later in this thesis.

34. The derivation of the term ‘weapons of mass destruction’ is discussed earlier in this chapter. While this inclusion of delivery systems within the use of the term WMD is not universally supported, in the context of this thesis it does allow for the use of ‘WMD’ rather than ‘WMD and their possible delivery systems’ in many instances within the text.

35. William Walker, ‘Weapons of Mass Destruction and International Order’, *Adelphi Paper 370*, International Institute for Strategic Studies, (2004), 90 pp, at pp 41-42.

An EU policy document in 2003 noted that WMD are different from other weapons ‘not only because of their capacity to cause death on a large scale but also because they could destabilise the international system’ and that:

acquisition of WMD or related materials by terrorists would represent an additional threat to the international system with potentially uncontrollable consequences. Armed with weapons or materials of mass destruction terrorists could inflict damage that in the past only states with large armies could achieve.³⁶

The control of WMD — and the materials and technologies that contribute to them — provides an interesting example of the development of governmental policies on human security as well as those more obviously in national security. WMD are, by their very nature, political weapons rather than military ones.³⁷ In the case of biological and chemical weapons, the utility on the modern battlefield is limited against protected military forces, while the potential for harm against unprotected civilian populations is severe. In understanding how governments interact with regimes, the control of the proliferation of WMD also forms an interesting case study to help understand how policies in this field have developed from declarative policies to practical action. In selecting practical actions, how do governments decide which actions would be effective and by what means could such effectiveness be assessed?

The dual-use nature of the WMD problem

Many of the materials and technologies that might contribute to development of WMD programmes also have peaceful uses. This ‘dual-use’ nature can refer to both tangible and intangible features of materials and technologies which enable them to be applied to both hostile and peaceful purposes.

An example of a dual-use material is thiodiglycol — a chemical in widespread use in industry, but also a close precursor to sulphur mustard (mustard gas).³⁸ Dual-use

36. European Union, ‘Basic Principles for an EU Strategy Against Proliferation of Weapons of Mass Destruction’, EU Council document 10352/03, dated 10 June 2003, available via the EU Council website.

37. The weapons are political rather than military not only because they have their greatest effects against centres of population rather than on military formations but, more significantly, in most cases their use or threat of use is designed to influence policy by the opposing side in a conflict rather than win an individual battle.

38. Johan Lundin (ed.), ‘Verification of Dual-use Chemicals under the Chemical Weapons Convention: The Case of Thiodiglycol’, *SIPRI Chemical & Biological Warfare Studies* [Scorpion Papers], no 13,

technologies include fermenters and aerosolizers. An example of something intangible is the laboratory skill set a postgraduate microbiology student might acquire. On the nuclear side, this dual-use nature is easier to control as the types of locations that would have peaceful uses of relevant materials is relatively limited.

The difficulties of implementing controls in relation to dual-use biological sciences is highlighted in national papers, for example:

The dual-use nature of virtually all the know-how, materials and equipment used in biology means that identifying and agreeing workable and acceptable verification and compliance measures for biological arms control is fraught with formidable intellectual, scientific and political problems.³⁹

When the potential to manufacture biological or chemical weapons was limited to military programmes run by governments, international controls had to focus on the activities of governments. Once peaceful civilian activities had advanced — both in scale and in technological development — to the extent that non-state actors could utilize them for hostile purposes, the nature of the problem changed fundamentally. This dual-use nature creates a new frame of reference to the security problems of WMD — and in particular of biological and chemical weapons — the issue is no longer just about weapons controlled by states, but also about the regulation of technologies outside of the ownership of governments that have not only peaceful uses, but also economically significant purposes.⁴⁰

The legitimate global trade in dual-use materials and technologies means that controls cannot be implemented on an *ad hoc* basis. Without basic agreement on what should be controlled, there is no chance of harmonization of controls — either on a global basis or for a trading bloc like the EU. This is a fundamental lesson from the activities of Iraq in the 1980s, when that country was able to procure a range of significant inputs into its

Stockholm International Peace Research Institute, (1991), 160 pp.

39. United Kingdom, *Strengthening the Biological and Toxin Weapons Convention: Countering the Threat from Biological Weapons*, Presented to Parliament by the Secretary of State for Foreign and Commonwealth Affairs, 29 April 2002, Cm 5484, para 24.

40. This should not be understood, of itself, as increasing the threat from non-state actors as threat requires intent. However, it may be argued that the risk that a non-state actor might pursue this route has increased. Moreover, there are further repercussions. As certain technologies become more widely available, it becomes much easier for a state, if it were to decide to do so, to co-opt the technologies for a hostile programme.

chemical weapons programmes by selecting exporting countries which had not implemented comprehensive controls. Concerns that dual-use materials may be used for hostile purposes by non-state actors have highlighted needs for controls within as well as between states.

It is worth noting that dual-use concerns also exist in non-WMD areas. These include: the control of narcotic and psychotropic substances; financial transfers; publications; and small arms.⁴¹

Global WMD controls

There is a long history of international legal measures to control WMD. The key multilateral instruments are:

- the 1925 Geneva Protocol;
- the 1968 [nuclear] Non-Proliferation Treaty (NPT);
- the 1972 Biological [and Toxin] Weapons Convention (BWC); and
- the 1993 Chemical Weapons Convention (CWC).

In addition, the UN Security Council unanimously adopted resolution 1540 under Chapter VII of the UN Charter in 2004. The resolution mandates that all states establish domestic controls to ‘prohibit any non-State actor to manufacture, acquire, possess, develop, transport, transfer or use nuclear, chemical or biological weapons and their means of delivery, in particular for terrorist purposes’.

As will be explored further in Chapter 3 (see page 68), these measures only form parts of the relevant overall regimes. However, much of the academic literature is focused on these specific legal instruments rather than the broader regimes that surround them.

The NPT, BWC and CWC have a number of common themes. Each of these conventions contain a bargain – the renunciation of hostile uses of the relevant materials and technologies in return for freedom to gain the benefits of the peaceful uses of them.

41. The control of drugs has many parallels with the control of CBW as both rely on the control of materials that have a legitimate as well as a non-legitimate use. Much of the international efforts against money laundering involves identifying transactions that have a legitimate basis and those which result from the proceeds of crime. Obscene publications have been the subject of international conventions for over a century. Proposed controls on small arms have, since the 1930s, had been hindered by the desires by some countries to preserve what they consider to be a legitimate international trade in such weapons for personal use.

Security, economic and geographical considerations influence how individual countries see the balance between the two sides of the bargain.⁴² While most western states have consistently put emphasis on the security aspects of the bargain, they have also had a long-term recognition that the other considerations have to be taken into account in order to encourage universal membership, national implementation and on-going active engagement with the treaties.

The early 21st century debate

The early 21st century policy debate on WMD threats and dual-use issues have been characterized by certain predominant themes:

- fears of terrorist or criminal use of biological, chemical, nuclear or radiological materials, substantially enhanced by the 11 September 2001 attacks in the US and the anthrax letters posted later that year;
- concerns that illicit trade in WMD-related materials and technologies could assist state or non-state actors in acquiring new capabilities;
- concerns regarding the harm that could result from natural outbreaks of disease, such as the spread of Severe Acute Respiratory System (SARS) in 2003 and the possibilities of a Highly Pathogenic Avian Influenza (HPAI) epidemic⁴³ — this also brought onto sharp focus the dangers from deliberate disease; and
- the inability to use traditional methods of arms control following the rise of the Bush Administration in the United States, notably with its announcement it could not accept any result that might have come out of the on-going negotiations for a compliance protocol for the BWC.

Each of these themes created pressures for novel thinking, policies and activities.⁴⁴

42. For non-nuclear-weapon states parties to the NPT, this bargain is no different in the biological and chemical fields than for nuclear. There is a greater focus in the politics of nuclear issues on this bargain as a number of high-profile peaceful activities, such as uranium enrichment, can be both peaceful and create technological capacities within a state that would make future acquisition of weapons easier. However, the same could be said of a thiodiglycol production plant or establishment of a P4 laboratory. This is the basis of much of the debate about BWC Article X

43. In more recent years there have been additional sources of potential harm with outbreaks of disease from a novel coronavirus causing what is now referred to as Middle East Respiratory Syndrome (MERS) and from H7N9 influenza.

44. The term 'activities' rather than 'policies' is deliberately chosen in this context as many policies have been simply declaratory. There is a distinction, that will become important later, between actions and words.

There was also a difference in transatlantic perspectives on levels of threat, with much of the debate in the US focusing on a perception of increasing overall threats. For example, the covering letter from President Bush to the US *National Security Strategy* included:

Enemies in the past needed great armies and great industrial capabilities to endanger America. Now, shadowy networks of individuals can bring great chaos and suffering to our shores for less than it costs to purchase a single tank. Terrorists are organized to penetrate open societies and to turn the power of modern technologies against us.⁴⁵

Furthermore, the US *National Strategy for Combating Terrorism* released in early 2003, opened with the words:

The terrorist attacks of September 11, 2001, in Washington, D.C., New York City, and Pennsylvania were acts of war against the United States of America and its allies, and against the very idea of civilized society. No cause justifies terrorism. The world must respond and fight this evil that is intent on threatening and destroying our basic freedoms and our way of life. Freedom and fear are at war.⁴⁶

By contrast, the European Security Strategy opened with the words:

Europe has never been so prosperous, so secure nor so free. The violence of the first half of the 20th Century has given way to a period of peace and stability unprecedented in European history.⁴⁷

Robert Kagan summarized the difference in transatlantic perspectives in the following terms:

It is time to stop pretending that Europeans and Americans share a common view of the world, or even that they occupy the same world. On the all-important question of power – the efficacy of power, the morality of power, the desirability of power – American and European perspectives are diverging. Europe is turning away from power, or to put it a little differently, it is moving beyond power into a self-contained world of laws and rules and transnational negotiation and cooperation. It is entering a post-historical paradise of peace and relative prosperity, the realization of Kant’s “Perpetual Peace”. The United States, meanwhile remains mired in history, exercising power in the anarchic Hobbesian

45. George W Bush, President of United States of America, covering letter on publication of the *National Security Strategy*, dated 17 September 2002.

46. United States of America, *National Strategy for Combating Terrorism*, published by the White House on 14 February 2003.

47. European Union, *European Security Strategy: A Secure Europe in a Better World*, adopted by the European Council on 12 December 2003.

world where international laws and rules are unreliable and where true security and the defence and promotion of liberal order still depend on the possession and use of military might.⁴⁸

The difference in transatlantic perspective has to be noted as much of the English language literature on international security issues originates from the US.

Identified challenges

Particular challenges for the international community in relation to the control of WMD are identifiable within the early 21st century debate, such as universality, national implementation and capacity building within countries.

Universal membership has been seen as key to promoting success under the WMD treaties.⁴⁹ The NPT has 191 states parties, with the main states outside of the treaty being declared 'hold-outs', such as India, Israel and Pakistan, and North Korea which had withdrawn from the treaty in 2003. In 2003, the BWC had 151 states parties and the CWC had 154; by the end of 2008, this had risen to 163 and 184, respectively; and by the end of 2015, had risen further to 173 and 192, respectively.

The WMD treaties oblige their states parties to carry out some form of national implementation to ensure the treaties are not only being complied with by official bodies but also those natural or legal persons within their jurisdiction or control.⁵⁰ The number of states parties that have enacted full implementation is seen as far from satisfactory. For example, in 2003, only 51 CWC States Parties out of 154 (33 per cent) were able to report that they had implemented legislation that covered all of the key areas of the Convention obligations. By September 2008, this had risen to 82 out of 184 States Parties (45 per cent)⁵¹, to 86 out of 188 (46 per cent) by August 2009,⁵² and to 88 out of 187 (47 per cent) by July 2012.⁵³ Later reporting has not been placed on the OPCW website.

48. Robert Kagan, 'Power and Weakness', *Policy Review*, no 113, (June 2002), <<http://www.hoover.org/publications/policy-review/article/7107>>

49. For a brief discussion of the 'universality problem' see: Richard Guthrie, 'Could a New Security Assurance Enhance WMD Norms?', in Richard Guthrie (ed.), *Verification 1997: the VERTIC Yearbook*, (London/Boulder: VERTIC/Westview Press), 1997, pp 11-22.

50. Technically, this obligation under the NPT falls within the obligation to implement a safeguards agreement with the International Atomic Energy Agency.

51. OPCW Director-General, *Report to the Conference of the States Parties at its Thirteenth Session on the Status of Implementation of Article VII of the Chemical Weapons Convention as at 15 September 2008*, OPCW Document C-13/DG.6, dated 11 November 2008

One of the lessons of the revelations of the AQ Khan network which created a black market in nuclear-weapon-related materials and technologies was that countries can be host to companies that are contributing to proliferation activities without the relevant governmental authorities being aware.⁵⁴ Effective national implementation therefore includes much more than simply the enactment of legislation but extends into areas such as licencing and customs controls.

Development of dual-use issues in the 21st Century

Even as the 20th century drew to a close, there was a growing recognition that most, if not all, peaceful technologies had been adapted at some point for hostile purposes. For example, Matthew Meselson of Harvard University summarizes this in the following terms:

Every major technology — metallurgy, explosives, internal combustion, aviation, electronics, nuclear energy — has been intensively exploited, not only for peaceful purposes but also for hostile ones. Must this also happen with biotechnology, certain to be a dominant technology of the twenty-first century?⁵⁵

Traditional security concerns, and therefore responses such as export controls, had focused on objects – weapons and their components or high technology goods. Most of these objects have had only military purposes or were part of leading edge technological advances.

With the changing frame of reference (see page 58), objects with both military and civilian uses (‘dual-use’) were now seen in many circumstances as posing a greater threat. Moreover, it is not just the physical objects that now need to be controlled, but the methods that produce them.

52. OPCW Director-General, *Report to the Conference of the States Parties at its Fourteenth Session on the Status of Implementation of Article VII of the Chemical Weapons Convention as at 19 August 2009*, OPCW Document C-14/DG.9, dated 21 October 2009

53. OPCW Director-General, *Report to the Conference of the States Parties at its Seventeenth Session on the Status of Implementation of Article VII of the Chemical Weapons Convention as at 27 July 2012: Article VII(1)(A) to (C) and Other Obligations*, OPCW Document C-17/DG.6, dated 28 August 2012.

54. See, for example, the Buhary Syed Abu Tahir case. Shannon Kile, ‘Nuclear arms control and non-proliferation’, *SIPRI Yearbook 2005*, (Stockholm/Oxford: SIPRI/Oxford University Press, 2005), pp 551–77 at p 552.

55. Matthew Meselson, ‘Averting the hostile exploitation of biotechnology’, *The CBW Conventions Bulletin*, no 48, June 2000, pp 16-19 at p 16.

There are four broad contributory factors for this. The first is that military technologies started to lag civil technologies in many fields. As recently as two decades earlier the drivers for technological innovation were primarily governmental – military and civil research and development. Information technology and biomedical innovation were now primarily commercially driven, but these technologies have both peaceful and hostile uses.

The second is that the capabilities of countries and organizations to take up new technologies and innovations and to be able to use them ('absorptive capacity') increased.⁵⁶ This has happened, in part, through the greater codification of 'knowledge' (through books, articles, digital media — to become 'information')⁵⁷ leading to easier transfer across jurisdictional borders.

The third is developments within the life sciences (not simply genetics) which have led to new understandings of the processes that underpin life. Improved quality control enables the use of extremely tiny quantities of materials in certain experimental procedures, such as combinatorial techniques. This rapidly increases the rate in which substances of interest can be identified in any particular context.

The fourth is the increasing computational developments which have enabled, for example, more accurate modelling of biological substances and the creation of ever more sophisticated machine tools that allow manufacture of components in more complex shapes to finer tolerances. Software developments are often readily transferable.

Each of these four areas provides peaceful benefits as well as hostile potential.

Developing economies require technological development to help drive economic development. Restrictions that are too tight can hinder this. In situations where countries with developing economies perceive themselves deprived of technology imports they can be left wondering whether the measures imposed by the exporters are designed to prevent economic development (or protect trade) rather than to prevent proliferation. In such

56. The classic text on absorptive capacity is: Wesley M Cohen and Daniel A Levinthal, 'Absorptive capacity: A new perspective on learning and innovation', *Administrative Science Quarterly*, vol 35, no 1, [Special Issue: Technology, Organizations, and Innovation], (March 1990), pp 128-52.

57. Robin Cowan and Dominique Foray, 'The Economics of Codification and the Diffusion of Knowledge', *Industrial & Corporate Change*, vol 6, no 3, (September 1997), pp 595-622.

circumstances, will developing countries be as keen to support the NACD aspects of the regime to control biological weapons? Hence the importance of the debate on Article X of the BWC.

Intangible technologies

Intangible technologies are those things that are difficult to codify – those things that are carried in people’s heads. This is also known as tacit knowledge. The only controls that could be effective against the transfer of tacit knowledge is to prevent the movement of people and the training of overseas students. Trained students vastly increase a country’s absorptive capacity. However, the problems of the ‘dual-use’ of technologies is magnified with tacit knowledge. For example, a microbiology student from a developing country in which anthrax is endemic studying overseas may return with benefits that would be worth a substantial equivalent in economic aid. However, that student would also take back valuable knowledge that could contribute to a biological weapons programme. Where should the balance lie?

Intangible technologies are occasionally confused with intangible transfers of technology. Intangible transfers of technology are means by which technologies, or information relating to technologies, can be transferred without a tangible object being transferred — in other words through an internet or e-mail transfer, for example.

Responding to scientific and technological changes

Having identified the dual-use potential of the life sciences (see page 63), Meselson noted that there were broader dangers that needed to be taken onto account:

During the century ahead, as our ability to modify fundamental life processes continues its rapid advance, we will be able not only to devise additional ways to destroy life but will also become able to manipulate it — including the processes of cognition, development, reproduction, and inheritance. A world in which these capabilities are widely employed for hostile purposes would be a world in which the very nature of conflict had radically changed. There in could lie unprecedented opportunities for violence, coercion, repression, or subjugation. Movement towards such a world would distort the accelerating revolution in biotechnology in ways that would vitiate its vast potential for beneficial application and could have inimical consequences for the course of civilization.⁵⁸

58. Matthew Meselson, ‘Averting the hostile exploitation of biotechnology’, *The CBW Conventions Bulletin*, no 48, June 2000, pp 16-19 at p 16.

Meselson identified that these scientific and technological developments had important policy implications that not only needed to be elaborated but also to be actively addressed:

At present, we appear to be approaching a crossroads — a time that will test whether biotechnology, like all major predecessor technologies, will come to be intensively exploited for hostile purposes or whether instead our species will find the collective wisdom to take a different course.⁵⁹

The combination of political and scientific and technological developments at the turn of the century led to many attempts to find new ways of tackling biological threats such as proposals for an Accountability Framework,⁶⁰ the adoption of modular measures⁶¹ and a Framework Convention on Biochemical Controls.⁶²

In the background, behind much of the innovative thinking of the period, was a simple, but rarely explicitly raised, question with a complicated answer — *what should effectiveness mean in the context of the regime to control biological weapons?*

In order to explore what might be an answer to this deceptively simple question it is necessary to explore the regime to control biological weapons (Chapter 3) and how the context of effectiveness has been used within that regime before the 2001 watershed (Chapter 4). This then sets the context for the new analysis of how effectiveness might be understood within the new inter-sessional processes.

59. Matthew Meselson, 'Averting the hostile exploitation of biotechnology', *The CBW Conventions Bulletin*, no 48, June 2000, pp 16-19 at p 18.

60. Canada, *Towards the Sixth BTWC Review Conference: An Accountability Framework*, BWC/CONF.VI/PC/INF.1, dated 10 April 2006, 3 pp.

61. VERTIC, 'A new strategy: strengthening the biological weapons regime through modular mechanisms', *VERTIC Research Reports*, no 6, (October 2006), 88 pp.

62. Alexander Kelle, Kathryn Nixdorff and Malcolm Dando, *Controlling Biochemical Weapons: Adapting Multilateral Arms Control for the 21st Century*, (Basingstoke: Palgrave Macmillan, 2006), 208 + vii pp.

3. The regime to control biological weapons and earlier analysis

As illustrated in the preceding Chapter, the regime to control biological weapons does not exist in isolation — biological weapons form one category of ‘weapons of mass destruction’ (WMD) and understandings of the issues surrounding biological weapons are influenced by more general WMD issues.

The aim of this chapter is to explore the regime to control biological weapons, discuss how it is perceived and illustrate why biological weapons, and the responses to the challenges they offer, differ from the other types of weapons. From this starting point, it is then possible to examine issues relating to the effectiveness of the regime.

Biological weapons have been subject to prohibitions since before the basic mechanisms of disease have been understood. For example, the taboo against the use of poison weapons is longstanding, such as the Manu code in Hindu law and the Saracen code of warfare in Islamic law which predate by centuries the earliest of the post-industrial revolution efforts at prohibition such as the 1874 Brussels declaration; all of which were enunciated before the germ theory of disease had been understood. In parallel with these prohibitions, many of which have been simply declaratory in nature, there had been practical efforts to counter the acquisition or use of these weapons.

This chapter starts by examining the breadth of the regime to control biological weapons and some of the significant elements that contribute to the regime. Relevant developments in the regime during the period of the case study are elaborated. The second section of this chapter examines earlier analysis and understandings that have been reached regarding the regime to control biological weapons. The third section examines how obligations under the regime to control biological weapons have been conceptualized. The chapter is rounded off with conclusions and judgements regarding which previous understandings are built upon or contribute to the work undertaken within this thesis, notably that while there is much analysis of the regime, there is little that relates to real world effectiveness.

The breadth of the regime to control biological weapons

As noted in Chapter 2 (see page 59), the regime to control biological weapons is much broader than the BWC. Even as the BWC was being negotiated, it was recognised that the Convention was but one component in the overall regime:

The fact of the matter is that the BWC was never supposed to be a stand-alone countermeasure against BW. Nor was it seen that way by the countries that had studied the weapons closely. The function of the BWC was instead to serve as a consolidating influence within a diverse array of countermeasures. This initially comprised the development and maintenance of the anti-BW protective posture expressly permitted through the General Purpose Criterion, and national intelligence machinery that had at least some capacity for monitoring foreign BW capability. It expanded as national penal codes began to criminalise misuse of pathogenic microbes and toxins, law that could also be directed against terrorists seeking access to such agents. Later, national export control measures would be added to the array as an anti-proliferation measure, with efforts to harmonise the controls subsequently being pursued through the Australia Group. Later still, interest would arise in mobilising the resources of international criminal law to that same end.

Within all this, the primordial function of the BWC was to assert a norm of abstention from BW armament, to reassert the taboo against resorting to the use of BW, and to provide a nucleus around which international action against transgressors could crystallise.¹

As the limits of the Convention are easier to define, some authors have deliberately selected the Convention as the focus of their analysis rather than the broader regime as this makes analysis much simpler, notwithstanding that this loses key features of the broader regime.

Perhaps the best way to illustrate the breadth of regime activities is to provide examples of the types of elements that contribute to the regime. Understanding of the contributions of different elements to the regime is important in order to be able to judge whether the regime is effective at achieving its objectives. What is provided within this chapter is simply an outline of some of the elements.

1. George Poste and Julian Perry Robinson, 'International Control Measures: The Biological Weapons Convention and its Projected Protocol', in: *Measures for Controlling the Threat from Biological Weapons*, Royal Society, (2000), pp 9-14. The section from which this quote was taken ends with – 'Incorporating compliance-verification measures was not at that time, unlike now, seen as a cost-effective addition to the array, especially since the technical component of such measures was relatively undeveloped.'

It is also worth noting that, drawing on the discussion of NACD regimes in the preceding chapter (see page 46), the regime to control biological weapons contains elements that are characteristic of each of these types of regime. On the disarmament aspect, biological weapons are seen as the problem and so are banned. On the arms control aspect, while the weapons aren't needing to be managed, the materials and technologies certainly are. On the non-proliferation side, there is a clear desire to ensure these weapons capabilities do not spread. As there are no declared possessor states for these weapons to spread from, the issue is less one of non-proliferation as non-acquisition.

Global treaty-based regime elements

The treaty-based elements listed below are described as global to distinguish them from relevant regional treaties.² It should be noted that not all countries have become parties to them.

The Geneva Protocol

The Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare was signed at Geneva on 17 June 1925. It enters into force for each state on ratification. The 1925 Geneva Protocol contains a prohibition on the use of chemical weapons, using a formulation appearing in earlier measures³ — ‘asphyxiating, poisonous or other gases, and of all analogous liquids, materials or devices’ — but adding a specific phrasing ‘to extend this prohibition to the use of bacteriological methods of warfare’.⁴

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2. The Antarctic Treaty requires that Antarctica should only be used for peaceful purposes, the Seabed Treaty prohibits stationing of WMD on the seabed, and the Outer Space Treaty prohibits stationing of WMD in outer space. Each of these is classed as a regional treaty.
 3. There were two specific precedents. Article 5 of the Treaty Relating to the Use of Submarines and Noxious Gases in Warfare, signed 6 February 1922 [but which never entered into force] reads: ‘The use in war of asphyxiating, poisonous or other gases, and all analogous liquids, materials or devices, having been justly condemned by the general opinion of the civilized world and a prohibition of such use having been declared in treaties to which a majority of the civilized Powers are parties’. Article 5 of the Convention on the Limitation of Armaments of Central American States, signed 7 February 1923, reads: ‘The Contracting Parties consider that the use in warfare of asphyxiating gases, poisons, or similar substances as well as analogous liquids, materials or devices, is contrary to humanitarian principles and to international law, and obligate themselves by the present Convention not to use said substances in time of war.’
 4. As the scientific understanding of diseases and their causes have developed, the term ‘bacteriological’ in this context has customarily been taken to include all biological methods of disease.

Although the Geneva Protocol contains no provisions for verification or compliance monitoring measures, it is cited within resolutions from both the General Assembly and the Security Council of the United Nations which empower the Secretary-General to investigate possible breaches of ‘the 1925 Geneva Protocol or other relevant rules of customary international law’. Such investigations were carried out in the 1980s and early 1990s. This was also the mechanism used for the investigation of alleged uses of chemical weapons in Syria in 2013.⁵ While most of the investigations related to chemical warfare, the first and last investigations before those carried out in Syria — carried out in south-east Asia and Azerbaijan, respectively — involved toxins that fall within the remit of the BWC.⁶ Now commonly referred to as the ‘UN Secretary-General’s mechanism’ or ‘UN Secretary-General’s investigative mechanism’, this power to investigate is being reinvigorated.⁷ The mechanism’s appropriateness for investigation of alleged use of weapons prohibited by the Biological Weapons Convention has been contested.⁸

Notwithstanding this simple prohibition on the use of bacteriological weapons, a number of states, on becoming parties, stated reservations along the lines that they considered the Protocol binding only in conflict with other parties and reserving the right to use bacteriological weapons in response to an attack with such weapons against them. As time has gone by, many of these reservations have been withdrawn. There are periodic efforts to encourage states to withdraw remaining reservations.⁹

5. Investigations of alleged use of chemical weapons within Syria that had been made after that country had joined the Chemical Weapons Convention were made under the provisions of the CWC and UN Security Council resolution 2118.

6. Richard Guthrie, ‘The United Nations Secretary-General’s mechanism to investigate alleged use of biological and chemical warfare’, briefing paper prepared by the Stockholm International Peace Research Institute (SIPRI) for the Swedish Ministry of Foreign Affairs, May 2006 [submitted by the Swedish Government to the United Nations study *Verification in All Its Aspects*]. This paper includes information on the relevant UN resolutions together with a list of investigations undertaken and resulting official documentation.

7. United Nations General Assembly resolution A/RES/60/288, adopted 8 September 2006, encourages ‘the Secretary-General to update the roster of experts and laboratories, as well as the technical guidelines and procedures, available to him for the timely and efficient investigation of alleged use’. This is being acted upon with training activities and exercises being held by Germany, Sweden and the United Kingdom, for example. The mechanism is the legal basis for the investigation into the alleged uses of chemical weapons on the territory of Syria that predate that country’s accession to the Chemical Weapons Convention.

8. See, for example, Iran, ‘Investigation’, BWC/MSP/2004/MX/WP.68, 28 July 2004, para 5.

9. See, for example, France, ‘90 ans de la signature du Protocole concernant la prohibition de l’emploi a la guerre de gaz asphyxiants, toxiques ou similaires et de moyens bactériologiques’ [90th anniversary of the signature of the Protocol prohibiting the use in war of asphyxiating, poisonous or other gases and of bacteriological methods of warfare], BWC/CONF.VIII/PC/WP.11, 26 April 2016.

The Protocol was the result of an intergovernmental conference on control of international trade in ‘arms, munitions and implements of war’ held in Geneva during 4 May–17 June 1925. Of the instruments in preparation at this conference, only the protocol on chemical and biological weapons remains relevant.¹⁰

The 1972 Biological Weapons Convention

The Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction is commonly known by two names: the Biological Weapons Convention (BWC) and the Biological and Toxin Weapons Convention (BTWC). The Convention was opened for signature on 10 April 1972 and it entered into force on 26 March 1975. The BWC took control of biological weapons much further than the Geneva Protocol which had simply banned the use of biological methods of warfare, but did not prohibit states from manufacturing them. Under Article I the BWC States Parties undertake:

never in any circumstances to develop, produce, stockpile or otherwise acquire or retain ... microbial or other biological agents, or toxins whatever their origin or method of production, of types and in quantities that have no justification for prophylactic, protective or other peaceful purposes.

Also known as the ‘general purpose criterion’, this criterion relating to types and quantities means that all biological materials fall within the remit of the Convention and that everything is prohibited unless it can be justified.¹¹

Under Article IV, BWC States Parties undertake to implement the prohibitions contained in the Convention within their own jurisdictions.

Like the Geneva Protocol, the BWC has no formal compliance and verification provisions, although it does include a complaints procedure; for some states, this lowers confidence in the compliance of parties to it. The BWC States Parties agreed at a Special Conference in 1994 to establish the ‘Ad Hoc Group’ to negotiate a legally binding protocol to the Convention that would have included certain measures to strengthen it,

10. It is worth noting, to help avoid confusion, that another measure of the period was also referred to as the ‘Geneva Protocol’ — the 1924 ‘Protocol for Pacific Settlements of International Disputes’ — which was superseded by the 1929 General Act and then by instruments adopted under the auspices of the United Nations after the Second World War.

11. But note the comments on research by Nicholas Sims later in this chapter.

including verification measures. The negotiations were brought to a standstill in the middle of 2001 when the United States announced that they would not be able to accept any product that would result from the negotiations.

BWC review process

Article XII of the BWC provides for conferences ‘to review the operation of the Convention, with a view to assuring that the purposes of the preamble and the provisions of the Convention ... are being realized’ and such Review Conferences have been held in 1980, 1986, 1991, 1996, 2001–02, 2006 and 2011. Article XII also states that: ‘Such review shall take into account any new scientific and technological developments relevant to the Convention’.

BWC negotiations

During the 1950s and 1960s the focus had been on ‘general and complete disarmament’, which would have included a global prohibition on biological warfare. During the early 1960s, as negotiations on general and complete disarmament faltered, the focus shifted to means by which parts of this problem could be solved. These means became known as ‘collateral measures’. The collateral measures included proposals such as a nuclear non-proliferation treaty, a fissile material cut-off, prohibitions on nuclear testing, establishment of nuclear-weapon-free zones (including outer space and the sea bed), a non-aggression pact between the two power blocs and bans on biological and chemical weapons. Over twenty proposals for collateral measures were put to the Eighteen-Nation Disarmament Committee (ENDC) in the early 1960s.

In the late 1960s proposals were put forward to separate the issues of biological and chemical warfare for negotiating purposes. Although these proposals were initially resisted from some quarters, once agreement on this separation was reached the negotiations proceeded swiftly with a text being concluded in 1971.¹² On 16 December

12. Details of the negotiations are included in: Nicholas A Sims, *The Diplomacy of Biological Disarmament: Vicissitudes of a Treaty in Force, 1975-85*, (London: Macmillan; New York: St Martin's Press, 1988), 356 + xv pp. A brief summary of the stages of negotiation can be found in: Nicholas A Sims, ‘The Evolution of Biological Disarmament’, *SIPRI Chemical & Biological Warfare Studies* [Scorpion Papers] no 19, Stockholm International Peace Research Institute, (2002), 200 + xi pp at pp 3-5.

of that year, the United Nations General Assembly adopted a resolution commending the Convention to all states.

Some states have noted that there is no explicit reference to a prohibition on use of biological agents within the text of the BWC.¹³ In response, some other states have expressed the view that a prohibition on use is implicit within the prohibition on possession. In order to make the situation clearer, the final document of the Fourth Review Conference of the BWC contained a consensus view that the use of biological weapons ‘is effectively a violation of Article I of the Convention’.¹⁴ A more detailed statement was made at the Sixth BWC Review Conference in 2006: ‘The Conference reaffirms that the use by the States Parties, in any way and under any circumstances, of microbial or other biological agents or toxins, that is not consistent with prophylactic, protective or other peaceful purposes, is effectively a violation of Article I’.¹⁵

BWC institution, or lack of

A change that took place following the Sixth BWC Review Conference in 2006 is that the BWC has a three-person ‘Implementation Support Unit’ based in Geneva to assist BWC states parties carrying out certain functions. Previously, the BWC had lacked any form of secretariat.

Other significant treaty-based regime elements

A number of international treaties provide contributions toward the regime to control biological weapons alongside the Biological Weapons Convention and the Geneva Protocol, although there is no widely accepted or agreed list of what these additional treaties provide. The other significant treaty-based regime elements highlighted here are the Genocide Convention, the Geneva Conventions, and the Cluster Munitions Treaty. However, this list is by no means exhaustive.

13. There were interventions during the BWC negotiations raising concerns that inclusion of use in the text would be seen as weakening the Geneva Protocol. Iran, at the Fourth BWC Review Conference in 1996, proposed an amendment to the text of the Convention to make the prohibition of use explicit; the proposed amendment is contained in: Iran, ‘A Proposal’, BWC/CONF.IV/COW/WP.2, 28 November 1996.

14. The relevant sentence is included in paragraph 3 of the section reviewing Article I within the *Final Declaration*, as reproduced in: BWC/CONF.IV/9, Part II, December 1996.

15. The statement is included in paragraph 3 of the section reviewing Article I within the *Final Declaration*, as reproduced in: BWC/CONF.VI/6, Part II, December 2006.

A useful guide to treaties that have contributed to NACD regimes is contained in a series of books by Jozef Goldblat.¹⁶

It is also worth noting where proposals had been made for treaty measures that would contribute to the regime but that did not appear in the final agreed treaty. The key example here would be the negotiations for an International Criminal Court (see below).

The 1948 Genocide Convention prohibits acts intended to carry out genocide which is the destruction, in whole or in part, of any distinct national, ethnic, racial or religious group. One act that could be carried out to promote genocide would be the spread of disease.

The four 1949 Geneva Conventions each include prohibitions on ‘biological experiments’ on protected persons as a grave breach. In 1977, two Additional Protocols were added to these Conventions. Amongst the new provisions introduced were arrangements for an International Fact-Finding Commission to investigate allegations of grave breaches, application of the Conventions to conflicts within states and a prohibition on attacks on foodstuffs.

A prohibition on cluster munitions may not seem at first glance to have much relevance to the control of biological weapons. However, many designs of munitions for dispersal of biological agents have relied upon cluster munitions technologies and the creation of bomblets.¹⁷ Restrictions in the 2009 Cluster Munitions Treaty will reduce the availability of these technologies.

During the negotiations for the Rome Statute for the International Criminal Court there were proposals for the inclusion of use of biological weapons within the definition of war crimes. However, in the final days of negotiation in July 1998, all of these options

16. Each of these books has borne the title *Arms Control* or *Arms Control Agreements*. The most recent edition is: Jozef Goldblat, *Arms Control*, (London: Sage, 2002) [published in association with the Peace Research Institute Oslo and the Stockholm International Peace Research Institute], 396 + xliii pp.

17. For example, anthrax tests on Gruinard Island in 1942 and 1943 involved testing cluster bomb sub-munitions. See the plates in Peter M Hammond and Gradon B Carter, *From Biological Warfare to Healthcare, Porton Down, 1940-2000*, (Basingstoke: Palgrave, 2002), 280 pp.

fell, primarily owing to the issue of whether use of nuclear weapons should be considered a crime.¹⁸

Non-treaty measures with global legal effect

UN Security Council resolution 1540

The United Nations Security Council adopted resolution 1540 on 28 April 2004 as a binding measure under Chapter VII of the Charter to counter the threat of terrorist acquisition of unconventional weapons, including biological, chemical and nuclear weapons. The resolution calls on UN member states to present national reports on steps they have taken or intend to take to control materials and technologies that could be used to develop or otherwise acquire such weapons. It is clear that the process of compiling the reports, together with assistance to states provided by the 1540 Committee, has led to the identification of gaps in implementation of the key international instruments, particularly as regards issues related to biological weapons.¹⁹ Resolution 1540 was initially intended to be in operation for two years but this duration was extended by a number of other resolutions. Under resolution 1977 it remains in operation until 2021.

International Organizations

A number of international organizations have roles and responsibilities that contribute to, or overlap with, the regime to control biological weapons. These include the World Health Organization (WHO), the World Organization for Animal Health²⁰ (OIE, original title Office Internationale des Épizooties) and the Food and Agriculture Organization (FAO). The International Committee of the Red Cross (ICRC) is also included in this category, although its status varies depending on the circumstances.²¹

18. Philippe Kirsch and John T Holmes, 'The Rome Conference on an International Criminal Court: The Negotiating Process', *American Journal of International Law*, vol 93, no 2, January 1999, pp 2-12.

19. Richard Guthrie, John Hart and Frida Kuhlau, 'Chemical and biological warfare developments and arms control', *SIPRI Yearbook 2005*, (Stockholm/Oxford: SIPRI/Oxford University Press, 2005), p 604.

20. Biological Weapons Convention Secretariat, *The World Organization for Animal Health (OIE)*, doc no BWC/MSP/2004/INF.1, dated 1 November 2004, 5 pp.

21. For example, for BWC meetings, the ICRC is considered an international organization, but for some CWC/OPCW meetings has been considered a non-governmental organization. There is a subtlety often missed in status: the WHO, OIE and FAO are all inter-governmental organizations, which the ICRC is not, although it is an international organization.

Of particular note are the new International Health Regulations comprising legally binding provisions for member states of the WHO on sharing epidemiological information about potential transboundary spread of infectious diseases in order to manage public health emergencies of international concern which were agreed in 2005²² and entered into force in 2007. The new rules will ‘prevent, protect against, control and provide a public health response to the international spread of disease’. The new regulations allow for the WHO Director-General to form a ‘determination of a public health emergency of international concern’, even if the government of the territory is in disagreement with this conclusion.

All of these organizations have in common that they have interests in the prevention of disease — and suffering or other implications that follow from disease — in humans, animals and plants. As the use of biological weapons is nothing more than the deliberate use of disease (as noted above, see page 45), the general roles of each of these organizations in the regime to control biological weapons is apparent.

The organizations, and implications such as the ‘second diagnosis’ problem, are discussed in more detail later in this Chapter.

Non-treaty-based group arrangements

The non-treaty-based group arrangements described here are essentially understandings between groups of like-minded states. These arrangements contribute to the regime to control biological weapons in a variety of ways.

The Australia Group is a multilateral forum for the co-ordination of export controls amongst a group of supplier states. This group was originally formed in the mid 1980s to harmonise export control policies in relation to materials that might be used in a chemical weapons programme. Around 1989 its remit was expanded by its participating states to include materials that may be relevant to biological weapons programmes. The Australia Group has no formal legal basis.²³ Its role in relation to biological materials is

22. The International Health Regulations were formally adopted by the World Health Assembly on 23 May 2005.

23. For background to the Australia Group, see: Robert J Mathews, ‘Chemical and Biological Weapons Export Controls and the “Web of Prevention”’: A Practitioner’s Perspective’, in: Brian Rappert and Caitriona McLeish (eds.), *A Web of Prevention: Biological Weapons, Life Sciences and the*

comparable with the role of the Nuclear Suppliers Group in controlling the trade in nuclear technologies.

Proponents of export control regimes argue that such arrangements are a key feature in stopping the spread of technologies and can thus make programmes to develop biological weapons much more difficult and costly.²⁴

Opponents of export control regimes argue that such controls are implemented in a discriminatory way with a brisk trade between states that have already reached a certain level of technological capabilities, while states that haven't reached that level are subject to restrictions. Opponents argue that the Biological Weapons Convention itself should be the sole basis of controls.²⁵

A new form of supply control appeared in 2003 with the creation of the 'Proliferation Security Initiative' (PSI) by the US. PSI is intended to prevent transfers of proliferation-sensitive materials to state and non-state actors who might use them for hostile purposes. Unlike simple export controls, PSI envisages the interdiction of supplies in transit.

Other measures

In the context of the broader regime, there are a number of additional measures that make valuable contributions towards preventing the hostile misuse of the life sciences. These include good laboratory practice standards including biosafety and biosecurity provisions, many of which are developed through professional associations at both national and international levels. Many professional associations also include codes of conduct to help reduce potentials for misuse.

National measures to licence or otherwise oversee research make a significant contribution.

Governance of Research, (London: Earthscan, 2007), pp 163-71.

24. See, for example: China, 'The Issue of Export Control', Working Paper, BWC/AD HOC GROUP/WP.453, 8 May 2001, 3 pp.

25. See, for example: Iran, 'International Cooperation-Transfer Denials', Working Paper, BWC/MSP/2009/MX/WP.22, 21 August 2009, 2 pp. [Note: The title of this paper was corrected in the notice of correction in document BWC/MSP/2009/MX/WP.22/Corr.1, 24 August 2009, 1 p. The title as corrected is given here.]

Previous analysis and understandings of the regime to control biological weapons

Analysis of the regime to control biological weapons can be carried out from a number of approaches, many of which have backgrounds distinct from the traditional international relations literature.

The regime to control biological weapons is a response to the perceived threats from biological weapons and the materials and technologies that can be used to create them. It therefore follows that in order to understand analysis of this regime, there is a need to understand how the threats of biological weapons have been perceived in the literature. However, this is not the only way to approach the regime for the purposes of analysis. The lists of approaches outlined here are not exhaustive, but intended to draw out approaches of the most relevance and significance to the subject matter of the thesis.

Within the problem-oriented approaches there are specialized areas such as the study of the implications of scientific developments, the examination of the threats from terrorism and implications for public health.

There are a number of more methodological approaches examined here, such as the chronological approach breaking down developments into discrete events, the narrative focus on particular critical periods and a sectoral approach.

Some of the more methodological approaches outlined here have roots in some of the traditions of International Relations in particular and Political Studies in general. As has been noted elsewhere in this thesis, the study of the regime to control biological weapons can only be carried out in a multi-disciplinary basis, thus the problem-oriented approaches draw on understandings from other fields of study.

Problem-oriented approaches

Some authors analyse the regime to control biological weapons in the context of the problems it is intended to counter; this is the approach taken by study groups such as the Stockholm International Peace Research Institute (SIPRI) and the Harvard Sussex Program (HSP).²⁶ Conceptually, much of the work falling within this approach assumes

26. Full disclosure: the author of this thesis has worked for both of these organizations.

that issues around biological weapons lead to problems that require management rather than problems that can be solved.

The six-volume series, *The Problem of Chemical and Biological Warfare*, published by SIPRI in the early 1970s remains the most comprehensive documentation on the subject, notwithstanding its age.²⁷ Indeed, in 2001, the US Department of Defense paid for the series to be scanned as there were few copies of the original books left available.²⁸ The six-volume series was published as the BWC was being negotiated, with draft copies of some of the volumes being circulated to negotiators.

With regard to evaluation of regime effectiveness, the fifth volume of the six-volume series, *The Prevention of CBW*, is of greatest significance. Within this volume, the study identifies 26 stages in the development of an offensive chemical or biological warfare capability.²⁹ While not all apply in all circumstances, these identified steps form a useful guide for analytical purposes. This tabulation was the first published attempt to elaborate activities involved in a chemical or biological weapons programme.

In 1969 and 1970, two reports were issued that influenced international debate, and the negotiations on the BWC. *Chemical and Bacteriological (Biological) Weapons and the Effects of their Possible Use* was prepared by a group of experts and was endorsed and published in the name of the UN Secretary-General in July 1969. The study had been requested in UN General Assembly resolution 2454A (XXIII) adopted on 20 December 1968. The second, *Health Aspects of Chemical and Biological Weapons*, was published by the World Health Organization in 1970. This report had initially been prepared as a contribution to the work of the UN Secretary-General's group of experts and an earlier version had been circulated in 1969, hence this is sometimes referred to as being published in the earlier year.

27. Stockholm International Peace Research Institute, *The Problem of Chemical and Biological Warfare*, [six volume series], (Stockholm: SIPRI, 1971-73). The six volumes are: I *The Rise of CB Weapons* [1971]; II *CB Weapons Today* [1973]; III *CBW and the Law of War* [1973]; IV *CB Disarmament Negotiations, 1920-1970* [1971]; V *The Prevention of CBW* [1971]; and VI *Technical Aspects of Early Warning and Verification* [1973].

28. The scans are available on CD-ROM from SIPRI.

29. Summarized in Table 2A.1, SIPRI V, p 142.

There are similarities in the conclusions about problems that are presented by the potential for biological warfare in the reports by the Secretary-General, the WHO and the SIPRI six-volume series. These various publications provide an indication that there was a broad consensus on the issues during this period. Nevertheless, it should be noted that while there were many contributors to these three studies, they shared the same lead drafter, Julian Perry Robinson.

There have also been more traditional problem-oriented approaches that take a longer-term historical perspective. Two detailed histories of past biological warfare programmes and policies have been published. The first, dealing with the period up to the end of the Second World War was published in 1999.³⁰ The second, involving many of the contributing authors to the first volume, covering the post-war period was published in 2006.³¹

Scientific developments approach

One of the themes within the problem-oriented approaches is the study of the implications of scientific and technological developments related to the life sciences. As the life sciences develop, new challenges to the regime may result. Some of these were noted in Chapter 2 (see page 65). Some of the work in this area is focused on the potential of new activities, while some has examined misuse of current otherwise peaceful activities. An additional focus has been biosecurity issues. In most cases, work covers more than one of these aspects.

The scientific community, through learned societies and national academies, such as the Royal Society (UK),³² the National Academies (US)³³ and the Koninklijke Nederlandse Academie van Wetenschappen (Royal Netherlands Academy of Arts and Sciences)³⁴ has carried out detailed work on these issues. The Inter Academy Panel for

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30. Erhard Geissler and John Ellis van Courtland Moon, (eds.), 'Biological and Toxin Weapons: Research, Development and Use from the Middle Ages to 1945', *SIPRI Chemical & Biological Warfare Studies* [Scorpion Papers], no 18, Stockholm International Peace Research Institute, (1999), 276 + 15 pp.
 31. Mark Wheelis, Lajos Rózsa and Malcolm Dando (eds.), *Deadly Cultures: Biological Weapons Since 1945*, (Cambridge MA: Harvard University Press, 2006) 479 pp.
 32. See, for example, Royal Society, *New approaches to biological risk assessment*, RS policy document 08/09, July 2009, 17 pp.
 33. See, for example, National Academy of Science, *Globalization, Biosecurity, and the Future of the Life Sciences*, February 2006, 300 pp.

International Issues (IAP), of which all these societies are members, has performed a coordinating role. For example, the IAP appointed a working group on biosecurity in 2004³⁵ to develop a statement of principles to be used by member academies or other scientific bodies in developing their own biosecurity policies.

In terms of academic analysis, much of what has been published in the English language derives from work undertaken at the Bradford University School of Peace Studies and others associated with this research group.³⁶ Malcolm Dando of Bradford University presents his perspective in the following terms:

the historical process of misusing current biological and medical capabilities in offensive biological warfare program[s] continues. The genetic engineering techniques discovered in the early 1970s were misused in the former Soviet Union during the 1980s. But we are only in the initial stages of the revolution in biotechnology. The Human Genome Project — designed to uncover the full details of our genetic make-up by the early years of the twenty-first century — signifies how much further this scientific revolution and its applications have to run. There are undoubtedly dangers that the new knowledge might be misused, for example, to develop new biological weapons that could be targeted at specific genetic characteristics of different ethnic groups.³⁷

Another Bradford scholar, Jim Whitman cautions:

There is a danger that the speed of scientific and technological advances will outpace our deliberative systems.³⁸

While scientific and technological developments have not been fully examined within BWC processes in recent years, issues relating to biosecurity have been on the agenda in both the 2003-05 and 2007-10 inter-sessional processes. The WHO produced new or

34. See, for example, Koninklijke Nederlandse Academie van Wetenschappen (Royal Netherlands Academy of Arts and Sciences), *A Code of Conduct for Biosecurity: Report by the Biosecurity Working Group*, Amsterdam, August 2007, 43 pp.

35. The decision to appoint the working group was taken at the IAP General Assembly which met in Mexico City in December 2003.

36. These others include Alexander Kelle, Kathryn Nixdorff and Brian Rappert.

37. Malcolm Dando, *The New Biological Weapons: Threat, Proliferation, and Control*, (London: Lynne Reiner, 2001), 181 + ix pp at p 11. See also: Malcolm R Dando, *Preventing Biological Warfare: The Failure of American Leadership*, (Basingstoke: Palgrave, 2002), 231 + xiv pp, and in particular chapter 4 of that volume 'Genomics and the New Biotechnology', pp 62-74.

38. Jim Whitman, 'Global Governance and Twenty-first Century Technology', in: Brian Rappert (ed.), *Technology and Security: Governing Threats in the New Millennium*, (Basingstoke: Palgrave, 2007), pp 89-110.

updated guidance on both biosafety³⁹ and biosecurity.⁴⁰ There has been some academic analysis of this crossover between biosecurity and NACD activities.⁴¹

One scientific and technological development that is receiving particular attention in the literature is synthetic biology, which was described in an official US submission to one of the BWC Meetings of Experts in the following terms:

Synthetic biology refers to the design and construction of biological components and systems that do not already exist in the natural world, as well as the re-design of existing ones imparting novel biological functions. As an interdisciplinary domain that includes biologists, engineers, chemists, and computer modelers, and as an emerging field extending beyond the traditional genetic engineering, synthetic biology is poised to become the next significant transforming technology for the life sciences and beyond.⁴²

The implications of synthetic biology have been the subject of academic study,⁴³ proposals in the specialized scientific media,⁴⁴ and Parliamentary inquiries,⁴⁵ yet there is not, thus far, an emerging consensus on what the impact of these developments will be in anything other than a short timeframe.

Assumptions that wholly technological answers are needed to respond to technological changes should be avoided, according to Joshua Lederberg, a Nobel Prize-winning biologist:

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39. World Health Organization, *Laboratory Biosafety Manual* [third edition], document no WHO/CDS/CSR/LYO/2004.11, November 2004, 178 + viii pp.
 40. World Health Organization, *Biorisk management: Laboratory biosecurity guidance*, document no WHO/CDS/EPR/2006.6, September 2006, 33 pp.
 41. See, for example, James Reville and Malcolm Dando, 'The Rise of Biosecurity in International Arms Control', in: Brian Rappert and Chandré Gould (eds.), *Biosecurity: Origins, Transformations and Practices*, (Basingstoke: Palgrave, 2009), pp 41-59.
 42. United States of America, *Synthetic Biology: A Transforming Technology*, BWC/MSP/2008/MX/WP.4, dated 30 July 2008, 4 pp at p 1.
 43. See, for example, Alexander Kelle, 'Synthetic Biology & Biosecurity Awareness In Europe', *Bradford Science and Technology Report* [University of Bradford], no 9, (November 2007), 23 pp; and Jonathan B Tucker and Raymond A Zilinskas, 'The Promise and Perils of Synthetic Biology', *The New Atlantis*, (Spring 2006), pp 25-45.
 44. See, for example, Hans Bügl, John P Danner, Robert J Molinari, John T Mulligan, Han-Oh Park, Bas Reichert, David A Roth, Ralf Wagner, Bruce Budowle, Robert M Scripp, Jenifer A L Smith, Scott J Steele, George Church & Drew Endy, 'DNA synthesis and biological security', *Nature Biotechnology*, vol 25, no 6, (June 2007), pp 627-29.
 45. See, for example, UK House of Commons Science and Technology Committee, *Bioengineering* [Seventh Report of Session 2009–10], HC 220, published 25 March 2010, 52 + 182 pp.

There is no technical solution to the problem of biological weapons. It needs an ethical, human and moral solution if it's going to happen at all. There is no other solution.⁴⁶

Indeed, a recent volume has attempted to bring together many of the scientific and technological development issues and examine them in an international security context, including some of the human aspects.⁴⁷

Terrorism approach

A notable theme within the problem-oriented approach has been prompted by the possibility of the use of biological weapons, or other WMD, as a terrorist or criminal act. Literature on possible terrorist use of WMD, or the materials and technologies that contribute to them, is often a study of perception of threat rather than an absolute assessment of threat. This is particularly applicable in relation to biological and chemical weapons. Press reporting has followed the issues of the potential of WMD terrorism, often taking a shrill tone.

When terrorists or criminals innovate and find new methods of carrying out attacks, perhaps it is not surprising that there may be subsequent assumptions that more deadly methods may be used next. The hypothesis that new forms of attack by those identified as terrorists — whether assassination in the 1930s,⁴⁸ multiple casualty events in the 1970s⁴⁹ or suicide bombings of buildings in the 1980s⁵⁰ — produce a peak in fears of use

46. As quoted in: Richard Preston, 'Annals of Warfare: The Bioweaponers', *New Yorker*, 9 March 1998, pp 52-65 at p 65.

47. Brian Rappert and Cairiona McLeish (eds.), *A Web of Prevention: Biological Weapons, Life Sciences and the Governance of Research*, (London: Earthscan, 2007), 218 + xi pp.

48. The 1935 session of the International Conference for the Unification of Penal Law, held in Copenhagen, included the following as terrorist acts: 'ignition of asphyxiating or noxious substances', 'pollution, fouling, or deliberate poisoning of drinking water or staple foods' and 'causing or propagating contagious or epidemic diseases' – Thomas M Franck and Bert B Lockwood jr, 'Preliminary Thoughts Towards an International Convention on Terrorism', *American Journal of International Law*, vol 68, no 1 (January 1974), pp 69-90.

49. Take, for example, the following quote from a debate initiated in the UK House of Lords: 'One only has to think of the appalling [recent attacks] to realise that nowadays international terrorists will stop virtually at nothing. The chemical weapon is easily portable, cheaply made and easily used ... [We must] think seriously about the appalling danger that would be presented to international order and stability if international terrorists of the kind that carried out the shocking [attacks] were to decide to use, instead of the weapons that they used there, this kind of weapon of indiscriminate destruction' – Lord Chalfont, 7 June 1972, *Hansard* (Lords), vol 331, c 311-62. The attacks he refers to were at Lod Airport, Tel Aviv, on 30 May that year in which 3 Japanese Red Army terrorists, operating in conjunction with the Popular Front for the Liberation of Palestine (PFLP-GC), killed 24 people and injured over 70 more. Chalfont was a former Minister of State in the Foreign and Commonwealth

of biological or chemical weapons is outside the focus of this thesis, however the historical precedents should be borne in mind when considering the events of recent years. Nevertheless, fears of terrorist or criminal use of biological, chemical or nuclear materials were substantially enhanced by the 11 September 2001 attacks in the US and the anthrax letters posted later that year. One effect of these and other events⁵¹ was a growing realisation of the vulnerabilities of modern societies to disruption. These fears had direct influence on policy making.

In 1995, Aum Shinrikyo dispersed the nerve gas Sarin on the Tokyo underground and subsequent investigation indicated that the group was certainly involved with research into biological agents, although its efforts to use any of these did not appear to lead to any casualties. This prompted much literature on the possibilities of use of biological weapons. The period 1995 through 2000 is characterised by Milton Leitenberg as being driven by spurious statistics (for example, hoaxes being counted as biological events), unknowable predictions, gross exaggeration of the feasibility of acquisition of usable weapons, apparent absence of a thorough threat assessment, and extravagant rhetoric.⁵²

RAND analyst Brian Jenkins was concerned about the prevalence of ‘fact-free analysis’:

While no one can predict the future course of terrorism with confidence, the history of terrorism counsels us to think broadly but at the same time to exercise caution. The analysis of ‘dream threats’ is filled with pitfalls. It is easy to begin by identifying vulnerabilities — they are infinite, positing theoretical adversaries — they are legion, then reifying the threat — a subtle shift of verbs from could to may happen. ‘Could’ means theoretically possible while ‘may’ suggests more. So long as the reader and the policymakers understand the utility of what necessarily must be speculative, there is no problem. The danger arises when speculation becomes the basis for launching costly efforts to prevent ‘what ifs’, or worse, when policymakers believe that highly publicized preventive or mitigation efforts will

Office and would have had access to earlier government assessments on these issues.

50. For example, one press article quoted an ‘expert’ as stating ‘I believe there’s certainly a will (on the part of terrorist groups) to use chemical weapons’. The article then went on to say: ‘Frank Stunnenberg of the University of Amsterdam agreed, adding, “All that’s needed is the knowledge, and I don’t doubt that they can get it together.”’ Dr. Stunnenberg said that it would take nothing more than ‘a basic knowledge of chemistry and \$240’ to make 60 pounds of mustard gas - enough to threaten the population of a medium-size city.’ – Gary Yerkey, ‘Experts study threat of chemical weapons in terrorists’ hands’, *Christian Science Monitor*, 29 August 1986, p 9.
51. For example, the fuel protests in the UK in 2000 which caused significant disruption.
52. Milton Leitenberg, *Assessing the Biological Weapons and Bioterrorism Threat*, Strategic Studies Institute, U.S. Army War College, (December 2005), 115 pp at p 45.

deter such adversaries. This is not to say the threat is not real. I believe that major assaults on information systems are a real possibility. Terrorist use of chemical or biological weapons is a legitimate concern, although the evidence here is sketchier. My intention is rather to point to the risks of fact-free analysis.⁵³

However there were some more analytically based pieces in this period.⁵⁴ Jonathan Tucker noted that ‘information on past incidents of CBW terrorism is anecdotal and often factually incorrect’.⁵⁵ A later chapter in the same book highlights one incident in more detail:

During the hysteria preceding the RAF trial, the claim of a threatened terrorist attack with chemical weapons was seized upon by the media. Various anonymous sources then built up the story by claiming that the stolen-material hypothesis was correct. Once the story was in the public domain, it became further distorted by journalistic sensationalism. Finally, although the alleged incident had been debunked in the specialist literature on left-wing terrorism in Germany, none of the U.S. terrorism experts who repeatedly cited it took the time to confirm its veracity. Once one author accepted the rumo[u]r as fact, others simply followed suit, a case of ‘incestuous inter-quote.’ In conclusion, if one were to categorize this case in the history of terrorism, it would be better placed under the heading ‘terrorism and the media’ than ‘terrorism and chemical and biological weapons.’⁵⁶

Leitenberg later wrote that all of the trends he had earlier identified were continuing beyond 2001 and concluded:

For the past decade the risk and imminence of the use of biological agents by nonstate actors/terrorist organizations — ‘bioterrorism’ — has been systematically and deliberately exaggerated.⁵⁷

Other analysts identified that claims of the level of terrorism threat in other areas were also exaggerated.⁵⁸ Elsewhere, Leitenberg noted that exaggerated claims can be

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53. Brian Michael Jenkins, Foreword, in: Ian O. Lesser, Bruce Hoffman, John Arquilla, David Ronfeldt, Michele Zanini and Brian Michael Jenkins, *Countering the New Terrorism*, (Santa Monica, California: RAND Corporation, 1999) [prepared for the US Air Force], 153 + xxiv pp.
 54. See, for example, Jonathan Tucker (ed.), *Toxic Terror: Assessing Terrorist Use of Chemical and Biological Weapons*, (Cambridge, MA: MIT Press, 2000), 303pp.
 55. Jonathan B Tucker, ‘Introduction’, in: Jonathan Tucker (ed.), *Toxic Terror: Assessing Terrorist Use of Chemical and Biological Weapons*, (Cambridge, MA: MIT Press, 2000), pp 1-14 at p 13.
 56. David Claridge, ‘The Baader-Meinhof Gang (1975)’, in: Jonathan Tucker (ed.), *Toxic Terror: Assessing Terrorist Use of Chemical and Biological Weapons*, (Cambridge, MA: MIT Press, 2000), pp 95-106 at p 106.
 57. Milton Leitenberg, *Assessing the Biological Weapons and Bioterrorism Threat*, Strategic Studies Institute, U.S. Army War College, (December 2005), 115 pp at p 88.
 58. John Mueller, ‘Simplicity and Spook: Terrorism and the Dynamics of Threat Exaggeration’, *International Studies Perspectives*, vol 6, no 2, (May 2005), pp 208–34.

counter-productive as they may end up stimulating interest in biological weapons in people previously not considering development or use of biological weapons.⁵⁹ Exaggerated claims continue to be published.

Whether exaggerated or not, threat perceptions were influential on elements of the regime to control biological weapons. In particular, the adoption of topics such as national implementation and security of pathogens in the first BWC inter-sessional process represented a refocusing of the regime onto the potential threats from non-state actors.

That the perceptions of threat were changed for many people is beyond doubt, but hard evidence for assessment of real threat levels was difficult to find. Some attempts were made at putting together a framework for threat assessment in relation to hostile uses of dual-use materials by non-state actors⁶⁰ and in identifying signs that might be observed if a group attempted to acquire dual-use materials for hostile purposes.⁶¹

Evidence-based policy making was lacking in some countries. Two key allegations were made during the decade, that ricin had been produced in London and that al-Qaeda cells working on biological terrorism had moved from Afghanistan to the Pankisi Gorge in Georgia. The Pankisi Gorge allegations were originally made by US Secretary of State Colin Powell before the UN Security Council in 2003, during the now-infamous briefing to the Council on Iraq's alleged WMD, and repeated by French Interior Minister Dominique de Villepin in 2005. Neither the London ricin claim nor the Pankisi Gorge allegations appear to be based on any substantive evidence.⁶²

59. Milton Leitenberg, 'The self-fulfilling prophecy of bioterrorism', *Nonproliferation Review*, vol 16, no 1, (March 2009), pp 95-109.

60. See, for example, Lyle Makosky, Eric R Stephen, *Development of a Threat Assessment Framework Applicable to Dual Use Biotechnology*, Defence R&D Canada Contract Report, DRDC-CR-2007-003, April 2007, 58 pp.

61. T J Sullivan and W L Perry, 'Identifying Indicators of Chemical, Biological, Radiological, and Nuclear (CBRN) Weapons Development Activity in Sub-National Terrorist Groups', *Journal of the Operational Research Society*, vol 55, no 4, [Special Issue: 'OR in Defence'], (April 2004), pp 361-74.

62. Richard Guthrie, John Hart and Frida Kuhlau, 'Chemical and biological warfare developments and arms control', *SIPRI Yearbook 2006*, (Stockholm/Oxford: SIPRI/Oxford University Press, 2006), pp 707-31 at p 730.

A number of bioterrorism-related exercises were carried out, most notably *Dark Winter* and *Atlantic Storm*. Both contained scenarios that were considered implausible by other experts.⁶³ However, these and other exercises influenced policy and perceptions.

Analysis in a more measured tone was produced by some authors.⁶⁴

With widespread concerns that a new enthusiasm for suicide bombings indicated that terror groups would be unconcerned at the loss of life in an attack, and therefore such groups might have a greater interest in mass casualty WMD attacks, a notable approach was that of Adam Dolnik who examined neglected nuances of suicide terrorism. Dolnik noted:

the fact that some individuals are willing to sacrifice deliberately their lives for the ‘greater good’ does not necessarily translate into a self-destructive attitude among the rest of the group. Almost all suicide attacks to date have involved the death of individuals, carefully planned to sacrifice the lowest number of people necessary to carry out the operation. Even the September 11 attacks involved only the necessary minimum of personnel to overtake the airplanes and to complete the mission successfully.⁶⁵

Responding to suggestions that a greater danger is posed by religious cults, especially those with apocalyptic ideology, Dolnik notes:

most suicide cults tend to direct their violence only inward, committing collective suicide without attacking others ... Apocalyptic cults that do kill non-members, on the other hand, surprisingly tend to be oriented toward survival. Even members of the Japanese cult Aum Shinrikyo ... demonstrated their desire to survive by adopting extensive safety measures and by emphasizing survival of Armageddon as the main benefit of being the group’s member.⁶⁶

Public health approach

The understanding that the use of biological weapons – whether in warfare or as a terrorist or criminal act – is nothing more than the deliberate use of disease makes it apparent that

63. David Ruppe, ‘Experts question merit of recent smallpox exercise’, *Global Security Newswire*, 9 March 2005.

64. See, for example, John Parachini, ‘Putting WMD Terrorism into Perspective’, *Washington Quarterly*, vol 26, no 4, (Autumn 2003), pp 37-50 and Jessica Stern, ‘Dreaded Risks and the Control of Biological Weapons’, *International Security*, vol 27, no 3, (Winter 2002/03), pp 89-123.

65. Adam Dolnik, ‘Die and Let Die: Exploring Links between Suicide Terrorism and Terrorist Use of Chemical, Biological, Radiological, and Nuclear Weapons’, *Studies in Conflict and Terrorism*, vol 26, no 1, (January-February 2003), pp 17-35 at p 32.

66. *Ibid.*, p 32.

there is much common ground in responses to outbreaks of disease, whether they stem from natural, deliberate or accidental (such as a laboratory incident) causes.

At the same time as the greater awareness was building of the vulnerability of modern societies to disruptions caused by deliberate actions, such as the 2001 anthrax letters, there were increased concerns regarding the harm that could result from natural outbreaks of new diseases, such as the spread of Severe Acute Respiratory System (SARS) in 2003 or the possibilities of a Highly Pathogenic Avian Influenza (HPAI or 'bird flu') epidemic. This led to a new realization of the connections between health security and economic security, and the understanding that a significant impact on economic security that resulted from health issues could have a major impact on national security.

The World Health Organization is the inter-governmental body tasked with issues relating to public health. The 1970 WHO publication, *Health Aspects of Chemical and Biological Weapons*, was followed by a second edition in 2004, *Public health response to biological and chemical weapons: WHO guidance*. While this illustrates the involvement of the WHO within this subject area, there are particular issues that are of significance in relation to the interaction between health and security issues. This is probably best summed up by a concept known as the 'second diagnosis problem'.

The second diagnosis problem was first highlighted by Robin Coupland of the International Committee of the Red Cross. Coupland noted that the identification of a disease in any particular circumstance might be known as the 'first diagnosis'. However, if there was an allegation that a disease had been deliberately induced, this would require a 'second diagnosis' to resolve the situation — to identify how this deliberate act had been carried out and who had perpetrated the act. But who should make this second diagnosis and how long might this take? Coupland and colleagues recognized dangers of presuming health or humanitarian organizations should make the second diagnosis.⁶⁷

Individual authors have focused on particular aspects of these problems, such as dual-use issues or the interaction of the regime and public health issues. Some authors

67. Robin Coupland and Dominique Loye, 'International assistance for victims of use of nuclear, radiological, biological and chemical weapons: time for a reality check?', *International Review of the Red Cross*, vol 91, no 874, (June 2009), pp 329-40.

have suggested that one of the best ways to reduce the impact of any use of deliberate disease is to reduce the general impact of natural disease. One suggestion has been for a ‘vaccines for peace’ programme.⁶⁸

Amongst the developed countries, there is a notable US–Europe divergence, based mostly on different attitudes to health provision. In most of Europe public health, and healthcare in general, is seen as an activity for which it is correct that government should be involved with. In the USA, healthcare is seen as essentially a contract between a patient and a provider and the ‘legitimate’ role of government in health issues is the subject of much debate.

There is a particular overlap in the public health area with civil protection considerations and with terrorism issues. This has had great influence on the nature and tenor of public debate on the subject.

An influence that needs noting is the sponsorship of events and of literature by those that might benefit from decisions to follow particular policies. A simple example of this would be a meeting and report organized by the New Defence Agenda and the Chemical and Biological Arms Control Institute entitled ‘Countering Bioterrorism: How can Europe and the United States work together?’ The meeting was held in Brussels on 25 April 2005 and produced a series of recommendations. One proposed recommendation related to vaccine procurement. The meeting and report were made possible with the support of Acambis and Agilent Technologies, both of which are involved with vaccine production.⁶⁹

A further example was the presentation by a representative of Emergent BioSolutions Inc. (an anthrax vaccine manufacturer) at a side event of the 2009 Meeting of Experts in which it was stated that the casualty effects of a one megaton nuclear weapon can be reproduced with only 6.5 kg of anthrax, without citing a specific source.⁷⁰ However, this

68. Erhard Geissler and John P Woodall (eds.), ‘Control of Dual-Threat Agents: The Vaccines for Peace Programme’, *SIPRI Chemical & Biological Warfare Studies* [Scorpion Papers], no 15, Stockholm International Peace Research Institute, (1994), 265 + xvii pp.

69. Full disclosure: the author of this thesis was present at this meeting and was one of the participants that spoke against adopting recommendations.

70. Richard Guthrie, ‘The Final Day: closure and reflections’, *MX report no 6*, BioWeapons Prevention Project, 31 August 2009, p 2.

figure derives from a 1995 paper⁷¹ that suggested this number as a minimum requirement in near perfect conditions with high levels of technical expertise to achieve 100 per cent aerosolization in use against a totally unprotected population, noting that urban populations would gain some protection from the buildings they were in, thus requiring more material to be used. Indeed, the paper illustrated that with basic protective measures the quantity of anthrax required to have the same casualty effects as a one megaton nuclear weapon would be raised ten-thousand fold to some 65,000 kg. The irony of the use of the minimum estimate from the 1995 paper is that these suggested basic protective measures did not include vaccination.

Methodological approaches

In addition to the thematic, problem-oriented, approaches outlined above, there are a number of methodological approaches that are of notable significance.

The events approach

One method for analysing a regime as complex as that to control biological weapons is to break down developments into discrete but inter-related events and present them in a chronological sequence.

This is one of the approaches used by HSP and quarterly chronologies are published in its *CBW Conventions Bulletin*.⁷² Examples of events in the HSP dataset include:

- the presentation of official speeches, announcements, declarations or documents;
- the gathering of individuals at a particular location, including committees and conferences;
- the movement of individuals, either singly or as a group;
- the publication of papers, articles and books; and
- the births and deaths of individuals;

Clearly, the significance of any event, or what it might mean in relation to other events, is subject to interpretation and this interpretation may vary according to the experiences,

71. Karl Lowe, Graham Pearson and Victor Utgoff, 'Potential Values of a Simple BW Protective Mask', Institute for Defense Analyses Paper P-3077, September 1995.

72. Copies of the *CBW Conventions Bulletin* are available from the Harvard Sussex Program website at <<http://www.sussex.ac.uk/Units/spru/hsp/pdfbulletin.html>>.

assumptions and prejudices, or indeed the theoretical perspective, being brought to bear by the individual who is doing the interpreting.

A key characteristic of an event is that its validity can be determined, such that it can be established that a particular policy document was released or an article was published. It must be noted, however, that even if an event is considered to be valid, this does not mean that all data embodied within the event is automatically assumed to be accurate.

However, the collation of events in a logical sequence with appropriate cross referencing provides a particularly rich research resource.

A further publication that followed a not entirely dissimilar methodology was *Arms Control Reporter*, published from 1982 to 2007.

The form of events analysis described here is distinct from the events analysis developed by Charles McClelland in the 1960s which was a quantitative approach involving the creation of a database of events for the purpose of statistical analysis.⁷³

Critical period approach

A further approach is to examine a particular period in the lifetime of the regime and to examine it in detail. This approach combines elements of International Relations, Political Studies and Contemporary History. Two particular examples of this approach have dealt with events within the past decade and a half in the regime to control biological weapons.

The first of these, by Jez Littlewood,⁷⁴ is a detailed examination of the negotiations of the protocol for the BWC, their cessation in 2001 and the implications of this cessation. The second, by Guy Roberts,⁷⁵ also examines the events of 2001 and provides thoughts

73. The original Kansas Event Data System (KEDS) has now become the Penn State Event Data Project, see the project website at <http://eventdata.psu.edu/>

74. Jez Littlewood, *The Biological Weapons Convention: A Failed Revolution*, (Aldershot: Ashgate Publishers, 2005), 250 + ix pp.

75. Guy B Roberts, 'Arms Control without Arms Control: The Failure of the Biological Weapons Convention Protocol and a New Paradigm for Fighting the Threat of Biological Weapons', *INSS Occasional Paper*, 49, Institute for National Security Studies [United States Air Force], (March 2003), 111 + xii pp.

on how the international scene was leading to new forms of international effort to control biological weapons.

Each of these authors base their writings on their own experiences within the regime — Littlewood was a member of the Secretariat supporting the Ad Hoc Group and other BWC meetings, while Roberts was a senior member of the US delegation at BWC meetings.

Although other authors have written about the same period,⁷⁶ the particular experiences and background knowledge that these authors bring to the subject matter provides a more rounded and nuanced perspective.

There have been other notable analyses of critical periods. For example, Nicholas Sims examined the first decade after the entry into force of the BWC.⁷⁷ There have been a number of articles and papers that focus on the state of the regime after particular Review Conferences, for example.⁷⁸

The sectoral approach

Nicholas Sims produced a book in 2001 that took a different perspective on the evolution of the regime to control biological weapons. Unlike his earlier book, noted above, which took an essentially chronological approach to the developments, this later volume took a sectoral approach.⁷⁹ This latter book is focused on the BWC rather than the broader regime. The author notes ‘The treaty regime was defined and developed by a process of cumulative diplomacy and accretion; each review conference built on its predecessor’.⁸⁰

The three sectors, which Sims describes as ‘regimes’, identified by the author are a regime of compliance; a regime of development; and a regime of permanence. Sims

76. See, for example, Ken Ward, ‘The BWC Protocol: Mandate for Failure’, *Nonproliferation Review*, vol 11, no 2, (Summer 2004), pp 183-99; and Malcolm R Dando, *Preventing Biological Warfare: The Failure of American Leadership*, (Basingstoke: Palgrave, 2002), 231 + xiv pp.

77. Nicholas A Sims, *The Diplomacy of Biological Disarmament: Vicissitudes of a Treaty in Force, 1975-85*, (London: Macmillan; New York: St Martin’s Press, 1988), 356 + xv pp.

78. One such monograph is: Una Becker, ‘Light at the End of the Tunnel? The Sixth Review Conference of the Biological Weapons Convention’, *PRIF Reports*, 79, (2007), 41 pp.

79. Nicholas A Sims, ‘The Evolution of Biological Disarmament’, *SIPRI Chemical & Biological Warfare Studies* [Scorpion Papers] no 19, Stockholm International Peace Research Institute, (2002), 200 pp.

80. *Ibid.*, p 18

described his regime of compliance as composed of the elements of the BWC, such as the complaints procedure, ‘that served as functional substitutes for verification’ together with confidence-building measures and negotiations for a protocol that were still continuing at the time. His regime of development is described as ‘a set of principles and norms that lead to practical economic and social benefits’ and the regime of permanence as the ‘legal and diplomatic elements which reinforce the permanent character of the BTWC and render it more irreversible’.⁸¹

Sims concluded that, of the three, the regime of compliance had evolved the furthest, notwithstanding that ‘Every element in the regime of compliance remains underdeveloped, and each can be strengthened’.⁸²

In bringing these three regimes together, Sims identifies two lacunae. The first of these is a regime relating to research as research is not a prohibited activity under the BWC. As research is not a prohibited activity then, Sims argues, it does not fall within the general purpose criterion. The second identified lacuna is the lack of an institutional core to the Convention.

Sims concludes a need for ‘a balanced approach to the evolution of the BWC treaty regime in each of its sectors’.⁸³

In a later book, Sims continues to focus on countering institutional deficit, but focuses on accountability framework issues rather than research issues.⁸⁴

The sectors in the middle book in the Sims trilogy were drawn upon in a recent PhD thesis⁸⁵ in which James Revill analysed four dimensions — ‘Compliance Dimension’, ‘Development Dimension’, ‘Institutional Dimension’ and ‘Research Dimension’.

81. All quotes in this paragraph are from *ibid.*, pp 1 & 2.

82. *Ibid.*, p 171.

83. Nicholas A Sims, ‘Midpoint Between Review Conferences: Next Steps to Strengthen the BWC’, *Disarmament Diplomacy*, 91, (Summer 2009), <<http://www.acronym.org.uk/dd/dd91/91bwc.htm>>.

84. Nicholas A Sims, *The Future of Biological Disarmament: Strengthening the treaty ban on weapons*, (Abingdon/New York: Routledge, 2009), 216 + xvii pp.

85. James Revill, *The Biological and Toxin Weapons Convention 2001-2006: An Assessment of the Intersessional Process*, PhD thesis, University of Bradford, 2010.

Identification of regime obligations

As noted earlier (see Chapter 1, page 40), the second sub-question of the first Research Question of this thesis is:

Can the possible benchmarks or criteria used within assessment of regime effectiveness be related to principles, norms and rules (i.e., obligations) within the regime?

The wording of this question derives from earlier literature regarding regimes, especially that focused on Regime Theory. This is discussed in Chapter 6.

To tackle this question, the first task has to be the identification of the principles, norms and rules within the regime to control biological weapons. An initial working premise underpinning this question is that to be as useful as possible, as many as possible of the identified principles, norms and rules within the regime should be encompassed within the dimensions. Ideally, all of them should be taken into account within the proposed dimensions. Once principles, norms and rules within the regime have been identified, these can then be compared in Chapter 8 with the proposed dimensions.

As will be explained in Chapter 6 (see page 144), the distinction between principles, norms and rules is not always easy to make and therefore there is some utility in understanding these obligations together.

Sims elaboration

Nicholas Sims identified a number of obligations under the Convention.⁸⁶ He elaborated them on an article-by-article basis and these are presented below.

Article I — Never in any circumstances to develop, produce, stockpile, or otherwise acquire or retain, biological or toxin weapons (defined as: (a) microbial or other biological agents, or toxins whatever their origin or method of production, of types and in quantities that have no justification for prophylactic, protective or other peaceful purposes; and (b) weapons, equipment or means of delivery designed to use such agents or toxins for hostile purposes or in armed conflict)

Article II — To destroy them, or divert them to peaceful purposes, not later than 9 months after the entry into force of the convention

86. Nicholas A Sims, 'The Evolution of Biological Disarmament', *SIPRI Chemical & Biological Warfare Studies* [Scorpion Papers] no 19, Stockholm International Peace Research Institute, (2002), 200 pp at p 6.

Article III — Not to transfer them to any recipient whatsoever, and not in any way to assist, encourage or induce anyone else to acquire them

Article IV — To take any necessary measures to give domestic legal effect, within each state party, to its international obligations under the convention

Article V — To consult and cooperate as necessary, bilaterally and multilaterally, in solving any problems that may arise, including the use of ‘appropriate international procedures within the framework of the United Nations and in accordance with its Charter’

Article VI — To cooperate with the UN Security Council in any investigation which it may ‘initiate’ (English text) or ‘entreprendre’ (French text), should it receive a complaint that one state party finds another state party to be acting in breach of its obligations⁸⁷

Article VII — To assist victims, again in cooperation with the Security Council, if biological or toxin weapons are used against a state party⁸⁸

Article IX — To continue negotiations in good faith ‘with a view to reaching early agreement’ on a chemical disarmament treaty

Article X — To pursue international cooperation in the peaceful uses of micro-biology,, through the ‘development and application of scientific discoveries’ for the prevention of disease and for other peaceful purposes;; and to implement the BTWC in such a way as ‘to avoid hampering the economic or technological development of States Parties to the Convention’ or international cooperation in the peaceful uses of microbiology

A comparison of these identified obligations with the proposed dimensions of assessment of effectiveness of the regime is carried out in Chapter 8 (see page 231).

Kelle elaboration

In his analysis, Alexander Kelle, separately identified norms and principles in 2003.⁸⁹ He identified eight specific norms within the regime, together with a normative requirement

87. The identification by Sims of this distinction between the language versions has some significance as the term ‘entreprendre’ is often used in translation as an equivalent to ‘undertake’. For example, the official text of the Commission on Human Rights decision 2004/120 reads ‘Special Rapporteur to undertake a study on human rights and the human genome’ in English and ‘Rapporteur spécial chargé d’entreprendre une étude sur les droits de l’homme et le génome humain’. However, the *Oxford-Hachette French Dictionary* (1994 edition, p 308) gives the first entry for the meaning of ‘entreprendre’ as ‘to start, to set about’ and gives an example of ‘entreprendre une action en justice’ as ‘to institute legal proceedings’.

88. This article is the subject of some disagreement as to the obligations it contains. The phrasing of the Article refers to a situation ‘if the Security Council decides that such Party has been exposed to danger as a result of violation of the Convention’.

89. Alexander Kelle, ‘Strengthening the effectiveness of the BTW control regime — feasibility and

to negotiate a convention on chemical weapons which has now been fulfilled. These eight identified norms are: ‘non-use’; ‘non-acquisition’; ‘disarmament’; ‘non-transfer’; ‘cooperation’; ‘assistance’; ‘consultation’; and ‘harmonization’. Three principles of the regime are also identified in this article: ‘use of [biological and toxin weapon] agents constitutes an abhorrent act of warfare and is therefore prohibited’; ‘peaceful uses of the biosciences are a legitimate undertaking’; and ‘assumption of states subscribing to the regime that defenses [*sic*] against the threat or use of [biological and toxin weapons] are permitted’.

While the first three of these identified norms are self-explanatory, some of the others are worthy of elaboration. In Kelle’s analysis, the ‘non-transfer’ norm derives from BWC Article III and strengthened through national implementation measures adopted under Article IV. The ‘cooperation’ norm is based on BWC Article X with the ‘assistance’ norm deriving from BWC Article VII, and the ‘consultation’ norm deriving from BWC Article V. The ‘harmonization’ norm in this analysis is of a different character being implicit in nature. The example by Kelle of this norm in action is the harmonized behaviour of states participating in the Australia Group. Kelle also identifies the possibility of an ‘investigation norm’ but suggests that this is ‘practically absent from the existing BTW regime’.

A comparison of these identified norms and principles with the proposed dimensions of assessment of effectiveness of the regime is carried out in Chapter 8 (see page 232 onwards).

Issues relating to norms

Any attempt to ascertain the characteristic of any norm or norms under the regime to control biological weapons prompts certain questions. How should the norms of the regime be identified? Is there any distinction between the norms within the more general regime to control biological weapons and the more specific BWC. Are these same norms held by all of the participants within the regime and the States Parties to the Convention? If there is more than one interpretation of these norms, are these truly norms? Is there simply one overarching norm – the acceptance of the taboo against inflicting disease? Are

options’, *Contemporary Security Policy*, vol 24, no 2, (August 2003), pp 95-132.

the norms embedded in regime members or is participating in the regime in general or joining the BWC in particular simply a gesture?

It is incontestable that norms develop over time — change over time cannot be done universally as some states will have different rates of adoption or acceptance of new or amended norms. By definition, this highlights a weakness of Regime Theory as this theory implies norms are shared by all participants in a regime. A response to this point would be that this might be accommodated if there is an over-arching norm binding the regime together that has universal acceptance and it is what might be classed as ‘sub-norms’ that are the subject of development.

In addition to the development of norms, there are issues of membership of the group that has collectively adopted any norm. In the case of the BWC, the attitudes of a number of states has varied through the years. For example, France clearly indicated it could not support the BWC before it was opened for signature in 1972 but acceded to the Convention in September 1984.⁹⁰

Single or multiple norms?

Nicholas Sims notes that in statements to the Second BWC Review Conference in 1986, the preponderance was for suggesting that a single norm existed within the Convention, although he also notes that this ‘assumes that the phraseology was carefully chosen in each instance, which may not have been the case’.⁹¹ He also notes that language regarding norms was almost completely absent from statements and proposals at the Third

90. The French Representative to the First Committee of the UN General Assembly indicated on 29 November 1971 why France would not be signing the BWC: ‘What we fear is that on the international level this would be the first step towards a policy of disarmament without control. Such a policy would limit itself to prohibiting the manufacture of weapons, the use of which is unlikely in any case. It would have the serious shortcoming of giving credence to the idea that disarmament is forging ahead, whilst the true dangers will not have been allayed, and in the field of verification it will be based on the use of national means of observation and will therefore be discriminatory, since not all states have sufficient means. International control as a principle is the indispensable corollary to any disarmament measure of a contractual nature, albeit partial. If this element is ignored, the draft convention on the prohibition of the manufacture of biological weapons is an extremely dangerous precedent, the existence of which will weigh heavily upon all disarmament work. A State cannot merely have faith in the goodwill of other Powers in a field where its security is at stake.’ [A/C.1/PV.1838, as cited in SIPRI II, p 187-88]

91. Nicholas A Sims, ‘The Evolution of Biological Disarmament’, *SIPRI Chemical & Biological Warfare Studies* [Scorpion Papers] no 19, Stockholm International Peace Research Institute, (2002), 200 pp at p 163.

BWC Review Conference five years later.⁹² Plenary statements made by States Parties at meetings of the BWC's inter-sessional process and at the Sixth Review Conference in 2006 contain a mix of singular and plural in relation to norm(s).⁹³

Dynamic norms?

Clearly, norm(s) are not static. It is not simply that norm(s) at the core of the regime have evolved over time, the perception of the prohibition of biological warfare has also changed over the years. Rapid developments in the life sciences and the accompanying spread of biological materials and technologies to numbers of facilities that are orders of magnitude higher than the numbers when the BWC was negotiated. The ownership of facilities is also an issue as at the time of negotiation of the BWC, most facilities were under the direct ownership or control of governments. By the first decade of the 21st century many relevant facilities were privately owned. New forms of research in the life sciences are being carried out. There are fears that laboratories could be the source of new dangers. Should the expectation that there should be responsible conduct of research in the life sciences, with appropriate biosafety and biosecurity arrangements, be considered to be a new norm or sub-norm under the BWC or the wider regime? Ensuring responsible conduct of research requires engagement with many actors outside of government.

The bargain of the renunciation by States Parties of hostile uses of biological materials and technologies in return for freedom to gain the benefits of the peaceful uses of them is embodied in Article X of the Convention. Although most Western states have consistently put emphasis on the security aspects of the bargain, states seeking greater economic development see access to peaceful uses as a key justification for using precious governmental resources in their engagement with the Convention. The human cost of disease is widely recognised, but it is worth noting that there are many parts of the world in which the economic costs of infectious disease have a significant impact, not only through individuals being unable to be economically active when they are unwell, but also

92. Sims, p 164-65

93. For example, the document dataset compiled for this thesis can identify 7 plenary statements by States Parties and 4 by NGOs made in the Sixth Review Conference in 2006 that use the term 'norm'; while 2 plenary statements by States Parties, 1 by an international organization and 1 by an NGO used 'norms'.

through the efforts of others to take care of them. Might some states see Article X issues as a norm or sub-norm of the Convention?

Conclusions relating to earlier analysis

There are a number of conclusions and judgements regarding previous understandings that are relevant to the work of this thesis. The most fundamental of which is that understanding the problems presented by the issue of biological weapons and the possible solutions there may be is a truly multidisciplinary effort that spans the natural and social sciences. This thesis therefore has to go beyond standard political sciences and international relations literature.

There is a need to separate biological weapons from the other ‘weapons of mass destruction’ for a number of types of analysis. While there is significant common ground between biological and chemical weapons there are also important differences. Biological weapons should only be compared and contrasted with the other types of WMD where appropriate. The nuances of the differences between the NACD concepts are important, notwithstanding that there are sufficient overlaps so that it is worth considering all of these as one grouping for a number of purposes.

As might be expected, when viewing issues relating to the regime to control biological weapons through different lenses, different emphases are brought forth. In the approaches outlined in this Chapter there are no inherently contradictory understandings. However, policy perspectives and the choices that follow from them have implications for each other. Perhaps the clearest example of this is the tension between a need for controls on materials and technologies to prevent hostile uses of them while at the same time as there is a need for these to be accessible for peaceful purposes.

The shrill tone of much that is written about the possibility of terrorist use of biological weapons has had a dominant influence on much public debate and discourse. While this has not drowned out the more analytical commentators on the subject matter, it has meant that analysts reaching measured conclusions have had some difficulties having their voice heard. The ‘incestuous inter-quote’ problem has made the difficulties of delineating between allegations and confirmed cases much more pronounced.

It is apparent from the variety of problem-oriented approaches that each of these might be used as background for an evaluation of success, failure and other measures of effectiveness of the regime to control biological weapons, but it is clear that no one measure would encompass all of these approaches. Hence, in the work of this thesis, more than one axis or dimension of assessment of effectiveness should be explored, as anticipated in a sub-question of the first Research Question.

In a thesis, the convention after such a review of earlier understandings would be to position the author in the context of the existing literature. However, in this case, it is not such a straightforward proposition. In relation to the problem-oriented approaches identified above, all of the main strands have to be taken into account. The critical period approach that has been outlined above is the foremost relevant approach to be used within this thesis. However, these methods on their own will not be sufficient.

The key element in attempting to understand what has taken place within the regime to control biological weapons and to identify how certain perceptions, including those of effectiveness, influenced choices is to recognise that there are usually multiple causes in each decision or critical juncture that is relevant to the narrative.

In concluding this Chapter, it is worth noting at this point that the key challenge that arises within this thesis is the lack of a previously tested method for understanding effectiveness of a regime such as that to control biological weapons. While the existing methods that have been used to understand effectiveness that have been identified within the thesis provide lessons and some tools for application in the chosen area, none are suitable in their entirety for the task required here.

4. Use of the concept of ‘effectiveness’ within the context of the regime to control biological weapons

Signposting

Chapter 2 concluded with the simple, but rarely explicitly raised, question with a complicated answer — *what should effectiveness mean in the context of the regime to control biological weapons?* Having explored the regime to control biological weapons in Chapter 3, there is a need to illustrate why 2001 was a watershed; not simply for general international interactions relating to the regime to control biological weapons but in particular interactions relating to effectiveness. A second aim of this Chapter is to provide some basic quantitative results on the use of ‘effectiveness’ and related terms in documents from meetings of the Biological Weapons Convention.

One of the underlying assumptions within this thesis highlighted in Chapter 1 (see page 21) related to this watershed:

The events of 2001 were a watershed for the efforts to control biological weapons. The rejection by the US of the draft protocol to strengthen the BWC followed by the use of the US postal service as a delivery system for powdered *Bacillus anthracis* forced governments around the world to consider how materials and technologies that could be used to make biological weapons should be controlled.

This assumption needs to be explored as part of the case to illustrate why a new approach to understand effectiveness needs to start after this date.

Introduction

Amidst the official inter-governmental activities within the regime to control biological weapons, there have rarely been specific interactions about the meaning of the concept of effectiveness. However, concepts of effectiveness have appeared within texts from international meetings relevant to the regime and within the text of the Biological Weapons Convention itself.

From the quotations provided below it can be seen that the attitudes expressed in relation to effectiveness were very much focused on verification with the next most common focus being on Article X issues. This is most clearly elaborated in texts prior to the 2001 suspension of the negotiations for a protocol to strengthen the BWC — indeed, the very process of ‘strengthening’ the Convention has an inherent element of improving

effectiveness. Post-2001, with no further negotiations on a protocol and the introduction of the inter-sessional process, there are new elaborations of activities that might enhance effectiveness.

In essence, the ‘shock’ of the events of 2001 prompted an examination, both explicit and implicit, of what the regime to control biological weapons was for. This does not imply, however, that those carrying out this re-examination, either implicitly or explicitly, would come to the same conclusions.

The selected quotations, provided below in chronological order, illustrate the development (or lack of development) of the concept of effectiveness regarding WMD in general (initially) and then control of biological weapons once that had become a separate issue.

The United Nations General Assembly

From the beginnings of concerns about Weapons of Mass Destruction (WMD), there were expressed desires for ‘effective’ countermeasures to their spread. The first ever resolution adopted by the UN General Assembly includes the following text on the tasks allocated to the new Atomic Energy Commission:

The Commission shall proceed with the utmost despatch and enquire into all phases of the problem, and make such recommendations from time to time with respect to them as it finds possible. In particular, the Commission shall make specific proposals:

- (a) for extending between all nations the exchange of basic scientific information for peaceful ends;
- (b) for control of atomic energy *to the extent necessary* to ensure its use only for peaceful purposes;
- (c) for the elimination from national armaments of atomic weapons and of all other major weapons adaptable to mass destruction;
- (d) for *effective safeguards* by way of inspection and other means to protect complying States against the hazards of violations and evasions.¹ [emphasis added]

There are two points about the text of this resolution worth highlighting in particular. First, is that the reference is the elimination of weapons from national armaments and,

1. United Nations General Assembly, Establishment of a Commission to Deal with the Problems Raised by the Discovery of Atomic Energy, resolution 1(I), adopted 24 January 1946, paragraph 5, ‘Terms of reference of the Commission’.

secondly, this resolution was adopted before the UN definition of WMD had been agreed in 1947-48 (see page 44)

As noted earlier, UN General Assembly resolution 1378 (XIV) (see page 50), adopted on 20 November 1959, referred to an aim of ‘general and complete disarmament under effective international control’ and resolution 2602E (XXIV) (see page 51), adopted on 16 December 1969 which added the phrase ‘strict and’ thus referring to an aim of ‘general and complete disarmament under strict and effective international control’.

However, there seems to be very little on the public record as to what the term ‘effective’ is taken to mean other than in the broadest of terms.

The Biological Weapons Convention

There were some references to effectiveness as a concept in the BWC negotiations but this was never elaborated in any detail. Most references are general statements such as ‘effective elimination’ without specific attributes of how such effectiveness should be achieved. The UK proposals for drafts of the BWC as put forward on 10 July 1969² and 26 August 1969³ only use the term ‘effective measures’ in relation to undertakings to negotiate a chemical weapons convention.⁴

There are direct references to effectiveness within the text of the Convention as opened for signature in 1972 itself. For example, Preambular paragraph 1 reads:

Determined to act with a view to achieving *effective progress* towards general and complete disarmament, including the prohibition and elimination of all types of weapons of mass destruction, and convinced that the prohibition of the development, production and stockpiling of chemical and bacteriological (biological) weapons and their elimination, through *effective measures*, will facilitate the achievement of *general and complete disarmament under strict and effective international control*, [emphasis added]

2. Contained in document ENDC/255.

3. Contained in document ENDC/255/Rev.1.

4. Of the cables released in recent decades by the United States from the time of negotiation of the BWC that have come to the attention of the author, the emphasis in relation to ‘effectiveness’ is also in regard to any future potential chemical weapons convention. Notably, a memo from Kissinger to Nixon dated 28 April 1971 regarding the negotiations says on-site verification for biological weapons ‘could not possibly be effective without also being extraordinarily intrusive’.

The use of this terminology would seem to follow on from the evolution in the general and complete disarmament debate (see page 50 onwards) and UNGA resolution 2602E (XXIV). This theme is continued in Preambular paragraphs 7 and 8:

Convinced of the importance and urgency of eliminating from the arsenals of States, through *effective measures*, such dangerous weapons of mass destruction as those using chemical or bacteriological (biological) agents,

Recognizing that an agreement on the prohibition of bacteriological (biological) and toxin weapons represents a first possible step towards the achievement of agreement on *effective measures* also for the prohibition of the development, production and stockpiling of chemical weapons, and determined to continue negotiations to that end, [emphasis added]

There are also references to effectiveness in Article IX regarding calls for negotiations of a Chemical Weapons Convention, but these are in very general terms.

As with many other international agreements, the Biological Weapons Convention includes provisions for on-going review of its operation. These are included in Article XII:

Five years after the entry into force of this Convention, or earlier if it is requested by a majority of Parties to the Convention by submitting a proposal to this effect to the Depositary Governments, a conference of States Parties to the Convention shall be held at Geneva, Switzerland, to review the operation of the Convention, with a view to *assuring that the purposes of the preamble and the provisions of the Convention, including the provisions concerning negotiations on chemical weapons, are being realized*. Such review shall take into account any new scientific and technological developments relevant to the Convention. [emphasis added]

While the phrase ‘assuring that the purposes of the preamble and the provisions of the Convention ... are being realized’ is an embodiment of the concept of effectiveness by another name, there is no guidance in the language of the Convention as to how effectiveness should be considered.

The connection between assuring the provisions of the Convention are being realized and effectiveness is made explicit in the Rules of Procedure adopted for the BWC Review Conferences at the Preparatory Committee for the First Review Conference:

The task of the Review Conference being to review the operation of the Convention with a view to assuring that the purposes of the preamble and the

provisions of the Convention are being realized, *and thus to strengthen its effectiveness*, every effort should be made to reach agreement on substantive matters by means of consensus. There should be no voting on such matters until all efforts to achieve consensus have been exhausted. [emphasis added]⁵

The text of paragraph 28 has remained unchanged and the identical text was used for the Seventh BWC Review Conference in 2011.⁶ These Rules of Procedure were themselves based on the rules adopted for the Review Conferences of the nuclear Non-Proliferation Treaty, the first of which had been held in 1975.

The First BWC Review Conference

The First BWC Review Conference, held in 1980, considered a number of issues. The Final Declaration, adopted by consensus, included the following as its first preambular paragraph:

Reaffirming their determination to act with a view to *achieving effective progress* towards general and complete disarmament including the prohibition and elimination of all types of weapons of mass destruction and convinced that the prohibition of the development, production and stockpiling of chemical and bacteriological (biological) weapons and their elimination, *through effective measures*, will facilitate the achievement of general and complete disarmament under *strict and effective international control*. [emphasis in italics added]⁷

The final preambular paragraph reads:

The States Parties to the Convention reaffirm their strong determination for the sake of all mankind, to exclude completely the possibility of bacteriological (biological) agents and toxins being used as weapons. They reaffirm their strong support for the Convention, their continued dedication to its principles and objectives and their commitment to *implement effectively its provisions*. [emphasis in italics added]⁸

The phrasing ‘general and complete disarmament under strict and effective international control’ will have been recognized as consensus text taken from UNGA resolution 2602E

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5. Preparatory Committee for the First Review Conference, Biological Weapons Convention, ‘Draft Rules of Procedure for the Review Conference’, BWC/CONF.I/PC/2, dated 9 July 1979, paragraph 28.
 6. The Rules of Procedure are included in the report of the Seventh Review Conference, BWC/CONF.VII/7, dated 13 January 2012.
 7. First Review Conference, Biological Weapons Convention, ‘Final Document’, BWC/CONF.I/10, dated 21 March 1980, p 6.
 8. *Ibid.*, p 6.

(XXIV) (see page 51), adopted on 16 December 1969 and subsequently used in the first Preambular paragraph of the Convention itself.⁹

The Committee of the Whole during the First Review Conference reported on discussions in relation to Articles I–IV:

It was a widely held view that the scope of the Convention, as defined in the respective articles, had not given rise to any problems or caused any ambiguities in the process of its application by States Parties. In this connexion some participants also noted with satisfaction that no complaints had been lodged regarding violations of the obligations as provided for in these articles. On this basis they concluded that the provisions of Articles I – IV had been *effectively implemented*. [emphasis added]¹⁰

The use of the term ‘effectively implemented’ implies that an examination of the effectiveness of the Convention had been carried out. However, the only yardstick referred to in the record of discussions is that of complaints, and that no complaints equated with effectiveness.

The Committee of the Whole also reported on discussions in relation to Articles V–VII:

With regard to these articles, it was widely noted that no State Party had found cause to resort to the complaints procedure. The opinion was shared by several States Parties that, nevertheless, it would improve the *effectiveness* of the Convention if the complaints procedure were strengthened in accordance with principles of flexibility, objectivity and non-discrimination. [emphasis added]¹¹

While there are no specifics about what measures might be adopted to strengthen the complaints procedure, the agreement of this text indicates that delegations were recognising there were areas in which improvements could be made to enhance effectiveness of the Convention even if this was only couched in general terms.

9. From direct observation of negotiations, the benefits for the negotiation process of the insertion of text that has previously been agreed by consensus are clear as this technique allows for a focus on issues that require agreement.

10. First Review Conference, Biological Weapons Convention, ‘Report of the Committee of the Whole’, BWC/CONF.I/7, dated 18 March 1980, para 7.

11. Ibid., para 14. In the draft version of the CoW report circulated as an unpublished conference room paper on 14 March 1980 the equivalent paragraph read: ‘With regard to these articles, it was generally recognised that no situation had arisen to warrant resorting to the complaints procedure. The opinion was expressed that, nevertheless, it would improve the effectiveness of the Convention if the complaints procedure were strengthened and improved.’

The Final Declaration included the following in the section regarding Article V:

The Conference considers that the flexibility of the provisions concerning consultations and co-operation on any problems which may arise in relation to the objective, or in the application of the provisions of, the Convention, enables interested States Parties to use various international procedures which would make it possible to *ensure effectively and adequately the implementation of the Convention* provisions taking into account the concern expressed by the Conference participants to this effect.

These procedures include, *inter alia*, the right of any State Party subsequently to request that a consultative meeting open to all States Parties be convened at expert level.

The Conference, noting the concerns and differing views expressed on the adequacy of Article V, believes that this question should be further considered at an appropriate time. [emphasis in italics added]¹²

References were also made in the sections on Article IX in relation to effectiveness in very general terms relating to possible future controls on chemical weapons.

The Second BWC Review Conference

The Second BWC Review Conference, held in 1986, followed many of the precedents set by the First Review Conference. Therefore, some general comments on effectiveness that are repeats of language from the First Review Conference are not repeated here.

The section of the Final Declaration dealing with the Preamble to the Convention included the following language:

Confirming the common interest in strengthening the *authority and the effectiveness of the Convention*, to promote confidence and co-operation among States Parties, [emphasis in italics added]¹³

and:

Declare their strong determination, for the sake of all mankind, to exclude completely the possibility of microbial, or other biological agents, or toxins being used as weapons and reaffirm their strong support for the Convention, their continued dedication to its principles and objectives and their legal obligation

12. First Review Conference, Biological Weapons Convention, 'Final Document', BWC/CONF.I/10, dated 21 March 1980, pp 7-8.

13. Second Review Conference, Biological Weapons Convention, 'Final Declaration', BWC/CONF.II/13, dated September 1986, part II, p 2.

under international law *to implement and strictly comply with its provisions.*
[emphasis in italics added]¹⁴

The phrase ‘implement and strictly comply with its provisions’ is another form of expression indicating concepts of effectiveness.

In the section on Article V there was reference to a number of new measures for information exchange and encouragement for contact between scientists across national borders which were the first iteration of what became the current system of Confidence-Building Measures (CBMs):

The Conference, mindful of the provisions of Article V and Article X, and determined to strengthen the authority of the Convention and to enhance confidence in the implementation of its provisions, agrees that the States Parties are to implement, on the basis of mutual co-operation, the following measures, in order to prevent or reduce the occurrence of ambiguities, doubts and suspicions, and in order to improve international co-operation in the field of peaceful bacteriological (biological) activities;¹⁵

The phraseology ‘to enhance confidence in the implementation of its provisions’ and ‘to prevent or reduce the occurrence of ambiguities, doubts and suspicions, and in order to improve international co-operation in the field of peaceful bacteriological (biological) activities’ are forms of expression indicating concepts of effectiveness.

In the section on Article X there were reference to new measures to encourage or enable the fullest possible exchanges in relation to peaceful uses. The section concludes with the statement:

The Conference upholds that the above-mentioned measures would *positively strengthen* the Convention [emphasis added].¹⁶

The review of Article XII (the Article that embodies the provisions for review of the Convention) included the following language:

The Conference, noting the differing views with regard to verification, decides that the Third Review Conference shall consider, inter alia:
- the impact of scientific and technological developments relevant to the Convention,

14. Ibid., p 3.

15. Ibid., p 6.

16. Ibid., p 9.

- the relevance for *effective implementation* of the Convention of the results achieved in the negotiations on prohibition of chemical weapons,
- the *effectiveness* of the provisions in Article V for consultation and co-operation and of the co-operative measures agreed in this Final Declaration, and
- in the light of these considerations and of the provisions of Article XI, whether or not further actions are called for to create further co-operative measures in the context of Article V, or legally binding improvements to the convention, or a combination of both.¹⁷

This again illustrates that delegates were interested in effectiveness of the Convention, although there were no detailed consensus conclusions on what effectiveness entailed.

The Third BWC Review Conference, VEREX and the Special Conference

The Third BWC Review Conference, held in 1991, followed many of the precedents set by the First Review Conference. Therefore, some general comments on effectiveness that are repeats of language from the First and the Second Review Conference are not repeated here.

Within the review of Article IV, the Final Declaration included that the ‘Conference notes the importance of’ a number of issues including ‘Legislative, administrative and other measures designed *effectively* to enhance domestic compliance with the Convention’ [emphasis added].¹⁸

Key to the subject matter of this thesis was that the Third Review Conference agreed a mandate for a group of experts to consider verification issues which became known as the VEREX process (short for ‘verification experts’). A key paragraph of the VEREX mandate was contained within the section reviewing Article V:

The Conference, determined to *strengthen the effectiveness and improve the implementation* of the Convention and recognizing that effective verification could reinforce the Convention, decided to establish an Ad Hoc Group of Governmental Experts open to all States Parties to identify and examine potential verification measures from a scientific and technical standpoint. [emphasis added]¹⁹

17. Second Review Conference, Biological Weapons Convention, ‘Final Declaration’, BWC/CONF.II/13, dated September 1986, part II, p 10.

18. Third Review Conference, Biological Weapons Convention, ‘Final Declaration’, BWC/CONF.III/23, dated September 1991, p 13.

19. *Ibid.*, p 16.

The group of verification experts held a number of meetings from 1992 to 1993 which culminated in adoption of a report containing a number of possible measures considered worthy of further examination in order to strengthen the Convention.

The VEREX report, published in 1993 concluded:

32. Based on the examination and evaluation of the measures described above against the criteria given in the mandate, the Group considered, from the scientific and technical standpoint, that some of the potential verification measures would contribute to *strengthening the effectiveness and improve the implementation* of the Convention, also recognizing that appropriate and effective verification could reinforce the Convention. [emphasis added]²⁰

Some criteria for evaluating measures to strengthen the effectiveness of the Convention were used during the VEREX process:

During Verex 3, all 21 potential verification measures, identified during Verex 1 and examined during Verex 2, were evaluated by the group. To evaluate these measures an agreed methodology was applied based on the six mandate criteria.

The criteria for evaluating the measures are:

1. Strengths and weaknesses based on but not limited to the amount and quality of information they provide and fail to provide.
2. Ability to differentiate between prohibited and permitted activities.
3. Ability to resolve ambiguities about compliance.
4. Their technological, material, manpower and equipment requirements.
5. Their financial, legal, safety and organizational implications.
6. Their impact on scientific research, scientific cooperation, industrial development and other permitted activities; and their implications for the confidentiality of Commercial Proprietary Information (CPI).

The first three criteria mainly represent the *effectiveness* of individual measures; the second three mainly represent their requirements and their impact. According to these criteria, capabilities and limitations were considered. [emphasis added]²¹

There were discussions during the VEREX meetings that effectiveness was more than verification. This was raised in particular during discussions on Article X issues.

The results of the VEREX meetings were fed into a 'Special Conference' of the BWC states parties held in September 1994. The report from this conference noted:

20. Ad Hoc Group of Governmental Experts to Identify and Examine Potential Verification Measures from a Scientific and Technical Standpoint, Biological Weapons Convention, 'Summary Report', BWC/CONF.III/VEREX/8, dated 24 September 1993, 20 pp at p 9.

21. Ibid., p 10.

that the VEREX Report considered, from the scientific and technical standpoint, that some of the potential verification measures would contribute to *strengthening the effectiveness and improve the implementation* of the convention and that some combinations of some potential verification measures, including both off-site and on-site measures, could provide information which could be useful for the main objective of the Biological Weapons Convention. The Conference noted that the Report recognised that *appropriate and effective verification* could reinforce the Convention. [emphasis added]²²

The report of the Special Conference also included the mandate for the ‘Ad Hoc Group’ to be established to carry out negotiations on a possible protocol to strengthen the Convention which included a number of references to effectiveness and related concepts:

In pursuance of the second part of its mandate under Item 9, the Conference, determined to *strengthen the effectiveness and improve the implementation* of the Convention and recognizing that *effective verification* could reinforce the Convention, decides to establish an Ad Hoc Group, open to all States parties. The objective of this Ad Hoc Group shall be to consider appropriate measures, including possible verification measures, and draft proposals to strengthen the convention, to be included, as appropriate, in a legally binding instrument, to be submitted for the consideration of the States Parties. In this context, the Ad Hoc Group shall, inter alia consider :

Definitions of terms and objective criteria, such as lists of bacteriological (biological) agents and toxins, their threshold quantities, as well as equipment and types of activities, where relevant for specific measures designed to strengthen the Convention;

The incorporation of existing and further enhanced confidence building and transparency measures, as appropriate, into the regime;

A system of measures to promote compliance with the Convention, including, as appropriate, measures identified, examined and evaluated in the VEREX Report. Such measures should apply to all relevant facilities and activities, be reliable, cost effective, non-discriminatory and as non-intrusive as possible, consistent with the effective implementation of the system and should not lead to abuse;

Specific measures designed to ensure *effective and full implementation of Article X*, which also avoid any restrictions incompatible with the obligations undertaken under the convention, noting that the provisions of the convention should not be used to impose restrictions and/or limitations on the transfer for purposes consistent with the objectives and the provisions of the Convention of scientific knowledge, technology, equipment and materials. [emphasis added]²³

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22. Special Conference of the States Parties to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction, ‘Final Report’, BWC/SPCONF/1, September 1994, para 33.
 23. Special Conference of the States Parties to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction, ‘Final Report’, BWC/SPCONF/1, September 1994, para 36.

Discussions in the Ad Hoc Group focused on the development of a new legal framework in the Protocol under negotiation. Where discussion occurred on concepts of effectiveness it was primarily on effectiveness of verification rather than effectiveness of implementing the provisions of the Convention itself.

The Fourth Review Conference and the ongoing Protocol negotiations

Fourth Review Conference was held in 1996 to follow the 5-yearly pattern, but as it was convened while the Ad Hoc Group was ongoing it was held for only two weeks rather than the customary three. There were some general comments on effectiveness that were repeats of language from earlier Review Conferences so are not repeated in this analysis.

Overall, the references to effectiveness were very general. One notable reference is that in the review of Article II which included the following language:

The Conference recognizes that for any State acceding to the Convention after the entry into force of the Convention, the destruction or diversion to peaceful purposes specified in Article II would be completed upon accession to the Convention. The Conference emphasizes that the destruction or diversion to peaceful purposes specified in Article II should be carried out completely and effectively.

The context of this reference to effectiveness had been the admissions by both Iraq and Russia to activities that were construed by many to be in breach of the provisions of the Convention.

The Ad Hoc Group negotiations continued almost until the Fifth Review Conference, being brought to a halt in the middle of 2001.

Jez Littlewood summarised the process of the negotiations for strengthening the Convention in the following terms:

The key deficiency with the Convention is the paucity of provisions to ensure compliance with the obligations undertaken under it; states parties essentially have to trust one another to implement the BWC honestly and effectively. The danger inherent in this approach was recognised during the negotiations by both states and non-governmental observers. Rectifying this weakness in the BWC has been central to the efforts to strengthen the Convention since 1975. Although work on the Protocol began in 1995 the negotiations represented a change in the direction and speed of a continual evolution of the Convention. That evolution began in 1980 and continues through to the present day, but is subject to periods of intense

activity and periods of no activity. The decade between 1991 and 2001 was not so much an evolution as an attempted revolution. Rather than clarify the collective understanding and interpretation of the obligations contained in the BWC or agree politically binding measures which states parties were encouraged to undertake to enhance implementation of the Convention, its states parties attempted to develop a new, supplemental, legally-binding agreement which would have radically overhauled the implementation of the BWC. That revolution failed and at this juncture even the evolutionary process of strengthening the Convention has stalled.²⁴

The failure of this revolution prompted new efforts to find ways to strengthen the Convention and the wider regime of which it forms the core.

The Fifth Review Conference and the birth of the inter-sessional process

The Fifth BWC Review Conference was unable to arrive at any form of consensus in 2001, and was therefore suspended with many uncertainties of what the future might bring.

The resumed Fifth Review Conference, reconvened at the end of 2002, had one substantive item on its agenda — the creation of the first inter-sessional process (commonly referred to at the time as the ‘new process’). The proposed new process was a compromise and was discussed on a ‘take it or leave it’ basis.

At the core of the new process was an aim to reach ‘common understanding and effective action’ which has remained the key aim of the subsequent inter-sessional processes.

A brief numerical analysis

While there is no specific quantitative methodology within this thesis, the creation of a large dataset of documents from the official BWC meetings allows for some examination of the level of interest in concepts such as effectiveness within these meetings through simple text searches. However, before looking at specific numbers, it is worth raising some notes of caution.

24. Jez Littlewood, *The Biological Weapons Convention: A Failed Revolution*, (Aldershot: Ashgate Publishers, 2005), 250 + ix pp at p 9.

There are a number of possibilities that can artificially inflate the number of hits. The simplest is that some papers are issued in more than one form; for example, it has become common practice for some of the working papers to be circulated in advance in informal versions before there has been a chance to typeset them to the BWC meeting publication standards. A document captured in the database in its advance version and then its official version would then appear twice in the statistics. Similarly, if a paper is reissued when additional co-sponsors have signed up to it, both the original and the Rev versions will appear in the statistics. Other possible duplications can come from similar papers being issued in successive meetings and from the language used in statements or presentations being repeated from earlier interventions. A further complicating factor is that there are times when effectiveness of weapons or of countermeasures to weapons are referred to.

There are also other factors that might lead to an artificial reduction in the number of hits. The most obvious of these is that not all interventions are circulated in written form, especially if a session is closed. Some interventions are only circulated in the language they were given in.²⁵ There may be typographical errors in the circulated versions of documents. Finally, and more significant for some of the older documents for which only poor quality scans might be available, the limits of optical character recognition (OCR) software can mean that some letters or words are not recognized. This is especially true regarding the collection of VEREX documents.

It therefore follows that the information provided in the table below can only be regarded as a very rough guide to the level of discussion of effectiveness. It should be further noted that while considerable effort has been put in to make the dataset as comprehensive as possible for the period under closest examination within the thesis (i.e., from the start of the inter-sessional process in 2003 up to the Seventh Review Conference in 2011), the other periods covered in the dataset will, with some certainty, have some identifiable gaps, most notably plenary statements in the early Review Conferences.

Table 4.1 Numbers of documents containing specific terms			
Meetings	Documents containing 'effectiv*'	Documents containing 'strengthen*'	Total documents in dataset
First Review Conference (1980)	19	19	102

25. Official languages used within the BWC are: Arabic, Chinese, English, French, Russian and Spanish.

Second Review Conference (1986)	15	13	27
Third Review Conference (1991)	28	27	83
VEREX (1992-93)†	75	28	675
Special Conference (1994)	22	30	77
Ad Hoc Group (1995-2001)	454	298	1086
Fourth Review Conference (1996)	21	16	63
Fifth Review Conference (2001)	71	84	173
First ISP (2003-05)	247	197	638
Sixth Review Conference (2006)	152	148	274
Second ISP (2007-10)	537	527	1129
Seventh Review Conference (2011)	121	135	211
<i>Note: Searches carried out using the Lucerne search software</i>			
<i>† The collection of VEREX documents contains many that are of poor scan quality for which OCR is not possible</i>			

It is worth noting that documents that contain other terminology relating to effectiveness, such as ‘implement and strictly comply with its provisions’ tend to appear only in documents that also include terms deriving from ‘effective’ or ‘strengthen’.

Conclusions

The BWC was in something akin to a crisis in the period following the arrival of the Bush Administration in the US in 2001. In the middle of that year, negotiations that would have strengthened the Convention — through the adoption of a protocol that would have included formal verification arrangements and an international organization — were brought to a halt when the US announced it could not agree to anything that might result from those negotiations. The scheduled five-yearly Review Conference for the Convention at the end of the year had to be suspended as no consensus could be reached — the first time a WMD treaty review had ever been suspended in such a manner. The Review Conference resumed at the end of 2002 and agreed a limited statement focused on a work programme for the following years that became known as the ‘inter-sessional process’.

While the protocol negotiations were on-going, the focus of the potential effectiveness of the regime to control biological weapons was on what might result from the negotiations. With the negotiations halted, how should effectiveness of the regime be understood? The regimes to control chemical and nuclear weapons each had global inter-governmental organizations connected with them and the post-2001 efforts of many governments in these fields went primarily into strengthening these existing bodies, their interaction with states and implementation of the relevant treaties within states. As there

was no inter-governmental organization for the BWC, a number of issues had to be reconsidered from first principles by some governments.

The arrival of the Bush Administration may be regarded as the start of a ‘harsh winter’ in multilateral NACD issues. At the same time as there was a greater awareness of the threat biological weapons posed — prompted in many cases through fears of terror attacks (real and imagined) — there was also no coherent or cohesive thinking internationally on what was the best way to make progress on the subject. Moreover, political hostility from the US froze most multilateral non-proliferation, arms control and disarmament (NACD) processes as well as there being some hostility towards the US the way it had introduced its new policies.

These policies caused some bafflement amongst commentators, for example:

The tabling [by the United States], within two hours of the end of the [2001] Review Conference, of language, without any prior consultation even with close allies, proposing termination of the Ad Hoc Group and its mandate showed a serious misreading of the widespread desire of all the other States Parties to strengthen the effectiveness and improve the implementation of the Convention in accordance with the mandate of the Ad Hoc Group. The attitude of the United States ... is very hard to understand let alone explain. The rest of the world appreciates and recognizes the value of the multilateral regime against biological weapons in strengthening collective security and following the events of 11 September and the subsequent anthrax attacks in the United States, it would have been expected that the United States would have been aware of – and would have wished to benefit from – the considerable benefits that could accrue from multilaterally strengthening the BWC regime as national measures are always going to be subject to national interpretation and are unlikely to be harmonised internationally.²⁶

With other options unworkable in the contemporary political climate, the scene was set for the ‘new process’, a series of meetings that became known as the ‘inter-sessional process’, that was adopted in the resumed Fifth Review Conference in 2002.

It is therefore clear that the events of 2001 were a watershed for the efforts to control biological weapons. It is the inputs into this post-2002 process, and their focus on ‘common understanding and effective action’ that form the basis of this thesis.

26. Graham S Pearson, ‘The Central Importance of Legally Binding Measures for the Strengthening of the Biological and Toxin Weapons Convention (BTWC)’, *WMDC Paper no 28*, Weapons of Mass Destruction Commission, (January 2005) 59 pp at p 45.

5. Conceptual frameworks and the role of theory

Introduction

Having established that earlier literature regarding the regime to control biological weapons does not contain within itself the answers to the challenges posed by the research problem, there is therefore a need to examine what other sources might be used to provide such answers.

While earlier conceptual analysis of regimes and of policy processes should be examined in order to see what may (or may not) be learned from them, there are also broader aspects of the role of conceptualizations and identification of other areas of learning that require consideration.

The examination of theory in this thesis is in three chapters. This chapter deals with some overarching issues in relation to theory. Chapter 6 deals with issues relating to theories regarding regimes. Chapter 7 deals with theories regarding policy processes.

This chapter is in five parts. The chapter starts by examining the role of theory in the context of this thesis. The second section examines the distinctions between International Relations and Political Studies as separate disciplines. The third section explores broader disciplines drawn on, or referenced, within this thesis. This exploration also serves to try to identify confounding factors that might potentially distort or otherwise influence the findings of this thesis. The fourth section of this chapter examines lessons from the author's earlier policy world experience which have implications for conceptual analysis. The fifth section examines some differences between natural sciences and social sciences approaches. The chapter contains no specific conclusions as it is followed by two further chapters relating to theoretical issues. Overall conclusions relating to theories can be found at the end of the Chapter 7.

The role of theory in the context of this thesis

Any project involving collection of data requires the establishment of a conceptual framework within which it can be carried out. Such a framework needs to be based on conceptualizations, knowledge and understandings derived from earlier analysis. Such conceptualizations, knowledge and understandings are often referred to as theory. Theory

contributes to the creation of the conceptual framework¹ for a research project, and such a conceptual framework underpins the identification of the research problem and subsequent research questions.

The relationship between the gathering of data and the role of presuppositions, including theory, has been neatly summarised by Alan Chalmers:

How can we establish significant facts about the world through observation if we do not have some guidance as to what kind of knowledge we are seeking or what problems we are trying to solve?²

As this is a project incorporating features from different disciplines, it is worth noting that theory has been defined within separate disciplines with distinct, but overlapping, definitions. Moreover, even within disciplines there are variations in definition between analysts. For most sections of this thesis, these distinctions are not necessarily important as long as the possibilities of differences in terminology are recognized. Indeed, if an aspect of earlier literature is drawn upon, it is more important that the relevance of this literature for the subject matter of this thesis is recognized by all readers than focusing on the possibility that one reader will label this as a theory, a second as an abstraction and a third as an understanding.

Richard Feynman usefully summarises the distinction between giving something a name and understanding what it is that has been labelled:

[My father] taught me ‘See that bird? It’s a brown-throated thrush, but in Germany it’s called a halsenflugel, and in Chinese they call it a chung ling and even if you know all those names for it, you still know nothing about the bird — you only know something about people; what they call that bird. Now that thrush sings, and teaches its young to fly, and flies so many miles away during the summer across the country, and nobody knows how it finds its way, and so forth. There is a difference between the name of the thing and what goes on.’³

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1. Some would specifically call this a ‘theoretical framework’.
 2. Alan Chalmers, *What is this thing called Science*, [third edition] (Buckingham: Open University Press, 1992), p 12-13.
 3. Feynman recounted this anecdote many times. This rendition is quoted from his ‘What is Science?’ lecture to the National Science Teacher’s Association in April 1966. At this lecture he went on to say: ‘The result of this is that I cannot remember anybody’s name, and when people discuss physics with me they often are exasperated when they say “the Fitz-Cronin effect”, and I ask “What is the effect?” and I can’t remember the name’.

An often cited summary of the distinction between the hard and soft perspectives on theory (sometimes viewed as the narrow and broad interpretations) within policy theorising is given by Harry Eckstein.⁴ According to Eckstein, ‘hard’ theory has particular traits, and he identifies four of these traits primarily based on the empirical nature of any such theory and notes that this is sometimes referred to as ‘formal theory’. On the other hand, Eckstein describes ‘soft’ theory as being ‘simply regarded as any mental construct that orders phenomena or inquiry into them’. This is a very broad and inclusive perspective of what constitutes theory.

Clausewitz, a very practical analyst, expressed a narrower view on the role of theory in understanding the world: ‘Every theory becomes infinitely more difficult from the moment that it touches on the province of moral quantities’ and, therefore, ‘it is easier to determine, by theoretical rules, the order and conduct of battle, than the use to be made of the battle itself’.⁵

A particular difficulty with the broader perspective of theory for a thesis such as this is that, because this perspective is all-encompassing, it can be harder to distinguish between types of ‘mental construct’ being used, and therefore what the implications of such use are. An example of this might be counterfactuals.⁶ This thesis, therefore, follows the narrower perspective of theory. In short, the distinctive characteristic of a theory, as opposed to any other conceptualization, is that it contains a suggestion within it of how one thing leads to another.

This places this thesis within what is sometimes described as the problem-solving theory. While so-called critical theory — described by Devetok as ‘essentially a critique of the dogmatism it finds in the traditional modes of theorizing’⁷ — has a place, the issues being examined in this thesis are real-world problems.

4. Harry Eckstein, *Regarding Politics: Essays on Political Theory, Stability, and Change*, (Berkeley: University of California Press, 1992) 405 pp at pp 125-26.

5. Carl von Clausewitz, *On War*, [as translated by Anatol Rapoport] (London: Routledge & Kegan Paul Ltd, 1908), 461 pp [as reprinted in the *Penguin Classics* series, 1982], quotes used at pages 185 and 190 respectively.

6. From one perspective, counterfactuals are simply one part of theory; yet from another, they are the basis of thought experiments to test theories.

7. Richard Devetok, ‘Critical Theory’, in: Scott Burchill and Andrew Linklater (eds.), *Theories of International Relations* [3rd edition], Basingstoke: Palgrave Macmillan, 2005, pp 137-60 at p 143.

There are many lessons to be learned from a variety of theoretical backgrounds that are relevant to the policy areas within this thesis and, therefore, a key aspect of this thesis is to identify where such lessons exist, rather than embed the author into one particular lineage of theory rather than another.

A social sciences method that will be drawn upon is that which has become known as grounded theory. Despite the name, grounded theory is not a theory in itself but represents an underlying approach to generate data from source material. Grounded theory techniques have particular implications for the overall research process:

Most grounded theory researchers will begin with research questions but they do not start with a hypothesis, nor do they begin their investigation with a thorough review of the literature relating to their topic. They build up theory from their data and they do not wait until all data are collected before they begin their analysis stage. Instead analysis takes place as the data are collected.⁸

Theory and the real world

There has been a growing trend in the social sciences in recent times to suggest that there is no single reality in the world and that whenever an author attempts to relate their research to the real world there is a suggestion that this is a reversion to positivist thinking.

It is incontestable that there could be no singular objective view of the significance or otherwise of any single meeting relating to the Biological Weapons Convention as each individual within that meeting will have their own perspectives on what has taken place. However, the policy areas covered within this thesis have specific real-world relevance and there are some objective observations that can be made. Biological and chemical weapons have been acquired by governments. Both have been used to cause thousands upon thousands of casualties. Their potential impact is much greater. Efforts to counter them, and in particular to counter biological weapons, have significant public health benefits that save lives.

As will be noted in the conclusions to this thesis, it follows that policy choices made in this area have direct impacts — keeping some people alive and stopping others from dying.

8. Judith Bell, *Doing Your Research Project*, (Milton Keynes: Open University Press, 2005 [fourth edition]), 267 + xv pp at p 19.

An underlying *leitmotif* of this thesis is the gap between theory and practice in international relations. Many analysts have noted the divergence between those that contemplate international events from an academic perspective and those that are involved with decision making. The potential for over-theorizing policy areas has been specifically recognized by Joseph Nye:

the danger is that academic theorizing will say more and more about less and less.⁹

In the same opinion piece, he notes a cost to increasing theory:

Some academics say that while the growing gap between theory and policy may have costs for policy, it has produced better social science theory, and that this is more important than whether such scholarship is relevant.

This does beg the question as to what criteria should be used to establish if theory is better if it is not relevant.

Nye suggests there are particular influences at play:

Scholars are paying less attention to questions about how their work relates to the policy world, and in many departments a focus on policy can hurt one's career. Advancement comes faster for those who develop mathematical models, new methodologies or theories expressed in jargon that is unintelligible to policymakers.

Other commentators, such as Vendulka Kubalkova, have noted implications for the lack of relevance to academic study to policy making is not limited to disadvantages to policy makers:

IR need not be irrelevant to policy making. The lack of relevance is expressed in the deepening disdain with which policy makers approach research and advice proffered by academics. For policy makers, the ready-made substitute for scholarly advice is at hand in the Information Age ... If academic IR does not perform this role, if the debates become too esoteric or impossible to understand, the sanctions (often too subtle to be regarded as such) will come into play: funding for professors and job opportunities for graduates will flow elsewhere, and the status and the profile of the profession will be lowered. The franchise will be taken over by whoever else is capable of performing the relevant tasks: print media, television commentators, and journalists.¹⁰

9. Joseph S. Nye Jr., 'Scholars on the Sidelines', *Washington Post*, 13 April 2009.

10. Vendulka Kubalkova, 'Reconstructing the Discipline', in: Vendulka Kubalkova, Nicholas Onuf and Paul Kowert (eds.), *International Relations in a Constructed World*, (Armonk, NY: ME Sharpe,

Theory/policy gap issues

While Nye was referring to International Relations theorizing in a broad sense, in 1997, Nancy Gallagher posed herself the rhetorical question ‘is arms control immune from the theory/policy gap?’¹¹ She identified two groups — ‘international relations theorists’ and ‘foreign policy practitioners’ — which she described as both ‘struggling with similar problems’ in the post-Cold War world. She noted:

The world does not look significantly different from the ivory tower than it does from the trenches where policy battles are fought. Scholars are more apt to critique than applaud current policy, yet their criticisms reflect a range of worldviews and often amplify debates already occurring in closed-door policy meetings.

Gallagher concluded:

Despite these commonalities, ‘thinkers’ and ‘doers’ often operate in such divergent ways that they fail to hear each other, or even recognize that the other group has something interesting to say. The results are wasted effort, unnecessary duplication, and frustration both for practitioners who lack the time and detachment needed for long-term planning, and for scholars who wonder whether their research really matters.

The acknowledgement of real world issues can make the study of international relations substantially more difficult as the results of research have to be matched with the real world to assess their validity, leading to greater temptations to retreat to aspects of epistemic relativism:

Given the small number of entities available for observation, the lack of appropriate experimental venues, and the inherent desire of human beings not to be shown up as wrong, it is hardly surprising that in recent decades international relations scholarship has turned away from the intractable problems of dealing with the real world and towards linguistic gamesmanship and wordplay.¹²

Unfortunately, there is a considerable body of writing on the subject of international relations as well as on the subject of policy formation that is quite separate from the real

1998), p 198.

11. Nancy W Gallagher, ‘Bridging the Gaps on Arms Control’, *Contemporary Security Policy* (Special Issue — Nancy W. Gallagher (ed.), ‘Arms Control. New Approaches to Theory and Policy’), vol 18, no 2, August 1997, pp 7-13.
12. Henry L Hamman, ‘Remodelling International Relations’, in: Vendulka Kubalkova, Nicholas Onuf and Paul Kowert (eds.), *International Relations in a Constructed World*, (Armonk, NY: ME Sharpe, 1998), p 174.

world and an important task in a thesis such as this is to identify theory that is relevant to the areas under examination.

Highlighting situations where such a theory/policy gap manifests itself is one method by which an attempt can be made to diminish the gap. The same highlighting can be useful where there is a gap between declaratory policy and implementation activities. While it is beyond the scope of the thesis to identify solutions in all cases where these gaps occur, such highlighting can serve to help future identification of solutions or to learn lessons.

Drawing from distinct disciplines

Academic disciplines are human constructs. They have developed over time to have distinct natures and all are built on traditions of particular forms of study and analysis. Any study that involves human agency has to reflect social ontologies. However, this does not mean that any epistemology applied to a social ontology has to itself have a social character, although many relevant epistemologies do.¹³

International Relations vs Political Studies

The definition of International Relations as a distinct discipline is itself the subject of some controversy. It is uncontested that the study of International Relations draws upon many elements of political, economic and social studies. The question is whether the nature of the study of International Relations is distinctive enough to warrant being considered a distinct discipline. This has some relevance for the methodologies of this thesis as the nature of the research problem requires a multi-disciplinary approach to resolve it. The use of more than one methodology brings with it questions of consilience with regard to the research results. While the concept of consilience is normally used within the realm of the natural sciences it may be usefully applied within this thesis as it applies to real world activities.

In real world activities within the regime to control biological weapons the distinction between national political actors (acting within domestic policy processes) and national

13. See, in particular, the work of John Searle; for example, John Searle, *The Construction of Social Reality* (1995) and John Searle, *Making the Social World: The Structure of Human Civilization* (2010).

actors on the international stage can be illusory as many of the individuals involved perform both roles. Yet the boundary between Politics and International Relations ceases to be an illusion in academic study if the two areas of study are considered to be distinct disciplines.

For the purposes of this thesis, International Relations will be considered to be a distinct discipline as this will enable analysis of effectiveness of international regimes within a more transparent methodology.

Any study of the effectiveness of regimes has to include at least two constituent parts: an examination of how such arrangements themselves operate (an area of study traditionally carried out within the discipline of International Relations) and an examination of how these arrangements influence political entities, usually states, involved in the arrangements (an area of study traditionally carried out within the discipline of Political Studies). The first of these is required as consideration of any individual regime has to be in the context of previous literature regarding regimes. The second is required as any international collaborative arrangement can only be considered effective in its outcomes if, *inter alia*, political entities implement any measures required within such a regime, carry out activities expected within that regime and otherwise remain in compliance with the provisions of the regime.

The tradition with studies of International Relations has been to treat states as 'black boxes' (or 'billiard balls') and to carry out studies at the level of analysis of international interactions. This simplification of the role of the state is legitimate in many studies in order to be able to achieve usable results in a required timeframe. However, the consideration of regime effectiveness, with its associated interaction between political entities and regimes, requires that this boundary between levels of analysis be breached, at least in part.

To take a hypothetical example, suppose a phenomenon or activity 'A' is to be examined in order to see how it influences 'B'. In a straightforward case, any academic discipline that uses aspects of A as a unit or level of analysis can be used as a conceptual framework and B can be considered a black box. If, on the other hand, activities within B have an influence on A at the same time as A influences B, then considering B as a black

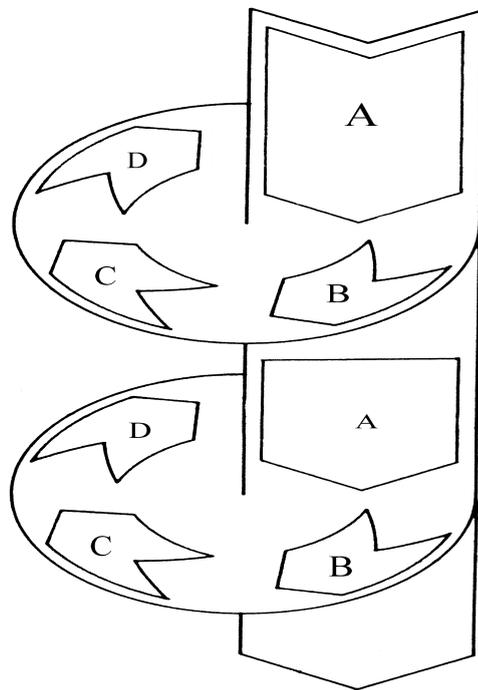
box is likely to lead to misleading results. This may not be an issue if the chosen academic discipline uses aspects of B as a unit or level of analysis as well as aspects of A; but if A and B are not shared as a unit or level of analysis in the same academic discipline then this should be considered as a boundary condition and the starting point should be to examine the interaction from both sides and then compare the results.

Much literature within Political Studies is based upon breaking up policy processes into analysable sections such that decisions can be analysed by understanding the influences on the decision makers. A political arrangement, whether a national system of governance or an international regime, is considered as the sum of these decisions. Assumptions that states are rationalist actors lead to assumptions that international negotiation be broken down into three stages for analysis — national preference formation, interstate bargaining and institutional choice — in a linear process. However, there are many cases in which the international situation influences the national preference formation. Indeed, if a regime is to be effective, especially in changing global conditions (both from political and from scientific and technological developments), it must have some form of influence on the participants in the regime. It therefore follows that the international process of the regime, which falls within the definition of ‘interstate bargaining’, must have an influence on on-going national preference formation if the regime is to be considered to be effective in achieving its objectives.

The indicative spiral in figure 5.1¹⁴ illustrates real-world interaction between governments and regimes. There are two ways it can be viewed. The first is that the large arrows represent national preference formation (A), with the subsequent smaller arrows representing interstate bargaining (B), institutional choice (C) and then regime interactions (D) which then leads back into national preference formation. The second is that the large arrows represent the regime (A) and its interactions with states with the subsequent smaller arrows representing national preference formation (B), interstate bargaining (C), and institutional choice (D) which then leads back into the regime.

14. This graphic is derived from the action research spiral published in S Kemmis and R McTaggart, *The Action Research Planner*, [Second Edition], (Victoria: Deakin University Press, 1982), p 11.

Figure 5.1



A leading proponent of rationalist framework analysis notes that this form of analysis ‘avoids a temptation that bedevils scholarship on international relations, namely to assume that state preferences are fixed’,¹⁵

It is important to look at interactions from both the regime and the governmental level.

As Martin Hollis and Steve Smith have noted:

The unit or state level exaggerates the differences among states, and underestimates the impact of the system on the actions of states; the systems level assumes that states are more homogeneous than they are and overestimates the impact of the system on the behaviour of the units.¹⁶

Chris Brown takes a slightly different approach:

The idea that there is a clear distinction between ‘politics’ and ‘international relations’ as subjects of theory is partly a reflection of a world composed of clearly delineated, bounded political entities — sovereign states — where the form that

15. Andrew Moravcsik, *The Choice for Europe: Social Purpose and State Power from Messina to Maastricht*, (London: Routledge, 1999), 514 + xii pp at p 20. [Note: this book was initially published by Cornell University Press in 1998.]

16. Martin Hollis and Steve Smith, *Explaining and Understanding International Relations*, (Oxford: Clarendon Press, 1991), pp 226 + vii at p 100.

political activity takes within the boundaries of these entities is dramatically different from the form of political activity between them.¹⁷

Most academic literature regards this boundary between the national and the international as sacrosanct. A key point missing in such literature is that people involved in national policy formulation are also key players within regime processes. This crossover of individual participants is important in interactions between governments and regimes. In intergovernmental meetings, for example, members of national delegations take on key roles such as chairing plenary meetings and chairing committees. In regimes which include an international organization, staff of that organization are often drawn from national delegations.

It therefore follows that a balanced consideration of influences that lead to policy and practical outcomes has to include investigation at both the national and the international level of analysis.

The classic analysis of this two-level game is by Robert Putnam.¹⁸ While Putnam identified the problem, he was not able to provide a coherent solution. Indeed, perhaps there may not be a coherent solution possible for such a complex set of interactions. Putnam's focus was on a highly theoretical game theory analysis of win-sets. However, this analysis produces results that are very dissimilar to the current author's practical experience.

In his classic work on the Cuban Missile Crisis, *Essence of Decision*, Graham Allison used three analytical models of decision making — Rational Actor, Organizational Behaviour and Bureaucratic Politics — each of which provided different explanations of some of Kennedy's decisions, each of which had significant international repercussions. Allison noted that each of these three models had implications for understanding international relations. For example, he noted: 'Applied to relations between nations, the bureaucratic politics model directs attention to intra-national games, the overlap of which constitutes international relations'.¹⁹

17. Chris Brown, 'The borders of (international) political theory', in: Noël O'Sullivan (ed.), *Political theory in transition*, (London: Routledge, 2000), pp 190-208 at p 190.

18. Robert D Putnam, 'Diplomacy and Domestic Politics: The Logic of Two-Level Games', *International Organization*, vol 42, no 3, (Summer, 1988), pp 427-60.

19. Graham T Allison, *Essence of Decision: Explaining the Cuban Missile Crisis* (Boston: Little,

Putnam noted, in relation to Allison's observations:

the nature of this 'overlap' remained unclarified, and the theoretical contribution of this literature did not evolve much beyond the principle that bureaucratic interests matter in foreign policymaking.²⁰

Attempts have been made to draw together some of the strands outlined above. For example, Moravcsik's work on liberal intergovernmentalism²¹ which describes developments in Europe almost as a policy market in which demand for outcomes (based on liberal, sometimes neo-liberal, conceptualizations) met supply of outcomes (based on intergovernmental conceptualizations). These two conceptualizations are mediated through the European institutions. Moravcsik illustrated how this policy market idea could also apply in other international arrangements.

The comparison of policy development with a market situation carries with it an assumption of changing circumstances over time which can affect both the supply and demand sides. This is an important recognition of the continually changing political contexts.

Foreign policy vs good governance

Traditional understandings of international relations are focused on assumptions regarding foreign policies adopted or activities carried out that are driven by security and other national interests. Yet much that happens within the regime to control biological weapons clearly can be identified as being in the national interests of participating governments but is not focused on traditional foreign policy concerns but on issues of 'good governance'. Literature on good governance has primarily had a focus on capacity building in less economically developed states, although there has been much activity within the regime to control biological weapons that has involved the building of capacities in all states.

Brown, 1971), p 149.

20. Robert D Putnam, 'Diplomacy and Domestic Politics: The Logic of Two-Level Games', *International Organization*, vol 42, no 3, (Summer, 1988), pp 427-60 at p 431.

21. Andrew Moravcsik, *The Choice for Europe: Social Purpose and State Power from Messina to Maastricht*, (London: Routledge, 1999), 514 + xii pp. [Note: this book was initially published by Cornell University Press in 1998.]

Broader disciplines drawn upon in this thesis

Much of the academic literature drawn on for this thesis is from the humanities and social sciences, and in particular theories of international regimes and of policy analysis. As these are particularly relevant for the Research Questions in this thesis, each has a chapter devoted to them (see Chapter 6 and 7 respectively). There are other bodies of earlier analysis that have relevance to the subject matter of this thesis, the implications of which should be noted. These additional areas include historical analysis, ethnography and innovation studies. In some cases, the descriptions provided below of the implications of these bodies of work also include lessons relating to methodology, it is more appropriate to include some of these details at this stage rather than Chapter 3 and the review of earlier analysis of the regime to control biological weapons.

While the sections below provide a brief outline of the relevance of each of these disciplines and earlier analysis within them, it should be noted that the preparation of a thesis of this nature also requires some understanding of the life sciences.

In addition, following the sections on disciplines there is some elaboration of lessons from the author's previous experience in the policy world that are not covered in other parts of this thesis.

One of the difficulties of too-tightly focused social science approaches to research problems is that they are often not good at identifying confounding factors external to the body of theory and earlier understandings being drawn upon. To take a hypothetical case, a researcher examining the traditions of wearing of certain types of clothing would be at risk of their results being overwhelmed by a confounding factor if they had not identified that a particular type of cloth was substantially cheaper or otherwise more easily available than all the others. This examination of related disciplines therefore also serves as a test to try to identify confounding factors that might potentially distort or otherwise influence the findings of this thesis.

Historical analysis

Any research project that compares circumstances pertaining at different times inevitably has an historical aspect. When those times are recent, this form of study is sometimes referred to as 'contemporary history'; this bears a number of similarities to political

analysis, although contemporary history tends to have a less prominent theoretical underpinning than political analysis. Historical analysis has been criticised for having ‘a largely descriptive purpose’.²² The development of theories within the social sciences, including international relations and political studies, have had a particular focus on parsimony. This has often led to theories being developed that suggest a single cause for an outcome. However, in the real world, there can often be many influences that lead to an outcome. In situations where there are a series of events that might lead to outcomes, such as series of meetings within the regime to control biological weapons, many of these influences may exist throughout the series but the strength of each of the influences may vary over time. Historical analyses can more easily accommodate multiple influences in understandings of the development of situations than conventional political analysis.²³

There have been analysts who rather than contrast social science analysis with history have instead tried to bring together the differing elements. Alexander George indicates that ‘the lessons of history’ can be combined into a comprehensive theory in relation to particular activities and notes that the development of policy-related theory can be based on intellectual cooperation between historians and political scientists.²⁴

The period covered by contemporary history, according to Jane Caplan, is ‘conventionally identified as that which lies within living memory, the outcome of which is not yet known’.²⁵ Much of the period of relevance for this thesis could be said to fall within this definition.

All case studies using historical analysis have a common feature relating to selection of relevant points. Jacob Burckhardt, a noted nineteenth century scholar, noted that history is ‘on every occasion the record of what one age finds worthy of note in

22. Kim Salomon, ‘What’s the Use of International History?’, *Journal of Peace Research*, vol 30, no 4, November 1993, p 376.

23. Colin Elman and Miriam Fendius Elman, ‘Diplomatic History and International Relations Theory’, *International Security*, vol 20, no 1, Summer 1995, pp 5-11. See also Jack S Levy, ‘Too Important to Leave to the Other: History and Political Science in the Study of International Relations’, *International Security*, vol 22, no 1, Summer 1997.

24. Alexander L George, ‘Case Studies and Theory Development: The Method of Structured, Focused Comparison’, in: Paul Gordon Lauren (ed.), *Diplomacy: New Approaches in History, Theory, and Policy*, (New York: The Free Press, 1979), pp 43-44.

25. Jane Caplan, ‘Contemporary History: Reflections from Britain and Germany’, *History Workshop Journal*, vol 6, no 1, Spring 2007, pp 230-38.

another'.²⁶ The selection in any historical analysis of any particular events or processes to have prominence over others can mean that these acquire a greater significance at the expense of those not selected. In the realm of contemporary history, this selection aspect of historical analysis remains significant as that which is recorded is remembered and saved but that which is not recorded is lost.

In policy communities, the history of how policy came to be how it is can have an influence on how practitioners within any particular policy process see their role. It can therefore be important to have an understanding of how practitioners see their role in an historical context. While this very quickly moves beyond the boundaries that need to be set for a research project such as this thesis, it is important to be aware of the 'conventional wisdom' that exists within a policy community (see page 44).

Historical analysis can highlight limitations of use of documentary evidence which can create a potential confounding factor which is discussed later (see page 137).

Ethnography

It may be argued that officials and diplomats involved in international issues form a community which operates within its own sets of rules and social conventions. To understand the context in which decisions within the scope of this thesis are discussed and adopted requires approaches derived from ethnographic methods. It should be emphasized that this thesis is not a true ethnographic study, but simply a study that draws on ethnographic understandings and methods in circumstances that are relevant to its scope. Ethnography has been defined in the following terms:

The study of people in naturally occurring settings or 'fields' by methods of data collection which capture their social meanings and ordinary activities, involving the researcher participating directly in the setting, if not also in the activities, in order to collect data in a systematic manner but without meaning being imposed on them externally.²⁷

26. As quoted in the Oxford Dictionary of Scientific Quotations (Oxford: Oxford University Press, 2006), citing the 1958 compilation of Burckhardt's work entitled *Judgements on History and Historians*

27. John D Brewer, *Ethnography*, (Buckingham: Open University Press, 2000), at p 10 [accessed via Google Books].

The term ‘naturally occurring’ is used to encompass circumstances that have not been designed or arranged by the researcher and will often include structures or arrangements that are human creations or constructs by the community that is being studied.

The relevance of ethnographic understandings and methods to the subject matter of this thesis can be simply summarised:

There is an emphasis within ethnographic methodology on the importance of understanding events in *context*. *Out* of context the nature of what has occurred may be misunderstood.²⁸ [emphasis in original]

A number of lessons of ethnographic research need to be heeded. Not least that the researcher, in interacting with the community being researched, has to be aware of their own preconceptions and assumptions about activities and events within that community.

In the case of this thesis, the author has been involved with this community for a number of years and has contributed materials that have influenced understandings within the community.²⁹ However, the interactive nature of this relationship need not cast doubt upon any research results. Moreover, this interaction falls short of the type of activity that would be considered Action Research.

The need for groundrules during ethnographic research has been clearly stated. Much literature has been produced relating to ethnographic research where the cultures of the researched and the researcher are significantly different. However, in the research carried out for this thesis this does not necessarily apply. In the field of research into education — circumstances where the cultural differences are not so stark — there has been much writing on groundrules in ethnographic research. For example:

It is undoubtedly necessary for every ethnographer to establish some type of ‘contract’ with the society to be studied. Such a ‘contract’ may include specifications about what records may or may not be examined; where the ethnographer may or may not go, when, and under what circumstances; which

28. Martyn Hammersley, *What’s Wrong with Ethnography?*, (London: Routledge, 1992), 230 + ix pp at p 23.

29. With regard to the Biological Weapons Convention, the author of this thesis has produced *Daily Reports* from each of the Meetings of Experts and Meetings of States Parties since 2007 as well as from the 2006 and 2011 Review Conferences which can be found at <<http://www.bwpp.org/reports.html>>. He also co-edited a *Briefing Book* for each of these Review Conferences. The 2011 edition can be found at <<http://www.bwc2011.info>>.

meetings may be attended and which are closed; how long the researcher will stay in the field; who (if anyone) has access to field notes, and who has the right to review and/or approve the ethnography and its analysis prior to publication, or under what circumstances they may or may not be published at all.³⁰

Within meetings relating to the regime — whether formal meetings of the BWC, workshops or seminars by groups of individuals interested in issues related to the regime, or within individual governments (or groups of governments) — there are issues of political sensitivity. The development of new policies or the elaboration of new means by which to enhance the regime can sometimes require exploration of issues behind closed doors. There are times in these circumstances where novel ideas are being explored and it is important to be able to distinguish between those in which officials are representing the considered views of their governments and those in which ideas are being presented and discussed on a level where personal expertise is being drawn upon to explore potential solutions to shared problems.

Other issues have a different form of sensitivity. Indeed, in understanding the utility of certain technologies for the potential contributions they might make within a programme to develop biological weapons, a by-product of such research can be the accumulation of information that itself becomes proliferation sensitive. The level of expertise of some of the participants means that it is important to avoid disclosure of proliferation-sensitive information in reporting their activities or views. Fortunately, it has been possible to draw up this thesis without reference to proliferation-sensitive information or breaching confidentiality of otherwise privileged information.

Innovation literature

Literature on innovation forms part of the study of science policy. Some of the analysis in this literature can be applied in other circumstances. As noted earlier (see page 64), the concept of ‘absorptive capacity’ is significant in understanding the dual-use nature of the WMD problem. There are further concepts within this literature that are relevant to this thesis.

30. Frank W Lutz, ‘Ethnography: the holistic approach to understanding schooling’, in Martyn Hammersley, *Controversies in Classroom Research*, (Buckingham: Open University Press, 1986), pp 107-19 at p 114.

Tacit knowledge within diplomacy

Within innovation literature there is a clear distinction between ‘information’ which can be codified, so be easily transferred between people, and ‘tacit knowledge’ which cannot be codified but is learnt through practice and experience.

An analogy often used within the teaching of innovation studies is that of driving a motor vehicle — there is only a certain amount that can be learnt through reading books and so much of the skill of driving comes through the development within each driver of relevant tacit knowledge — ‘learning by doing’.

Within diplomacy there is much that is uncodified and which is learned through experience. While there is much process and procedure — and what anthropologists might describe as ‘ritual’ — that can be codified, a substantial proportion of official interaction in formal and informal settings is at a level that includes tacit knowledge. For example, to gain a sense of how far to push a certain proposal within an international meeting, or to assess with some confidence how an amendment might be perceived, takes a considerable time to learn by doing.³¹

The tacit knowledge element in diplomacy is often missed by scholars as, by definition, it is uncodifiable.

Assumptions of path dependency and the concept of the adjacent possible

Any conceptualization of an artifact that has been created by human action is prone to suffer from assumptions that, because the artifact exists, the artifact’s coming into being in that form was inevitable. This applies whether the artifact is a political structure or an artifact that is a manifestation of a particular technology. In relation to both of these types of artifact, a concept of ‘path dependency’ has been highly prevalent in the literature.

In developments in both international politics and in technological innovation there have been assumptions that there were pathways to be followed and sometimes an implication that these pathways contained an element of inevitability. For example, the path of technological innovation was considered to be distinct from the society that

31. There have been some attempts to write what might be described as training manuals for representing governments in inter-governmental meetings. See, for example, Ronald A Walker, *Manual for UN Delegates*, United Nations Institute for Training and Research, 2011, 194 + xii pp.

created it. Technological artifacts were examined in isolation. Yet examinations of the history of the typewriter and the adoption of the QWERTY keyboard layout, the adoption of the clutch-brake-accelerator arrangement in motor vehicles, or the battle for video standards between Betamax and VHS illustrate that the derivation of all of these were in interaction with society. There was no inevitability in the outcome. There is now a considerable literature on the interaction between technological innovation and society.³² The same pattern of examination can be identified in the analysis of international arrangements. Early writings examined international arrangements in isolation with later analysis taking into account some of the domestic political aspects of policy making, including influences on individual policy makers.

The understandings from the lessons of innovation literature in the context of this thesis is important as there is no absolute reason why international diplomacy has to be carried out the way it does, the process is as much a human construct as the QWERTY keyboard. There are similar issues in questions of how international arrangements within the regime to control biological weapons are implemented on a national or other sub-international basis.

Within innovation literature the concept of path dependency has been supplemented by concepts such as the ‘adjacent possible’. Kauffman, a complexity theorist, defined this as the ‘set of configurations, reachable from any configuration in one step’ and that this ‘plays a role in formalizations of the self-organization of biological and other complex systems’.³³ The notion of the ‘adjacent possible’ has been applied in areas as diverse as biology, physics, economics and innovation.³⁴

It is relevant to the subject matter of this thesis to understand that what may be interpreted with hindsight as a path-dependent trajectory of development of a regime

32. See, in particular, the writings of Andy Stirling on innovation issues. See also Donald MacKenzie and Judy Wajcman (eds.), *The Social Shaping of Technology*, (Milton Keynes: Open University Press, 1988), 327 pp.

33. Stuart Kauffman and Lee Smolin, ‘A possible solution to the problem of time in quantum cosmology’, *Santa Fe Institute Working Paper no 97-03-020*, 5 March 1997, 15 pp, citing: Stuart Kauffman, ‘Investigations on the character of autonomous agents and the worlds they mutually create’, Santa Fe Institute preprint, 1996.

34. A recent application of this concept to innovation is: Steven Johnson, *Where Good Ideas Come From: The Natural History of Innovation*, (London: Allen Lane/Penguin, 2010), 336 pp.

could have been simply a sequence of adoption of next steps within the adjacent possible at each stage. This also has implications for other forms of historical analysis.

Lessons from policy world experience

There are two theoretical/analytical themes that are relevant to the subject matter of this thesis, neither of which appear to be represented in the academic literature, but which have previously been used by the author in his earlier policy work. As they are both touched upon later in this thesis, it is worth examining them here. One relates to groups of factors that impinge upon decisions; the other relates to categorising roles that individuals play towards policy formation. Also noted in this section are lessons from the author's experience in the policy world relating to the uses of documentary evidence and distinctions between mysteries and puzzles in the world of policy analysis.

Power/status, finance/resources and intellect/knowledge

Any decision — whether personal or in local, national or international policy — involves three groups of factors to be taken into account. These three groups have been used in understanding decisions for many years by the present author.³⁵

- power/status, each on an absolute basis as well as on a relative basis between those involved — these might be summarised as intangible benefits;³⁶
- finance/resources, essentially costs and benefits in an accountable manner, usually focused on financial costs and benefits — these might be summarised as tangible benefits; and
- intellect/knowledge, essentially those factors based on intellectual arguments, based on knowledge of a situation or process; sometimes this takes on a moral aspect in terms of the pursuit of a decision because 'it was the right thing to do'.

This group of factors also includes questions of culture and values.

A key feature of these groups of factors is that it is generally relatively easy to understand conflicting influences within each group — for example, the financial costs and benefits

35. This is a separation of influences used many times by the present author in previous incarnations in the policy world. In this use, it was never formalised and the groups of factors have been used with a variety of names but always reflecting the three fundamental areas. However, it is not possible to say for certainty where it originally derived.

36. The category of power/status could also include other forms of human-human interaction including such aspects of individual decision making as social networks.

of a potential decision, or where the balances of power lie between entities — but it is more difficult (if not impossible in almost all cases) to compare directly between groups.

As, in most cases, one or other of these groups of factors is dominant in any individual decision, it can be a highly successful political strategy to ensure debate is focused on the area in which a protagonist has most advantage.

A simple example of the interplay of these groups of factors would be an individual decision about purchase of a car. For some, the status symbolism of a particular model might be most significant in the choice of model. Others might be most influenced by financial issues, such as how much it costs to run. Yet more will be most influenced by outside intellectual issues such as what is the impact on the environment. In most cases, the decision will be brought to a conclusion on more than one factor. The key point here is that the separate groups of factors are broadly incommensurable. A particular model may be associated with power or status; how much status is worth a particular financial cost?

It is perhaps no coincidence that regime theorists suggested that there were regimes based on processes on power, interests and knowledge — in this work they had stumbled into the understandings that had existed for some time in certain parts of the policy world, although no direct reference is made to this by the leading regime theorists. Nor does there seem to be any substantive analysis of the interaction between these three groups within policy making.

Policy formation — making, shaping and implementing

A second method of policy analysis used in the author's previous policy experience is to analyse policy formation is to separate those who might be involved in policy development in any particular case into one of three categories — policy makers, policy shapers and policy implementers. This technique is particularly useful when seeking to influence policy development in one way or another by identifying who might fall within these categories.³⁷

37. This is a technique used many times by the present author in previous incarnations in the policy world. However, it is not possible to say for certainty where it originally derived.

This technique recognises that policy decisions are not taken in a vacuum and that the initial policy decision does not dictate the overall outcome of a policy. A simple example of this discontinuity in the UK context is policing policy, where a new power to stop and search was introduced by policy makers, but the police forces — the policy implementers — utilizing the power ended up with a policy outcome not intended by the policy makers, nor anticipated by the policy shapers.³⁸ A second UK example would be the introduction of new powers of investigation within the Regulation of Investigatory Powers Act 2000 which were then used in relation to much more trivial situations.³⁹

As both international regimes and national policy processes are analysed in later chapters, it will be seen that regimes have a potential for a direct influence on each of these three groupings within national policy processes.

Issues relating to documentary evidence

A further element of previous work by the present author relevant to this thesis relates to how meetings come to agreements on language such as that for treaties or conference declarations. Six methods by which consensus can be achieved in a negotiated text were identified — agree to disagree, persuasion, bargaining, deferral, deletion and ambiguity.⁴⁰ Another method, which is more of a procedural trick, was subsequently identified following further conversations with practitioners — that of limiting who it is that is able to participate in the negotiations.⁴¹ The processes that lead to ‘consensus by deletion’ and to what might be described as consensus by limited participation are of particular concern.

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38. See, for example: ‘Whilst we accept that there may be circumstances where the police reasonably believe, on the basis of intelligence, that a demonstration could be used to mask a terrorist attack or be a target of terrorism, we have heard of no examples of this issue arising in practice. We are concerned by the reports we have received of police using counter-terrorism powers on peaceful protestors. It is not clear to us whether this stems from a deliberate decision by the police to use a legal tool which they now have or if individual officers are exercising their discretion inappropriately. Whatever the reason, this is a matter of concern.’ Joint Committee on Human Rights [House of Lords & House of Commons], *Demonstrating respect for rights? A human rights approach to policing protest*, HL Paper 47-I / HC 320-I 2008-09, 23 March 2009, para 93.
39. See, for example: [No author listed], ‘Family’s shock at council spying’, BBC News, 11 April 2008, <<http://news.bbc.co.uk/1/hi/england/dorset/7343445.stm>>
40. Richard Guthrie, ‘Tackling ambiguities: lessons for the Review Conference from the Chemical Weapons Convention negotiations’, discussion paper, 28th Workshop of the Pugwash Study Group on the Implementation of the CBW Conventions, ‘The Second CWC Review Conference and After’, Noordwijk, the Netherlands, 5-6 April 2008, 4 pp.
41. The present author is indebted to Christopher Park of the US State Department for the identification of this method.

Working with documentary histories has to take into account the limitations that are inherent in any documentary record. In addition to general contextual concerns — identifying why a particular document might have been written, who might have been the intended audience and were there any particular messages the author(s) might have been meaning to convey or to divert attention from — the issues of consensus by deletion and consensus through limited participation have to be taken into account as these processes do not always leave clearly visible traces in the public record. This is of less concern if access to the processes that lead to the documents are visible ones, or if participants in the process are able to be open about what went on behind closed doors.

Delegations at inter-governmental meetings within regimes are usually in favour of attempting to reach consensus rather than voting for the simple reason that once the precedent has been set for voting this might become commonplace. With consensus, every state party has the power to stop anything it is sufficiently concerned about. With voting, although you might win the vote today on something you want to pass, you might also lose the vote tomorrow on something you felt was more important.

A point often missed by analysts looking into diplomatic processes from the outside is that nothing moves forward without the consent, or at least the grudging acceptance, of all the governments represented in the meeting. While academic literature often uses the term ‘consensus’ to mean a large majority, the term is used in international diplomacy to mean a lack of dissension. It should be noted further that while lack of dissension is very similar to unanimity in favour, there are subtle differences which users of the term should be aware of, especially if a consensus document or consensus declaration from an inter-governmental meeting is being referred to. Within EU circles, the term ‘unanimity’ includes situations in which abstentions are declared. In UN circles, a consensus would not normally be considered to have been achieved if there was any explicit expression of abstention.

As the suggestions compiled within each Meeting of Experts are not consensus documents and so each delegation can ensure its suggestions are incorporated into the list, many of the issues involved with documentary evidence are avoided.

Conclusions on conceptual frameworks and the role of theory

While overall conclusions on theory will be presented at the end of Chapter 7, it is worth noting at this stage that the examples provided within this chapter illustrate that a thesis such as this must be informed from a variety of theoretical inputs.

As summarised in the old adage, often cited as from Frederick Engels but sometimes attributed to Karl Marx, that ‘Practice without theory is blind, theory without practice is sterile’ summarizes the need for theory to both implement and examine practical action.

6. Regime Theory, the Oslo-Potsdam Solution and theoretical understandings of effectiveness

Signposting

The context and background of the problem of biological weapons was examined in Chapter 2 and the regime to control biological weapons was examined in Chapter 3, including a review of how this regime has been understood in earlier analysis. The background to some theory relevant to investigating the research problem and related research questions was provided in Chapter 5. This Chapter examines a body of work known as ‘Regime Theory’ that was specifically elaborated with the intention to bring new understandings to the study of international regimes. This Chapter specifically tackles this body of work and illustrates why this body of theoretical work does not provide tools needed for the area of study.

Introduction

This chapter provides an overview of what was, at an early stage, to be the main theoretical focus of this thesis; that is the body of thinking on international regimes that has become known as ‘Regime Theory’. However, as the work on the thesis progressed, it became apparent that the tools within Regime Theory were not ideally suited to the work within this thesis. A clear understanding of Regime Theory is required in order to have sense of its applicability and its limits. Understandings of the effectiveness of regimes are then explored, together with an examination of how methods of evaluation of effectiveness have been developed, including those outside of Regime Theory. The chapter continues with exploration of what is really meant by describing a regime as effective and whether the concept of effectiveness is an either/or quality or whether there are degrees of this quality.

This chapter was prepared as part of the initial effort to utilise existing Regime Theory as a framework of analysis for analysing effectiveness of the regime to control biological weapons. As research progressed it became clear that the limitations of Regime Theory outweighed its benefits for use as an analytical tool in the issues being examined within this thesis. Nevertheless, the examination of Regime Theory threw up a number of lessons learned which are relevant for this thesis. It has therefore been recast to allow such lessons to be drawn.

Regimes and Regime Theory

It should be of little surprise that literature in the realm of international relations on the subject of international regimes reflects the diversity of theoretical approaches that have been used in the study of international relations since the Second World War. These range from realist state-centric approaches that are dismissive of international regimes exercising influence on the behaviour of states, to neoliberal approaches which interpret creation of regimes as a demonstration of self-interest and rational choice, to constructivist approaches that explain compliance through the lenses of norms and rule following.

One of the pioneers of 'Regime Theory', Stephen D Krasner, defined regimes as institutions consisting of:

implicit or explicit principles, norms, rules, and decision making procedures around which actors' expectations converge in a given area of international relations. Principles are beliefs of fact, causation, and rectitude. Norms are standards of behavior defined in terms of rights and obligations. Rules are specific prescriptions or proscriptions for action. Decision-making procedures are prevailing practices for making and implementing collective choice.¹

This has become known as the 'consensus definition' notwithstanding that there is no consensus that this is the most appropriate definition but that there is simply a mainstream view.² While Krasner is credited with this definition, he himself acknowledges the prior work of others in this area. Nevertheless, for the purposes of discussion this will be referred to herein as the Krasner definition. The Krasner definition has been referred to as 'classic and famously vague'.³

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1. Stephen D Krasner (ed.), *International Regimes*, (Ithaca, NY: Cornell University Press, 1983), 372 + x pp at p 2; It is worthy of note that many commentators omit the words 'implicit or explicit' from the beginning of the quote when using this definition. See, for example, Hasenclever, et al., 1996.
 2. While academic literature often uses the term 'consensus' to mean a large majority, the term is used in international diplomacy to mean a lack of dissension — a criterion that the Krasner definition certainly does not fulfil. It should be noted further that while lack of dissension is very similar to unanimity in favour, there are subtle differences which users of the term should be aware of, especially if a consensus document or consensus declaration from an inter-governmental meeting is being referred to. Within EU circles, the term 'unanimity' includes situations in which abstentions are declared. In UN circles, a consensus would not normally be considered to have been achieved if there was any explicit expression of abstention.
 3. Radoslav S Dimitrov, Detlef F Sprinz, Gerald M DiGiusto and Alexander Kelle, 'International Nonregimes: A Research Agenda', *International Studies Review*, vol 9, (2007), pp. 230–58.

A second definition that is often referred to is that by Keohane in which he defines regimes as:

institutions with explicit rules, agreed upon by governments, that pertain to particular sets of issues in international relations.⁴

The Keohane definition is explicit in focusing on the actions of states. While the Krasner definition does not limit regime activity to states, the focus of the book it is quoted from is on state activities. Keohane refers to the Krasner definition as ‘a collective definition, worked out at a conference on the subject’.⁵

Notwithstanding that many analysts distinguish between principles, norms and rules in relation to the Krasner definition, Keohane calls this a ‘false dichotomy’ and elaborates on this point by pointing out:

at the margin norms and rules cannot be sharply distinguished from each other [and] it is difficult if not impossible to tell the difference between an ‘implicit rule’ of broad significance and a well-understood, relatively specific operating principle.⁶

Some authors try to compare norms, or at least a subset of norms, with legally-binding rules.⁷ This ambiguity has its uses in declaratory policies, but creates difficulties for analysis at a political level. Other authors have been more explicit and have attempted to draw out some of the distinctions while recognizing certain key similarities:

legally binding measures, of course, carry the greatest obligation: only legal norms need be treated as obligatory in international relations. Norms of a political or moral nature do not enjoy the same status ... However, the decisive factor is whether the provisions are perceived as binding; if they are, their formal status is of less importance.⁸

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4. Robert O Keohane, *International Institutions and State Power: Essays in International Relations Theory*, (Boulder: Westview Press, 1989), p. 4, , as cited in: Andreas Hasenclever, Peter Mayer and Volker Rittberger, ‘Theories of International Regimes’, *Cambridge Studies in International Relations*, (Cambridge: CUP, 1997), p 12.
 5. Robert O Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy*, (Princeton: Princeton University Press, 1984), p 57.
 6. Robert O Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy*, (Princeton: Princeton University Press, 1984), p 59.
 7. Ethan A. Nadelmann, ‘Global Prohibition Regimes: The Evolution of Norms in International Society’, *International Organization*, vol 44, no 4, (Autumn 1990), pp 479-526.
 8. Sverre Lodgaard, ‘The building of confidence and security at the negotiations in Stockholm and Vienna’, *World Armaments and Disarmament: SIPRI Yearbook 1986* (Stockholm/Oxford: Stockholm International Peace Research Institute/Oxford University Press, 1986), p 427.

There will be situations within this thesis where distinctions between principles, rules and norms will be less significant than the common aspect they share which is that they form an obligation, expectation, or standard of behaviour of some sort.

Outside of Regime Theory, there are many other uses of the term ‘regime’ in the literature. The major part of the variation in the use of the term derives from the adoption by the theorists of this word that was already in more general use.⁹ However, it would be erroneous to simply assume that the adoption of this sort of term from the general to the specific means that the specific suggested definition is locked into place with no possibility of other interpretations. In addition there has been somewhat loose further use of the term in other forms such as ‘verification regime’.

While both the Krasner and the Keohane definition define regimes as institutions, it is important to note that there is a distinction between international institutions and international organizations. While organizations would fall within the Keohane definition of regimes, they are generally regarded as being outwith the Krasner definition. However, international organizations may in their own right be valuable contributors to international regimes that they are part of — for example, the OPCW in the regime to control chemical weapons.

The field of study of international institutions has itself been known as ‘international organization’ and the journal of that name has been a key focal point of this field.¹⁰ It is

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9. For example, John Simpson, has defined the nuclear non-proliferation regime in the following terms: ‘The measures put in place to deter the spread of nuclear weapons, more commonly known as the nuclear non-proliferation regime, comprise an integrated network of unilateral, bilateral, regional and multilateral treaties and other standard-setting arrangements. Collectively, these measures provide a comprehensive framework for the behaviour of states, international organizations and other actors in the nuclear area. These measures constitute a global regime which has been evolving since the end of the Second World War.’ Emily Bailey, Richard Guthrie, Darryl Howlett and John Simpson, ‘Volume I: The Evolution of the Nuclear Non-Proliferation Regime’ (Sixth Edition), *PPNN Briefing Book*, Programme for Promoting Nuclear Non-Proliferation, March 2000, p 3. Other researchers dealing with WMD control issues have a broad interpretation of the term ‘regime’: ‘Despite the discrimination inherent in the [nuclear] non-proliferation regime, it thus serves the security objectives of all states that desire peace. This assessment can be sustained only if — *within the framework of the regime* — leading parties take effective steps to foster peaceful resolution of conflicts in trouble-prone regions and to contain and reverse arms races, not only between the industrialized states but also between antagonists in the South.’ [emphasis added] Harald Müller, David Fischer and Wolfgang Kötter, *Nuclear Non-Proliferation and Global Order*, (Stockholm/Oxford: SIPRI/OUP, 1994), p 9. A note within the book states that Harald Müller was the lead author of the chapter this quote was taken from.
10. See, for example, J Martin Rochester, ‘The Rise and Fall of International Organization as a Field of

in this journal that many of the early articles on Regime Theory were published, including versions of most of the chapters of the Krasner 1983 book.¹¹

It is important to note that Regime Theory is not the only suggestion offered to explain the observed phenomena. Buzan notes that Regime Theory stands in contrast to the Rationalist/Grotianist/International Society research strand of the English School.¹²

The origins of and impetus behind Regime Theory

The impetus behind the initial work on defining regimes was in a particular subject area:

The original normative concern ... was a desire to understand the consequences for the international economic order of a relative decline in American dominance.¹³

With this economic aspect in relation to a particular country as the focus, it is immediately apparent why many of the early papers on Regime Theory were published in the United States. However, as the application of this theory was broadened, the literature on the theory derived from a more diverse body of authors. A few early authors also tackled regimes outside predominantly economic areas.¹⁴

The economic basis of development of Regime Theory was made explicit by Keohane who noted ‘my study focuses on relations among the advanced market-economy countries’.¹⁵ However, politics and economics are inextricably linked and the possibility of separation of anything that is purely economic from anything that is purely political is vanishingly small.

Study’, *International Organization*, vol 40, no 4, (Autumn 1986), pp 777-813.

11. The chapters appear in the vol 36, no 2, (Spring 1982) edition of the journal.

12. Barry Buzan, ‘The English School: an underexploited resource in IR’, *Review of International Studies*, vol 27, no 3, (July 2001), p 475.

13. Marc A. Levy, Oran R. Young and Michael Zürn, ‘The Study of International Regimes’, *European Journal of International Relations*, 1995, vol 1, no 3, pp. 267–330.

14. See, for example, Ernst B Haas, ‘Is there a Hole in the Whole? Knowledge, Technology, Interdependence, and the Construction of International Regimes’, *International Organization*, vol 29, no 3, (Summer 1975), [special edition: *International Responses to Technology*], pp 827-76.

15. Robert O Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy*, (Princeton: Princeton University Press, 1984), p 6. Also worth noting from the same page ... ‘I begin with the premise that even where common interests exist, cooperation often fails’.

It would be an error to assume that there is a single 'Regime Theory', although many authors equate Keohane's 1989 contractualist (or functional) theory¹⁶ that has become known as 'neoliberal institutionalism' with the term.¹⁷

Other analysts view the study of regimes to be 'regime analysis' rather than an area of study based on a coherent body of 'regime theory':

Regime analysis as such is not a full-fledged theory, but rather a conceptual framework that needs to be 'filled' with theories. Most studies on international regimes have indeed made use of several types of social science theories, in particular, structural approaches (e.g. hegemonic stability theory), game theory, public choice theory, functional theory and cognitive approaches. In line with what we said before, none of these theories should a priori be regarded as superior. Every theory has particular strengths and weaknesses in terms of selecting, organizing and relating the information we observe in reality.¹⁸

Critiques of Regime Theory

A number of critiques of Regime Theory are presented here which challenge assumptions about regime types, the limitations of state centredness and the difficulty of analysing single elements in a complex international system.

Critiques relating to measures of effectiveness are provided within the discussion of regime effectiveness that appears later in this chapter.

Just as varying styles of music become popular for particular periods or as hemlines rise and fall, so there is a fashion element in the social sciences. This is sometimes beneficial as new analytical techniques or concepts are applied to many cases within short periods of time within a variety of areas of study. However it can also be limiting as the popularity of use of a technique or concept may be more to do with its fashionable nature at the time, or that it is being promoted by those with the loudest voices, rather than it being the most useful to bring forward greater understanding. This has the consequence, in some cases, of making the study of theories of international relations a study of the

16. Robert Keohane, *International Institutions and State Power: Essays in International Relations*, (Boulder, CO: Westview Press, 1989).

17. Andreas Hasenclever, Peter Mayer and Volker Rittberger, 'Theories of International Regimes', *Cambridge Studies in International Relations*, (Cambridge: CUP, 1997), 248 + x pp at p 28.

18. Thomas Bernauer, *The chemistry of regime formation*, Geneva: United Nations Institute for Disarmament Research, 1993), p 10.

academic community in the subject area rather than a study of how international relations are actually carried out.

General critique

The creation of a body of theory relating to regimes was not universally supported. The classic general critique of Regime Theory was provided by Susan Strange in 1982.¹⁹ She noted criticisms on five counts:

first, that the study of regimes is, for the most part a fad, one of those shifts of fashion not too difficult to explain as a temporary reaction to events in the real world but in itself making little in the way of a long-term contribution to knowledge. Second, it is imprecise and woolly. Third, it is value-biased, as dangerous as loaded dice. Fourth, it distorts by overemphasizing the static and underemphasizing the dynamic element of change in world politics. And fifth, it is narrowminded, rooted in a state-centric paradigm that limits vision of a wider reality.

It should be noted that the use of the term ‘paradigm’ in this context is itself ‘imprecise and woolly’. It is also possible to note that if Regime Theory were ‘for the most part a fad’ it would be unlikely to be being debated in such detail some 30 years later.

Other commentators also found the concept of regimes insufficiently specific:

In fact the regime concept, as used by adepts of this approach, has never been clearly defined ... Definitions of the concept cover a mixed bag of subjects reflecting different meanings.²⁰

Not only are these definitions of regimes criticised, but the fact that there are many other definitions in use has been commented upon. One of the contributors to the Krasner edited volume started his contribution with the following words:

Grappling with the problem of trying to describe and explain patterns of order in the anarchic world of international politics, scholars have fallen into using the term ‘regime’ so disparately and with such little precision that it ranges from an

19. Susan Strange, ‘*Cave! Hic Dragones: A Critique of Regime Analysis*’ which appears in: *International Organization*, vol 36, no 2, (Spring 1982), pp 479-96 and Stephen D Krasner (ed.), *International Regimes*, (Ithaca, NY: Cornell University Press, 1983), pp 337-54.

20. Pierre de Senarclens, ‘Regime Theory and the Study of International Organizations’, *International Social Science Journal*, vol 45, no 4, pp. 453-62, as quoted in Marc A. Levy, Oran R. Young and Michael Zürn, ‘The Study of International Regimes’, *European Journal of International Relations*, 1995, vol 1, no 3, pp. 267–330.

umbrella for all international relations to little more than a synonym for international organizations.²¹

Other scholars have felt that bringing forward definitions for regimes had brought about more confusion than clarification:

Despite attempts to clarify the concept, confusion reigns. What used to be simple, commonly understood distinctions between order and disorder, cooperation and conflict, and international institutions and international behavior[s] have become blurred from prolonged exposure to deep scholarly rumination.²²

Realists have criticised the emphasis on regimes/institutions and perhaps the most cited realist critique of regimes is that of Mearsheimer on the realist belief that international institutions have ‘minimal influence on state behavior[s]’,²³ and that ‘Institutions are not a form of world government. States themselves must choose to obey the rules they created’.²⁴

It is worth noting that realists from the days of EH Carr have stressed the limitations of international institutions.²⁵ Those realists that do take issues of international cooperation seriously argue that issues of power and of direct benefits to states are uppermost in regime formation where the world view is of a zero-sum game. This followed directly from the views of Kenneth Waltz who suggested the distribution of material capabilities within the international system of states was key to shaping any international order.²⁶ To Waltz, the primary ordering principle in the international system is power, rather than international law or international institutions.²⁷ Although he later acknowledged that his theories were ‘built up from the assumed motivations of states’.²⁸

21. Arthur A Stein, ‘Coordination and Collaboration: regimes in an anarchic world’, in Stephen D Krasner (ed.), *International Regimes*, (Ithaca, NY: Cornell University Press, 1983), p 115.

22. J Martin Rochester, ‘The Rise and Fall of International Organization as a Field of Study’, *International Organization*, vol 40, no 4, (Autumn 1986), p 800.

23. John J Mearsheimer, ‘The False Promise of International Institutions’, *International Security*, vol 19, no 3 (Winter 1994-1995), p 7.

24. John J Mearsheimer, ‘The False Promise of International Institutions’, *International Security*, vol 19, no 3 (Winter 1994-1995), p 9.

25. This point is inserted in order to recognise what so much of the literature says, even though the point is fundamentally in error. If it were correct, there would have been no individuals with a realist perspective in the 1920s (i.e., before Carr) who might have questioned the collective abilities of the League of Nations, for example.

26. Kenneth N Waltz, *Theory of International Politics* (New York: Random House, 1979), pp 97-99.

27. Kenneth N Waltz, *Theory of International Politics* (New York: Random House, 1979), p 97.

28. Kenneth N Waltz, ‘International politics is not foreign policy’, *Security Studies*, 1996, p 6.

From this realist perspective, perceived direct benefits from regimes are more important than any contributions that norms provide. The neoliberalist and constructivist perspectives have the role of norms at the core of their understandings of regimes. However, questions of power still have a role to play:

Neoliberals readily concede that cooperation is affected by power relationships, but argue that constellations of interests (which are not readily reduced to configurations of power) and prevailing expectations — which, in turn, are strongly influenced by the presence and content of international institutions — are at least as important.²⁹

Nonetheless, norms and the regimes built around them are only as potent as the perception of their importance by those who might be influenced by them. When norms come into direct contest with issues of national interest, political forces come into play that are often beyond the theories espoused in the study of international relations other than the most basic tenets of realism. An example of this is the Bush Administration rejection of certain norms as hindering national security interests in the early part of the 21st century.

One of the difficulties of power-based analysis of regimes is that this is often accompanied by an assumption that governments operate as unified entities. Indeed, as will be discussed in Chapter 7 this is rarely the case.

The liberal perspective is a counterpoint to this, as societies within countries are understood to be comprised of individuals and privately constituted groups which seek to promote their independent interests. By this understanding, a government should reflect the interests of the society (or from a segment of that society) from which it derives its authority and these interests will be further reflected in the international behaviour of states.

Indeed, this relates to one of the fundamental difficulties with Regime Theory in some areas of application — the assumption that cooperation has to be enhanced in an anarchic world of states, where states are fundamentally rivals.

29. Andreas Hasenclever, Peter Mayer and Volker Rittberger, 'Theories of International Regimes', *Cambridge Studies in International Relations*, (Cambridge: CUP, 1997), 248 + x pp at p 23.

Assumptions about regime types

Does Regime Theory equally apply to all forms of regime, and if it does not, can the theory underpin equally valid understandings to these different types of regime?

To take an example to illustrate this point, imagine that there is “Motor Vehicle Theory” that suggests that to be a motor vehicle, an item must have particular defining characteristics — say: wheels; a mechanical method of propulsion; a method of steering; and so forth. This might be the starting point for much literature about motor vehicles. However, understanding whether a particular motor vehicle is capable of being used to move two large boxes from one place to another is not enhanced by discussion under motor vehicle theory of how well colour coordinated the interior is; nor by discussion of whether the occupants have comfortable seats or other aspects that might relate to enjoyment of the ride.

To extend this analogy, how far could the same body of writings be applied to a sports car and a 7.5 tonne lorry? Is it correct to assume equivalence or similarity between the regime relating to behaviour in open waters, centred on the Law of the Sea Convention, with that relating to control of biological weapons? That the concept of regimes has been stretched to include a wide variety of disparate international activities has been recognised:

For the international organization field, the concept of regime has meant almost intellectual chaos. The problem is that the term has been stretched to embrace everything from a patterned set of interactions (an international system), to any form of multilateral coordination, cooperation, or collaboration (provision of collective goods), to formal rules (international law), to formal machinery (international organization).³⁰

Ruggie recognised in 1975 that not all regimes were similar. He identified three purposes for regimes: ‘Acquiring a capability’, ‘Making effective use of a capability’ and ‘Coping with consequences of use of a capability’. Alongside this, he identified four ‘instrumentalities’ relating to the relationship between a regime and national behaviour: ‘A Common Framework for national behavio[u]r’, ‘A joint facility coordinating national

30. J Martin Rochester, ‘The Rise and Fall of International Organization as a Field of Study’, *International Organization*, vol 40, no 4, (Autumn 1986), p 800.

behavio[u]r', 'A common policy integrating national behavio[u]r' and 'A common policy substituted for independent national behavio[u]r'.³¹

Keohane overtly stated that his study was on international regimes relating to money, trade and oil.³² There appears to be no evidential basis for an assumption that an international technology control/arms control regime such as that to control biological weapons should share key characteristics with regimes in these areas.

State centredness

While the Krasner consensus definition contains no reference as to whether the actors need be governments or even to have any official authority, by defining regimes in terms of decision-making procedures Krasner, perhaps inadvertently, introduces a circular argument which results in analysis using this definition being focused on states — as, under this definition, participants in a regime must have some form of authority to adopt decisions.

The introduction of consideration of decision-making procedures, requires that regimes become a matter of policy for the actors. Combined with the reference within the definition to 'a given area of international relations' means policy has to be made by the actors within the regime and this can therefore only be done at a level of government. This assumption of policy being made at a high level can, wittingly or unwittingly, lead to lack of attention to contributions to the regime at a lower level, for example by professional or trade associations or by public interest non-governmental organizations (NGOs).³³

Some analysts have noted that Regime Theory derives much of its analytical bite through focus on states as unified rational actors.³⁴ Other analysts note the difficulty of

31. John Gerard Ruggie, 'International Responses to Technology: Concepts and Trends', *International Organization*, vol 29, no 3, [special edition on: *International Responses to Technology*] (Summer 1975), pp 557-83, see in particular the table at p 572.

32. Robert O Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy*, (Princeton: Princeton University Press, 1984), p 15.

33. Although it has somewhat gone out of fashion, there used to be a distinction made in policy circles between public interest non-governmental organizations (PINGOs) and business interest non-governmental organizations (BINGOs). One joke doing the rounds at the time was that Australian NGOs should be called DINGOs ...

34. Lisa L Martin and Beth A Simmons, 'Theories and Empirical Studies of International Institutions',

treating states as rational actors. As noted earlier, governments are not like individual people and do not instantaneously acquire a unified perspective on any issue. Therefore it is not possible to apply rational actor model analysis to governments as a whole. This will be explored in Chapter 7.

The state-centred nature of Regime Theory has meant some analysts have questioned its applicability to a regime such as that to control biological weapons:

Whether the framework of regime analysis is still adequate to conceptualize and understand this plethora of activity [within the regime to control biological weapons] is debatable. Although regime analysis was, in part, intended as a shift away from realist conceptions of international relations with its acknowledgement of normative factors and of the influence of domestic politics on state behaviour, regime analysis is still a largely state-centred framework. However, the biological weapons problem is no longer (if, indeed, it ever was) one that is solely confined to or manageable by states.³⁵

Non-equality of states

Within most analysis of regimes, and in particular the behaviourist model of regimes, there has to be expectations by actors within a system of the behaviour of others; but are all actors equal? There may be obvious economic and political differences between states, yet the differences run deeper and have far more subtle effects. To take an example, would an assurance by a state about enactment of technology controls under the aegis of an international regime be perceived the same no matter which state gives it? To extend this example further, would the reaction by officials in most countries be the same to an identical statement that might be given in the names of Iran, Kiribati or Switzerland?

As cited earlier, Keohane notes 'my study focuses on relations among the advanced market-economy countries', (see page 145). Clearly relations between market-economy and non-market-economy countries might be somewhat different. This market-economy focus is prevalent in writing on Regime Theory.

International Organization, vol 52, no 4, (Autumn, 1998) [special edition: *International Organization at Fifty: Exploration and Contestation in the Study of World Politics*], p 738.

35. Daniel Feakes, Brian Rappert and Caitríona McLeish, 'Introduction: A Web of Prevention?', in: Brian Rappert and Caitríona McLeish (eds.), *A Web of Prevention: Biological Weapons, Life Sciences and the Governance of Research*, (London: Earthscan, 2007), pp 1-13 at p 7.

One element in a complex system

A particular issue in a situation such as the regime to control biological weapons is that it exists in a broader context. For example, the negotiations on the Biological Weapons Convention were heavily influenced by factors relating to nuclear weapons, in the form of the SALT negotiations, and to chemical weapons, and in particular their transport across the United States.³⁶ It follows that if an analysis of the development of the regime to control biological weapons during the period 1968-72 did not take these factors into account it would not be able to adequately explained how events unfolded. Nonetheless, there exists, even in respected academic literature, a number of myths about the Nixon Administration's renunciation of biological weapons.³⁷ This is a clear example where mythology surrounding WMD issues has been taken by some analysts as literal truth so that such research takes on an almost euhemeristic character.

Although most analysts recognise broader contexts that regimes sit within, Regime Theory can fail to take account of such wider political situations which can contain many influences that are not directly related to a regime but which may impinge upon it. This is a consequence of developing parsimonious theory and need not be a failing so long as application of Regime Theory in any particular circumstance takes these broader contexts into account.

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36. The memo that triggered the US National Security Council review of chemical and biological warfare policy in 1969, which is cited by many as being a significant step in allowing negotiations for the BWC has this as the major paragraph: 'I am increasingly concerned about the structure of our chemical and biological warfare programs, our national policy relating to such programs, and our public posture vis a vis chemical and biological warfare activities. It is clear the Administration is going to be under increasing fire as a result of numerous inquiries, the more notable being Congressman McCarthy's and Senator Fulbright's.' — untitled memorandum, Secretary of Defense Melvin Laird writes to the President's Assistant for National Security Affairs Henry Kissinger, dated 30 April 1969, as retrieved from: Washington National Records Center, OSD Files: FRC 330-75-0089, Box 50, 370.64 CBR [the document carries a 'Confidential' security marking until declassified 3 February 2003, although there was a Nixon Presidential Library copy released in 2001 but subsequently withdrawn before being re-released]. McCarthy's focus of these issues had started with the transport of chemical weapons across the USA.
37. For a useful commentary about how the US position unfolded that provides a corrective to the mythology, see Jonathan B. Tucker, A Farewell to Germs: The U.S. Renunciation of Biological and Toxin Warfare 1969-70, *International Security*, vol 27, no 1 (Summer 2002), pp 107-48, in particular the section starting from p 115.

General Regime Theory conclusions

The study of regimes is not contiguous with Regime Theory, yet Regime Theory has come to influence much of the scholarly analysis of regimes. While there is no single Regime Theory, there are common threads.

Regime Theory covers a diversity of regime types — including those that cover international finance, trade, oil, security through military cooperation as well as security through control of materials and technologies. Each of these issue areas has unique characteristics and this diversity of issues, purposes and instrumentalities are too broad for a general theory to apply in all cases. Key variations mean that understandings that might be valid in one flavour of regime, such as one relating to economic cooperation, may not apply in another, such as technology control or arms control.

A key question remains regarding evaluating regime effectiveness. If a problem such as the threats and risks associated with hostile uses of the life sciences is to be tackled through regime activities then a more nuanced understanding of effectiveness is required in order to assist development of better policies and activities under the auspices of the regime.

Understanding effectiveness of regimes

In the early development of Regime Theory, the focus of understanding of the effectiveness of a regime was on how it affected the interaction of the states involved. For example, some of the most respected promoters of Regime Theory note that measures of effectiveness should include evaluation of the purposes of a regime, but that:

The most fundamental and most widely discussed of these purposes is the enhancement of the ability of states to cooperate in the issue area.³⁸

Within the realm of Regime Theory, there is no consensus on what effectiveness is. An early example deriving from hegemonic stability theory posits that a regime is effective if it results in cooperative behaviour among the participants that they would have been unlikely to have carried out if the regime had not existed. However, this can be very difficult to test except in specific circumstances that occur by chance or by exploration

38. Andreas Hasenclever, Peter Mayer and Volker Rittberger, 'Theories of International Regimes', *Cambridge Studies in International Relations*, (Cambridge: CUP, 1997), 248 + x pp at p 2.

through counterfactuals. Moreover, in the period of this case study, the supposed hegemon, the United States, was at odds on key policy issues with many of the other BWC States Parties.

A further consideration is that there is a difficulty in defining precisely what an effect is:

When regimes analysts looked for effects, these were understood to be outcomes influenced by a constellation of rules rather than just tasks performed by a collective international agency.³⁹

Within the remit of Regime Theory, there is much written about the defining characteristics of a regime, much about how participants operate or act together within a regime and some about what the situation might be if there wasn't a particular regime in place. However there is relatively little written about the level of effectiveness of the type of regime being examined in this thesis in achieving the principles for which it was established. A clear example of where measures of effectiveness through results are important would be the international efforts to eradicate smallpox or polio. While cooperation and interaction between the major players are key aspects of whether the eradication effort succeeds, the most significant measure of success/failure in such a regime would be the numbers of cases of infections that occur in each year of the continuing effort.⁴⁰

A new direction in trying to come to terms with questions of effectiveness was attempted in the environmental arena in the 1990s by a research team headed by Oran Young. Young's approach can be distinguished from much that had been written before.⁴¹

39. Lisa L. Martin and Beth A. Simmons, 'Theories and Empirical Studies of International Institutions', *International Organization*, vol 52, no 4, (Autumn,1998) [special edition: *International Organization at Fifty: Exploration and Contestation in the Study of World Politics*], p 737.

40. More extreme examples could be cited to make this point even stronger. Imagine a regime to stop the tides; a Convention to Nullify Unwanted Tidalflows (CNUT), for example. Would the simple fact that CNUT could not stop the tides have any impact on whether this regime should be considered a success or failure and the only measure should be if there happened to be close participation amongst those involved? How about a regime to control pink elephants?

41. Oran R Young, *The Effectiveness of International Environmental Regimes: Causal Connections and Behavioural Mechanisms*, (Cambridge, MA: MIT Press, 1999), 326 + xiv pp.

Young's team recognized that effectiveness could be approached in five separate ways; none of which might be expected to provide a complete answer in evaluating effectiveness in any particular circumstance. The five approaches are:

- problem-solving, which might be summarised by the question: how far does the regime assist in alleviating the problem?
- legal, how well are contractual obligations met?
- economic, is the regime efficient?
- normative, are the embedded norms being absorbed?
- political, does the process of regime activity improve the political situation?

Each of these approaches has its own advantages and limitations, many of which are recognized by the members of Young's team.

Practitioners views of regimes

Amongst practitioners, there are broadly three views of the purposes of regimes. The elaborations provided below are based on numerous conversations and interactions with practitioners and others. While there will be a bias in the locations that these discussions took place as most will have occurred during meetings relating to the control of weapons, most practitioners also have previous experience in other areas. No assumption is made about what proportion of the population takes any particular view on any particular regime. Note that the terms used for the different views will vary between individuals. These views are of direct relevance to assumptions of how regime effectiveness should be understood.

This distinction amongst practitioners on views of regimes does not always mean that an individual practitioner will see all regimes from the same perspective. For example, one individual might view the international efforts to control climate change as a transformative regime while regarding the nuclear non-proliferation regime as having started as a patrician regime and become a conservative regime.

The terms used within this sub-section come from a number of practitioners. Often just one of these terms would be used to describe a particular circumstance which would imply that the users do not have an overarching conceptualization of these terms. Searches for the terms through search engines such as Google Scholar, Google and

DuckDuckGo pick up very few related hits, highlighting that there are times that terms used by practitioners do not enter the common lexicon of academic analysis.

Patrician or hegemonic view of regimes

The patrician view of regimes is that they exist in order that larger states can bring smaller states into line. This view is sometimes espoused by delegates from both larger and smaller states. Although this view is strongly held, it embodies a particular paradox as many larger states are often lagging in terms of compliance or national implementation. Moreover, the presumed hegemon in many international regimes, the United States, is itself deeply conflicted about multilateralism.

Transformative view of regimes

The transformative view of regimes is that they exist in order to aspire to a goal without necessarily having a consensus at the beginning of how this might be achieved.

This has the consequence that effectiveness can be difficult to assess as any progress towards the objectives of the regime would be seen as a success, but it is hard to make an assessment of what proportion of possible progress that progress represents.

Conservative view of regimes

The conservative view of regimes is that they can only exist once consensus has been reached on an issue.

From this view, regimes are not effective at bringing about change but are effective at locking in a situation and retaining the status quo.

Escaping circular arguments

Measures of effectiveness are hampered by one of the circular arguments involved within the definitions of regimes. By defining a regime as an entity that contains rules, if any participant were no longer to be in compliance with the rules, that participant would no longer be a member of the regime and therefore the regime remains effective as the remaining members are still in compliance with the rules. This circular logic is implicitly recited by Hasenclever et al. who, acknowledging the writings of Nollkaemper,⁴² note:

if the 'effectiveness' of a rule is defined technically as the extent to which the behavior of those subject to the rule conforms to it, the rules of regimes, by definition, are not ineffective.⁴²

This may be perfectly acceptable logic for a regime relating to trade, for example, where non-participants may be essentially irrelevant to the regime. However, for a regime where global security is involved, this logic does not work as a reference point for effectiveness as any entity outside the regime may pose a threat to those within the regime through use or threat of use of whatever that particular regime prohibits.

Effectiveness vs Regime Theory

It is perfectly possible for a regime to be evaluated for its success in one aspect or another without Regime Theory being invoked, as was done before Regime Theory itself was developed.⁴³

Neither effectiveness nor cooperative behaviour are simply on-off activities. As well as any new participant engaging in cooperative behaviour, increased cooperative behaviour by an existing participant would increase effectiveness of the regime by this measure. But how should cooperative behaviour itself be measured? One aspect of cooperative behaviour within a regime that included controls on technologies might be a national export control arrangement — but are all export control arrangements equal, or does an export control arrangement that has a greater probability of preventing an export that would be against the aims of the regime be considered to constitute a greater level of cooperative behaviour?

The opposite of this argument provides a clearer answer. If a regime can only exist in one of two states 'effective' or 'not effective' without any gradation of these states, then a regime with 100 participants but only 1 that had engaged in any form of cooperative behaviour that they would not have engaged in were it not for the regime would be considered equal to a regime in which all 100 had engaged in new behaviour. To anyone interested in analysis of regimes in order to understand what would make better policy to

42. Andreas Hasenclever, Peter Mayer and Volker Rittberger, 'Theories of International Regimes', *Cambridge Studies in International Relations*, (Cambridge: CUP, 1997), 248 + x pp at p 15.

43. See, for example, Inis L Claude jr, 'Collective Legitimization as a Political Function of the United Nations', *International Organization*, vol 20, no 3 (Summer 1966), pp 367-79.

achieve aims and objectives that might be encompassed within the principles and norms of regimes this would be an absurd proposition.

Differences between regimes

The difficulties of applying understandings deriving from regimes in one issue area to regimes in a second issue area was explored in the section on critiques of Regime Theory above. These argument also apply to issues relating to effectiveness.

One problem in some of the literature is that questions are too generalised — for example, some analysts pose a simple question ‘are regimes effective?’

This question has direct parallels with the question ‘are laws effective?’ To test this question, would it be considered valid to study compliance with laws relating to road traffic, for example, and then presume the results would be valid for crimes of violence? In simple terms, would knowledge of levels of compliance with laws on speeding provide any evidence for understanding compliance with laws on murder?

This is not to say that analytical tools to assess one regime or one law could not be used to analyse another successfully, but simply that it is not possible to presume that the results from a regime (or group of regimes) in one area, such as trade, could be applied to a regime (or group of regimes) in another area, such as security, unless detailed analysis of the circumstances has been made.

Assessment of effectiveness of regimes

In order to develop understandings of how assessment of regimes could be improved, Underdal proposed three questions:

- (i) What precisely constitutes the object to be evaluated? (ii) Against which standard is the object to be evaluated? (iii) How do we operationally go about comparing the object to our standard?⁴⁴

These three questions have been much cited, but essentially boil down a common system of assessment that exists in a wide variety of circumstances — from an identified

44. Arild Underdal, ‘The Concept of Regime “Effectiveness”’, *Cooperation and Conflict*, vol 27, no 3, 1992, pp 227-40.

starting point, identify the best-case scenario that might have been possible and then attempt to identify what progress has been made towards this scenario. It is, perhaps, an illustration of the paucity of ideas in this field that these three questions are cited so often.

The baseline, end point and the real-life situation can be used in measuring systems in a number of ways. How far has progress been made from the baseline? What progress towards the end point is needed? Is the real-life situation closer to the baseline or the end point?

The method within the study of regimes that has become predominant for using this technique of assessment has become known as the ‘Oslo-Potsdam solution’ and is essentially an effort to quantify a baseline and an idealised end-point and to compare these with the situation in real life.

However, not all aspects of effectiveness are directly measurable. In a case such as that of the regime to control biological weapons, the effectiveness of the *overall regime* may be contested as it is not possible to determine with absolute certainty how many efforts to acquire such weapons may be being carried out in a covert manner.⁴⁵

Creating a baseline for assessment

Any assessment requires a baseline — that is the point at which progress (or otherwise) is measured from. However, such a baseline does not have to be at the start of a regime. Indeed, an assessment of effectiveness could be from one particular moment to another — has regime *X* been effective from time *A* to time *B* or after a particular event; or has the level of effectiveness increased or decreased over the relevant period?

In evaluating effectiveness of either an *overall regime* or a *disaggregated regime*, the most extreme comparison that can be made is that of the situation in which no regime exists.

45. Even if the Biological Weapons Convention were to have universal membership and a set of comprehensive verification arrangements, there would still be no absolute guarantee that no covert acquisition efforts were taking place.

Three distinct methodologies have been brought forward to promulgate a baseline assessment: before and after snapshots; counterfactuals; and regimes covering only part of a jurisdiction.

Before and after snapshots

A popular way of attempting to create a baseline is to examine the situation before a regime was in place. In the case of regimes this can be difficult to isolate a situation in which a regime does not exist for the simple reason that if there is a policy concern that an issue has to be tackled, it is likely that some policy-making bodies in some jurisdictions would already be doing some activity in the issue area. This makes it hard to establish a baseline for comparison. Moreover, it may be that many states could have been giving consideration to some form of activity in the issue area for which there is the prospect of a regime being created but have not yet acted in anticipation that a regime may be created. Such hesitation in action is especially prominent in issue areas where legislation requiring definitions is needed in implementing policy or where the same government department has competing policy priorities.⁴⁶ Getting a slot in a legislative calendar can be difficult and no government department would wish to introduce two sets of legislation on the same topic within only a few years of each other if such a situation can be avoided. As noted by a former Director of the Geneva Branch of the United Nations Department for Disarmament Affairs, writing about why some Pacific island countries had not joined the BWC:

It must be remembered, however, that in these small countries the resources required to get the legislation onto the legislative calendar are competing intensely for the attention of their governments with other formal measures.⁴⁷

To create a hypothetical example to illustrate the point, suppose there is a growing concern in a number of countries that there should be some form of collective action relating to the global trade in ‘widgets’. In most of these countries, policy on the trade in

46. The presentation to Parliament of the UK implementing legislation for the Chemical Weapons Convention was alleged to have been delayed from its original suggested dates by the Secretary of State because, as the Royal Society of Chemistry put it: ‘Post Office privatisation is more important, in his view’, [No author listed], ‘Heseltine drags feet on CWC’, *Chemistry in Britain*, September 1994, p 695.

47. Tim Caughley, ‘Pacific Islands’, in: BioWeapons Prevention Project, *Building a Global Ban: Why States Have Not Joined the BWC*, April 2009, pp 17-19 at p 17.

widgets may not have been fully developed, not least because each country perceives a benefit in having, for example, a common definition of what a widget is that has not yet been reached. If no regime is established, for whatever reason, most of these countries will adopt a policy on widget trade in any case. Any before and after analysis of any international regime on widget trade may possibly over-estimate the effectiveness of the regime in encouraging policy adoption as the motivations for action existed prior to the regime being formed. Nevertheless, such an analysis would correctly identify the effect of the regime in promoting common standards.

These arguments also apply to situations where some states are outside of a regime, as the regime may influence behaviour of states not within it.

Counterfactuals

A second popular way of attempting to create a baseline is to carry out a thought experiment to create an estimate of what the situation would have been if a regime had not existed. This concept is referred to within the Oslo-Potsdam solution as the ‘non-regime counterfactual’ or ‘NR’.

The limitations of analysis of regimes through counterfactuals have been long recognised:

Regime analysis has suffered from conceptual problems with the dependent variable; that is, the outcome to be explained. Firstly, the definition of the dependent variable — usually related to regime formation, regime change, regime decline, or regime effects — tends to be unclear in many studies. One of the reasons for this circumstance is that many inquiries are preoccupied with theoretical aspects of regime analysis and provide only selective empirical evidence to support their hypotheses and assumptions. ... in cases where the dependent variable is well defined, it is often oversimplified, for example dichotomized as the existence or non-existence of an international regime in a particular issue-area.⁴⁸

Indeed, the usefulness of the comparison of the no-regime counterfactual has itself been questioned:

48. Thomas Bernauer, *The chemistry of regime formation*, United Nations Institute for Disarmament Research/Dartmouth Publishing, (1993), p 77.

The no-regime counterfactual does not suffice as the only evaluative criteria because it gives only a very vague indication of how well a regime serves the purpose it has been designed for.⁴⁹

The greatest limitation of counterfactuals is that their use relies on judgement. A judgement is, when all is said and done, no more or less than a guess — albeit an educated guess. This element of guesswork creates large possibilities for error margins in any baseline for assessment.

When a short timescale is chosen for assessment, such as two or three years, the errors that might be introduced through counterfactuals can be kept to a minimum. When counterfactuals are used to assess a situation that continues over a number of decades greater errors can be introduced.

International relations are an accumulation of non-linear processes and are therefore essentially chaotic. This means that a small change in initial conditions can lead to significant changes to the outcome. This is recognised by analysts of regimes, and in particular the Nash equilibrium⁵⁰ that is often used as a no regime counterfactual:

the Nash equilibrium is not always robust against small changes in the assumptions about the model's parameters. In fact, even minor changes in the assumptions can sometimes make a substantial difference to the conclusions.⁵¹

A common error in counterfactuals relating to the regime to control biological weapons is to assume that if the conditions had not existed to bring the negotiations for the Biological Weapons Convention to a successful conclusion in 1971 then there would have been no BWC. This disregards the possibility that conditions might have been conducive some years later.

49. Carsten Helm and Detlef Sprinz, 'Measuring the Effectiveness of International Environmental Regimes', *Journal of Conflict Resolution*, vol 44, no 5, October 2000, pp 630-52 at 634.

50. A Nash equilibrium is arrived at when each player's strategy is a best reply to the strategies of the other players. This usually assumes that there is no cooperative behaviour between the players. There is normally more than one Nash equilibrium possible for any individual set of circumstances.

51. Jon Hovi, Detlef F Sprinz and Arild Underdal, 'The Oslo-Potsdam Solution to Measuring Regime Effectiveness: Critique, Response, and the Road Ahead', *Global Environmental Politics*, vol 3, no 3, August 2003, pp 74-96 at 86-87.

Regimes covering only part of a jurisdiction

One approach that formed a baseline for work by the team lead by Oran Young was to examine the impact of an air pollution regime on the USSR as the Long-Range Transboundary Air Pollution (LRTAP) Convention only applied west of the Urals in that country.⁵² However, while this might be superficially attractive, the team makes no reference to the system of governance by decree that existed in that country at the time and the greater complications of running such a system in circumstances in which different standards were applying in separate parts of the country. This would tend to reduce the variation in national policy between the two areas. Indeed, as Young's team acknowledges, a major part of the reduction in the European area was achieved by moving some of the most polluting activities east of the Urals.

Should two regimes be considered to be equally effective if both reduce the problem or issue the regime is designed to counter by an equal amount, but one achieves the reduction absolutely and the other achieves it by simply transferring the problem from one place to another?

Defining an end point for assessment

In any system of assessment there is a requirement to have a benchmark of what could have been achieved in order to measure real progress against it. However, should such an end point be placed realistically, taking into consideration broader political and economic contexts as examples, or should it be based on what could have happened in an idealised world?

The problem of where to place the end point, and the problems of pragmatism over idealism is summarized by Underdal in the following terms:

it may be argued that the concern with regime effectiveness provides no role for some purely hypothetical frontier that is not generally achievable given the institutional constraints under which actors *actually* operate. To qualify as 'potential', a solution must be accessible within the kinds of setting that do in fact exist or can feasibly be brought about.⁵³

52. Oran R Young, *The Effectiveness of International Environmental Regimes: Causal Connections and Behavioural Mechanisms*, (Cambridge, MA: MIT Press, 1999), 326 + xiv pp at pp 189-90.

53. Arild Underdal, "The Concept of Regime "Effectiveness"", *Cooperation and Conflict*, vol 27, no 3, 1992, pp 227-40 at p 233 [emphasis in original].

There may be circumstances in which it is more realistic to evaluate a regime against a pragmatic end point rather than an idealised end point.

Idealised end point issues

The idealised end point may be conceptualised in a number of ways. This concept is referred to within the Oslo-Potsdam solution as the ‘collective optimum’ or ‘CO’.

However, what constitutes the idealised end point is not easily defineable, except in limited cases. For example, for a regime relating to reducing emissions of particular substances an idealised end point might simply be taken as zero; but there could be certain uses for such substances that might not have significant negative impacts but which bring particular benefits. Indeed, this is why many agreements only include partial reductions as a practically achievable objective. However, in the real world such clear-cut cases are rare, especially as many regimes have more than one principle, norm or rule that has to be considered in evaluation of effectiveness.

If the objectives or goals of any particular policy process, whether an international regime or in domestic politics, are then influenced by questions of what might be practically achievable, an understanding is needed of how such objectives or goals were reached in order to make an assessment of regime effectiveness.

The pressures on defining objectives or goals can also apply in the opposite direction, making it only possible to adopt an aspirational goal that is known by those that adopted it as being unachievable. An example of this is the question of targets for progress on universality adopted at the First Review Conference of the Chemical Weapons Convention as part of an Action Plan on the issue. It became politically impossible to adopt a target that was not 100 per cent even though this was known to be not achievable within the proposed timescale. The Action Plan on Universality was widely considered to be a success by practitioners,⁵⁴ yet it would have been considered ineffective by the Oslo-Potsdam methodology.

54. See, for example: ‘We note with satisfaction the increase in the membership of the CWC. We welcome the States that joined the Convention in the period after the 1st Review Conference. We believe that the implementation of the Action Plan, as well as efforts by States Parties and the Technical Secretariat played a significant role in this regard.’ Statement by Victor Kholstov for the Russian Federation to the Second CWC Review Conference, 8 April 2008; and ‘We are pleased to

Pareto optimization

One method of examining what might be considered an idealised end point is embodied in a concept known as the Pareto frontier. Pareto-optimal solutions are derived from non-zero sum conditions⁵⁵ Underdal summarizes the Pareto frontier as ‘when no further increase in benefits to one party can be obtained without thereby leaving one or more prospective partner(s) worse off’.⁵⁶ It can be understood that there may be many Pareto-optimal solutions to any particular set of circumstances and this range of solutions is represented by the frontier.

Pareto optimization is based on economic principles and while there may be some crossover into other areas, the economic derivation of this abstraction/conceptualization has to be recognized in order to consider when it is appropriate to apply it to a particular set of circumstances. Within the Oslo-Potsdam solution, the collective optimum is often equated with the Pareto frontier. This is an approach favoured by Helm and Sprinz.⁵⁷

Irreversibility issues

A further aspect of defining the idealised end point is whether measures for promoting irreversibility should be included. Irreversibility measures are those that reduce the possibility of those activities prohibited under the regime being restarted or, indeed, in some cases being started in the first place. The assessment of irreversibility measures provides an example of the difficulties of quantification of effectiveness of regimes.

This is clearly illustrated by comparing two hypothetical environmental regimes that have reduced emissions to their stated target. Each would have an identical (100 per cent) quantitative score on effectiveness of emissions reductions and would, on a superficial

note that the goal of universality for the Convention is considerably closer now than at the time of the First Review Conference - with membership having increased by 32 to 183 States Parties. This increase has been due, in no small part, to the collective effort of States Parties, the OPCW policy-making organs, the Technical Secretariat and the Director-General in pursuing the Universality Action Plan ...’, Statement by Lydia Morton for Australia to the Second CWC Review Conference, 8 April 2008.

55. Under zero-sum conditions there is no basis for regimes as a loss by one participant represents a gain by another. See, for example, Stephen D Krasner, ‘Global Communications and National Power: Life on the Pareto Frontier’, *World Politics*, vol 43, April 1991, pp 336-66.
56. Arild Underdal, ‘The Concept of Regime “Effectiveness”’, *Cooperation and Conflict*, vol 27, no 3, 1992, pp 227-40 at p 233.
57. Carsten Helm and Detlef Sprinz, ‘Measuring the Effectiveness of International Environmental Regimes’, *Journal of Conflict Resolution*, vol 44, no 5, October 2000, pp 630-52.

level, be considered equally effective. Yet suppose one of these had active measures in place to prevent future emissions above the target level while the other did not.⁵⁸ In such circumstances, could these regimes be considered equivalently effective?

It therefore follows that a truly idealised end point has to include irreversibility measures. But how should such measures be quantified? If no attempt to reverse the goals of the regime is made, then such measures are untested. Nevertheless, it could be the presence of such measures that deterred any attempt towards a reverse. Yet, as not all such measures are equivalent — a comprehensive reporting mechanism is very different from an arrangement for voluntary provision of information — there is no clear method for quantification and therefore some qualitative assessment has to be made.

Irreversibility measures increase the ability of a regime to withstand external shocks. For some analysts, a distinction is made between regime effectiveness and robustness.⁵⁹ For the purposes of this thesis, robustness will be considered as an element of effectiveness.

Other end point definition difficulties

Difficulties with measuring or defining an idealised end point go beyond simple contestation. There are situations where the idealised end point can only be elaborated in general terms — ‘an end to conflict’ or ‘global free trade’ — which don’t easily translate into easy quantitative measurements.

Furthermore, there are situations where developments in other fields mean that the context of the idealised end point is changing, or is perhaps even unknowable. A good example of such a situation is the regime to control biological weapons.

For the regime to control biological weapons, two distinct changes have happened which will influence the perceived idealised end point for at least some of the participants in the regime. The first of these is the new political context relating to international

58. Such measures might also prove useful if a new, more strict, emissions reduction target were to be introduced at a later stage.

59. See, for example, Frank Schimmelfennig, ‘Arms Control Regimes and the Dissolution of the Soviet Union: Realism, Institutionalism and Regime Robustness’, *Cooperation and Conflict*, vol 29, no 2, 1994, pp 115-48 and Harald Müller, ‘Regime Robustness, Regime Attractivity and Arms Control Regimes in Europe’, *Cooperation and Conflict*, vol 30, no 3, 1995, pp 287-97.

perceptions of the significance of terrorism and the concerns that those carrying out terrorist acts could utilise biological weapons (see discussion of terrorism approaches to analysis, Chapter 3, page 83).⁶⁰ The second of these is the rapid development within the life sciences that includes, but is not limited to, the rise of synthetic biology. These two evolving influences are fundamental to the new frame of reference relating to the dual-use nature of the problem as elaborated in Chapter 1 (see page 58).

The new political context relating to terrorism concerns means that some participants within the regime perceive that new measures are needed to counter new and emerging threats. It goes without saying that to measure effectiveness against new and emerging threats might require the definition of a different end point from that which might have existed earlier. However, these threats may have existed even if they hadn't been perceived by regime participants. In such a case, the actual level of effectiveness of the regime would have remained the same.

The rapid advances in the life sciences mean that it is only possible to estimate what may be of concern in the five to ten year timeframe at maximum. The recent development of CRISPR gene editing techniques has occurred at a much shorter timescale than this.⁶¹ As many measures within a regime such as that to control biological weapons are introduced and implemented within a similar timeframe, it may not be possible to know what the effectiveness will be of these measures in the light of changing circumstances.

Measuring the real-life progress

Once a baseline and an end point have been established, an assessment of the effectiveness of a regime can be made once the real-life progress from the baseline towards the end point can be established. The concept of real-life progress is referred to within the Oslo-Potsdam solution as the 'actual performance' or 'AP'.

60. See also, Debora MacKenzie, 'Tilting at Windmills', *New Scientist*, 28 November 2015, pp 30-31.

61. The first CRISPR paper was published in August 2012 and highlighted the potential to use the system for programmable genome editing. Very rapidly a multitude of papers were published elaborating methods to do this with great accuracy and reliability. By early 2016, the technique has been well established. Notably, the delegation of Switzerland has been raising potential implications of CRISPR during the third BWC inter-sessional process; see, for example, the statement by Ambassador Urs Schmid to the Meeting of Experts, 12 August 2015.

Measuring progress has an inherent difficulty as it hard to accurately⁶² measure certain activities. In the case of the regime to control biological weapons, for example, if one measure of effectiveness were to relate to how difficult it was for a country to acquire biological weapons is it enough to simply count the number of potential supplier countries that have systems to control exports? As there is a great variation in how well individual export control systems work would this number have any meaning? There can also be deliberate efforts to reduce the effectiveness of a dual-use goods regime within a country's governance system for political or economic reasons.⁶³

This difficulty of measurement is made much simpler in cases where a regime is just regulating one tangible function, such as the emissions of one particular substance or a discrete group of substances. This is perhaps a contributory factor in this sort of regime being the focus of effectiveness evaluations.

Problems with Oslo-Potsdam and related regime effectiveness assessment systems

There has been a long-recognised problem that there are many activities of governments that are not easily quantifiable.⁶⁴

The Oslo-Potsdam solution has a particular fundamental problem – NR, AP and CO are all based on judgements and assumptions, so error margins for each of these individual judgements are compounded. Indeed, humans are notoriously bad at instinctive quantitative judgements and error margins are often severe.⁶⁵

There are a number of underlying assumptions to the Oslo-Potsdam work. For example, the quantitative work by Sprinz and Helm in 1999⁶⁶ includes a number of equations with variables relating to costs. By placing them in the same equation there is the implicit assumption that the relevant costs — abatement costs and costs of mitigating

62. The key term here is accuracy, as measurement in such circumstances may be subject to false precision.

63. See, for example, the Matrix Churchill case within the United Kingdom and the resulting Scott Inquiry.

64. See, for example, United Kingdom, Comptroller and Auditor General [National Audit Office], *Measuring the Performance of Government Departments*, HC301 (Session 2000-01), 22 March 2001.

65. An often cited illustration of human inability to quantify probabilities is the Monty Hall problem.

66. Detlef F Sprinz and Carsten Helm, 'The Effect of Global Environmental Regimes: A Measurement Concept', *International Political Science Review*, vol 20, no 4, October 1999, pp 359-69.

damage above a threshold — all share the same dimensions and that the ‘political coefficient’ that might influence the perception of damage (but somehow not influence abatement) is dimensionless. This would be reasonable if all costs could be related to a financial equivalent, but there are many non-financial costs in regimes. Within the realm of environmental policy, a key issue that has continued since the beginning of environmental protection concerns has been the difficulty of assigning financial values to environmental impacts.⁶⁷

Moving beyond environmental issues to other forms of regime, the equivalent equation in an area such as the regime to control biological weapons would have to replace the environmental damage term with one that would include loss of security and damage (injury) from possible use of such weapons. What should be given as the cost of a life?

The equations of Sprinz and Helm are highly reminiscent of the pseudo formulae that the tabloid press likes encouraging academics to come up with to fill their news pages, such as a calculation of the most depressing day of the year.⁶⁸

A numerical value for effectiveness of a regime may satisfy a certain type of curiosity, but what does such a quantification tell us? Is there any benefit for understanding a regime to control something for security purposes from knowing a score for one regime in, for example, the area of trade? Does a numerical value of effectiveness provide any form of information that would allow practitioners within the regime to improve it?

More useful for practitioners involved in efforts to try to improve particular types of regime would be a method of evaluating regime effectiveness that would identify or highlight areas in which the regime might be enhanced.

67. See, for example, Parliamentary Office of Science and Technology, ‘Ecosystem Services’, *postnote*, 281, March 2007, 4 pp.

68. [no author listed], ‘Feeling depressed? Welcome to Blue Monday - officially the most miserable day of the year’, *Daily Mail*, 18 January 2010, <<http://www.dailymail.co.uk/news/article-1244005/Feeling-depressed-Welcome-Blue-Monday-club.html>>.

Credibility of the situation as presented by Underdal

Notwithstanding all of the issues identified above, the case made by authors such as Underdal is substantially undermined further, at least in the situation as it relates to the regime to control biological weapons, by comments such as this one:

I suspect, though, that most governments in the industrialized world in fact tend not to pay much attention to the costs of international problem-solving efforts — at least as far as transaction costs in the most basic sense are concerned (salaries, office costs, travel and accommodation expenses, etc.)⁶⁹

While this might sometimes be true of some countries such as Norway, Sweden and Switzerland in situations where some of the costs are marginal, the subject of costs comes up in decision making processes within regimes on a regular basis. Take, for example, the situation at the Sixth BWC Review Conference and the position of Japan over whether the proposed Implementation Support Unit should have two or three staff members, which was entirely based on financial issues.⁷⁰ This situation in 2006 was by no means unique and similar examples can be found going back long before the publication of the quoted article, although most of the time there is no written record of such proceedings.⁷¹

That this statement ended up in the final article raises issues of the credibility of the journal as well — a simple wild supposition such as this should have been picked up by both editors and reviewers. The clear implication is that this is a guess about a key issue without the author checking any possible evidence base. As the suspicion elaborated in the quote is far from the correct situation in the real world, there has to be a concern that the author, reviewers and editors are not familiar with the realities of international decision making. Moreover, not only would it seem that none of these individuals were sufficiently familiar with any individual negotiators to contact them to check this detail but that the author, editors, and reviewers had not themselves had any experience of international negotiation. This inevitably critically weakens the credibility of the rest of the arguments in the article. Nonetheless, Underdal should be given credit for being transparent in his speculation.

69. Arild Underdal, 'The Concept of Regime "Effectiveness"', *Cooperation and Conflict*, vol 27, no 3, 1992, pp 227-40 at p 229.

70. Richard Guthrie, "'First reading" completed: Article X consultations to continue', *BWPP Review Conference Reports no 8*, 29 November 2006, p 2.

71. Discussions with practitioners regularly bring forth examples of this sort of event.

This credibility issue goes to the heart of the theory/policy gap discussed Chapter 5 (see page 122).

Conclusions relating to Regime Theory and concepts of effectiveness

The key conclusion of this section is simple. Although the existing methods that have been used to understand effectiveness that have been identified within this chapter provide lessons and some tools for application in relation to a regime such as that to control biological weapons, none are suitable in their entirety for the task required here. This therefore requires that some form of new approach will be needed.

The existing literature on understanding success or failure in a regime like that to control biological weapons is weak. Much focuses on how 'robust' a regime is, rather than its effectiveness. There is much less written on aspects such as cooperation, within the framework of Regime Theory, in the regimes such as that to control biological weapons than there is in literature on regimes relating to trade issues, for example.

Robustness may be defined as the ability of a regime to deal with external challenges and influences. Clearly a regime that falls apart is not likely to be effective in advancing its objectives. Therefore, while robustness could be considered to be a significant contributor to effectiveness of a regime, it can be only one factor in an overarching assessment of effectiveness of an individual regime.

Much of the assessment of effectiveness within Regime Theory relates to whether a regime enhances cooperation between states, rather than whether the regime is effective at achieving its objectives. Much literature is focused on individual legal instruments rather than the broader regimes. Some analysis relies on highly contested techniques such as the use of counterfactual scenarios. Other analysis looks at regime effects in individual states involved in a regime. The limitations of a quantitative approach such as Oslo-Potsdam have been explored. Taken with the new frame of reference resulting from the dual-use nature of the biological weapons problem (see page 58), it is clear that new measures for success/failure will need to be developed.

The focus on cooperation misses further key aspects of a regime such as that to control biological weapons. A key obligation of the Biological Weapons Convention in

embodied in Article III through which States Parties undertake not to 'transfer to any recipient whatsoever, directly or indirectly, and not in any way to assist, encourage, or induce any State, group of States or international organizations to manufacture or otherwise acquire any of the agents, toxins, weapons, equipment or means of delivery' as specified in Article I of the Convention. This is so that States Parties to the Convention do not assist any state, other entity or person outside the Convention to carry out prohibited activities. Clearly, the drafters and adopters of the text of the Convention felt this to be an important part of the overall package agreed to. Yet to an analyst working under the rubric of Regime Theory, this aspect would have little relevance.

There are further reasons to believe that examining regime success/failure as a measure of effectiveness appears somehow to be outside the scope of Regime Theory academic studies. It is worth remembering the perspective that: 'The most fundamental and most widely discussed of these purposes is the enhancement of the ability of states to cooperate in the issue area' (see page 154) For a regime such as one relating to trade, this would be a useful measure of success if 99 per cent of regime members were cooperating with enhanced ability or capacity — any other member would essentially be irrelevant. But on the other hand, according to this measure a weapons-control regime in which over 99 per cent of the participants had been cooperating extremely well would also be seen as effective by this 'most fundamental' measure, even if another participant had caused millions of fatalities with the weapons that were supposed to be under control. As this proposition is clearly absurd, new suggestions for evaluating success/failure within regimes are required.

7. Theories regarding policy processes and policy analysis

Signposting

This chapter is the third dealing with aspects of theorization and conceptualization. The background to theory relevant to investigating the research problem and related research questions was provided in Chapter 5 with details of theories regarding international regimes explored in Chapter 6. The concept of regime effectiveness and the different theoretical understandings that have been developed in this area were explored in this chapter.

This chapter provides an overview of the second of the strands of this thesis; that of policy analysis, and in particular analysis of processes by which policy organs come to decisions within governance structures. This is relevant at both the governmental level as well as the sub-national level, such as governance decisions within professional or learned bodies. The exploration of theoretical work in this Chapter identifies a consistent difficulty with modern systems of analysis. In response to this difficulty, the author presents a conjecture of a generic idealized policy decision. As a regime can only be considered to be effective if it has some form of influence on the behaviour of participants within it, such a generic decision becomes a useful tool for analysis of regime effectiveness.

The relevance of ‘behaviour’ and generic policy development to understanding effectiveness of regimes

If regimes such as that to control biological weapons are worthy of study, it would have to be because their existence changes something — for better or for worse.

A fundamental assumption underlying the work of many earlier researchers examining effectiveness of regimes is that a regime has effect if it influences behaviour of its participants, see the discussion in Chapter 6,¹ whether at the level of governments, at the level of individual officials within governmental processes or at the level of other governance processes or individuals whose actions may either contribute to or operate

1. There is also influence on non-participants but this is harder to analyse than for participants.

against the purposes of the regime.² What, therefore, can be understood to constitute ‘behaviour’?

In the simplest of terms, for the purposes of this thesis, behaviour can be understood as a combination of activities and attitudes that influence those activities. These are the taking of decisions or the implementation of decisions that are core to all policy processes.³ Behaviour results from the development of policy and the enactment of decisions, both conscious and unconscious, but this is not a one-way process. An alternative way of looking at this is that governance, however defined, relies on policy of one form or another. Regimes are a manifestation of international aspects of policy development and governance on issues that are a shared concern of more than one government or other regulatory system. In order to understand the interaction of regimes and other layers of governance, there has to be an underlying understanding of generic policy development.

This requirement to understand generic policy development becomes more significant if the purpose for studying a regime or regimes is to come to some form of conclusion about regime effectiveness. Indeed, perhaps the simplest benchmark for effectiveness of a regime is whether it has achieved any policy objective that the members of the regime may have had.⁴ To utilise any such benchmark other than in the most superficial way, however, requires the understanding of generic policy development.

Much of what is discussed in this chapter applies not only at the level of the state, but also in any situation of collective policy development whether sub-national, governmental or inter-governmental.

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2. This does not work against the classic definition of a regime between governments because, as will be shown in this Chapter, governments are composed of individuals.
 3. Decisions that are not acted upon fall within that category of pseudo-policy sometimes derided as ‘resolutionary politics’.
 4. However, if such an achievement would have taken place even if the regime had not existed, such an achievement could not be attributed to the regime.

Policy processes

As noted in Chapter 5 there are a variety of approaches to theory within academic studies (see page 117 onwards). Of particular relevance to this chapter are the distinctions between hard/soft or broad/narrow perspectives on theory.

The position taken in this thesis is that theory is there to guide the research and place it in an appropriate context rather than dictating the path that research should take. As the old saying goes, ‘rules are for the obedience of fools and the guidance of wise men’.⁵

Much of the English-language literature on national policy processes derives from the United States and is focused on the political system of that country. This produces a major skew in what is written as there are many distinctions and differences between national systems. Most notably, the US constitution is elaborated in some detail and so the core of the political system might be described as having been designed from scratch rather than having evolved over a number of centuries. While the design has been subject to modification, most of the underlying ideas remain the same. Literature examining policy processes in such a system has a baseline from which to analyse them. This makes analysis much easier. [For a discussion of the difficulties of baseline assessment, see Chapter 6, page 160 onwards.]

Other systems, such as that in the United Kingdom and in many Commonwealth countries, have evolved over time and do not necessarily have a written constitution.⁶ It is much more complicated to analyse policy processes in a system without a written constitution and any assumption that all methods used to analyse a written-constitution system can be applied in these circumstances would appear to be optimistic.

Classically, much literature has focused on structure and agency. These definitions broadly cover the activities of actors (‘agency’) in the contexts they work in (‘structure’). However, there are political, social and cultural influences on national policy making

5. The quote, and many variations of it, have been variously attributed to Douglas Bader and Oscar Wilde.

6. It is a common misperception that the lack of a written constitution in the UK means there is a lack of written materials on what constitutes the ‘constitution’. Most of what might be considered constitutional elements are codified and thus written down; they are simply not in a single document and elements are subject to evolution. In addition to this there is a considerable amount of process, procedure and precedent that is not so much codified as expected.

processes that are not clearly reflected in such theoretical literature which need to be taken into account. There are also sociological and psychological influences that include, for example, role perception of the individuals involved. While sociological and psychological aspects are beyond the scope of this thesis there is a need to be conscious that they exist — not least to identify external factors that might be missed by the Research Question which might influence the results of research.

As noted in Chapter 5 (see page 123 onwards) in the traditional divide of academic disciplines, politics is seen as a field of study distinct from international relations. However in real-world analysis it is difficult to separate national policy processes from international processes when it comes to aspects of international regimes, not least because the individuals involved in both processes are often the same.

Nevertheless, in the context of this thesis, it is useful to contrast national policy processes with those within international regimes.

Not least as this enables a form of triangulation to further assess the credibility of the results of this thesis achieved through the top-down approach. Some analysts have noted that Regime Theory derives much of its analytical bite through focus on states as unified rational actors.⁷ However, this assumption that governments operate as unified entities is rarely the case:

Most governments are not, in fact, the equivalent of a single individual with a single purpose and the ability to control completely the government's actions. Rather, each government consists of numerous individuals, many of them working in large organizations. Constrained, to be sure, by the shared images of their society, those individuals nevertheless have very different interests and priorities, and they are concerned with very different questions. Many of them are preoccupied by events at home and deal with events abroad only as these events interact with and affect their ability to pursue their interests at home. Others are concerned directly with what happens abroad but do not agree on what should be done. At any one time a government is concerned with countless issues and problems at home and abroad.⁸

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7. Lisa L Martin and Beth A Simmons, 'Theories and Empirical Studies of International Institutions', *International Organization*, vol 52, no 4, (Autumn,1998) [special edition: *International Organization at Fifty: Exploration and Contestation in the Study of World Politics*], p 738.
 8. Morton H Halperin and Priscilla A Clapp with Arnold Kanter, *Bureaucratic Politics and Foreign Policy*, (Washington DC: Brookings Institution Press, 2006; 2nd edition), p 362.

The liberal perspective is a counterpoint to this, as societies within countries are understood to be comprised of individuals and privately constituted groups which seek to promote their independent interests. By this understanding, a government should reflect the interests of the society from which it derives (or from a segment of that society) and these interests will be further reflected in the international behaviour of states.

Bureaucratic politics, rational actor and organizational behaviour models

In his classic work on the Cuban Missile Crisis, *Essence of Decision*, Graham Allison used three analytical models of decision making — Rational Actor, Organizational Behaviour and Bureaucratic Politics — each of which provided different explanations of some of Kennedy’s decisions, each of which had significant international repercussions. For example, he noted: ‘Applied to relations between nations, the bureaucratic politics model directs attention to intra-national games, the overlap of which constitutes international relations’.⁹

As noted in the discussion on theory and the distinction between analysis at the regime level and the state level (see page 127 onwards), Putnam observed, in relation to Allison’s bureaucratic politics model:

the nature of this ‘overlap’ remained unclarified, and the theoretical contribution of this literature did not evolve much beyond the principle that bureaucratic interests matter in foreign policymaking.¹⁰

Mac Destler observed:

Bureaucratic politics is the process by which people inside a government bargain with one another on complex public policy questions. Its existence does not connote impropriety, though such may be present. Nor is it caused by political parties and elections, though both influence the process in important ways. Rather, bureaucratic politics arises from two inescapable conditions. One is that no single official possesses either the power, or the wisdom, or the time to decide all-important executive branch policy issues himself. The second is that officials who have influence inevitably differ in how they would like these issues to be resolved.¹¹

9. Graham T Allison, *Essence of Decision: Explaining the Cuban Missile Crisis* (Boston: Little, Brown, 1971), p 149.

10. Robert D Putnam, ‘Diplomacy and Domestic Politics: The Logic of Two-Level Games’, *International Organization*, vol 42, no 3, (Summer, 1988), pp 427-60 at p 431.

11. I M Destler, *Presidents Bureaucrats and Foreign Policy: The Politics of Organizational Reform* (Princeton: Princeton University Press, 1972), p 52.

The rational actor model is based upon some fundamental assumptions. The key assumption is that individuals, and by extension any bodies that individuals are involved with, can identify goals and they then act in a rational manner in their attempts to achieve those goals. If this assumption holds true in any particular situation it is then possible for the analyst to explain and potentially predict the activities of participants in policy processes once their goals have been identified. However, such goals might not be overtly expressed. Moreover, the overtly expressed goals may in fact be subordinate to other goals that are not publicly known. [See Chapter 1, page 17, for an example of unstated goals.]

It is worth noting that most formalised theories within the discipline of policy studies are based on the rational actor model. These theories do not overtly recognise the three groups of factors identified in Chapter 5 (see page 136 onwards) — power/status, finance/resources and intellect/knowledge — the implications of which for policy studies are discussed later in this Chapter.

As governments are not like individual persons they therefore do not instantaneously acquire a unified perspective on any issue. Therefore it is not possible to apply rational actor model thinking to governments as a whole, except in the simplest of situations. Indeed:

The rational actor model simplifies and obscures the persistently neglected fact of bureaucracy as the ‘maker’ of government policy is not one calculating decision-maker, but rather a conglomerate of large organizations and political actors who differ substantially about what their government should do on a particular issue and who compete in attempting to affect both governmental decisions and the actions of their government.¹²

The experiences of practitioners in decision making illustrate that these conventional theories are insufficient to explain what occurs in the real world. Amy Sands, who served in the US Arms Control and Disarmament Agency, wrote of some of her experiences:

The generally employed decision-making models (the rational actor model, the organizational model, and the bureaucratic politics model) have pursued single-factor explanations that oversimplify a very complex, multifaceted process. Focusing on only one aspect of the overall environment eliminates or downplays

12. Graham T Allison and Morton H Halperin, ‘Bureaucratic Politics: A Paradigm and Some Policy Implications’, *World Politics*, vol 24 (Spring 1972), pp 40-79 at 42.

other factors. Because alternative decision-making models are derived from diverse theoretical conceptions about society, attempts to integrate them can be problematic. Yet, the failure to consider interconnections between factors identified by different types of model weakens the practical application of such approaches to policy-making.¹³

Another perspective on the limits of the rational actor model when compared with real life is provided by Christopher J Lamb and Irving Lachow:

While the rational actor model has generally done a good job of explaining human decisionmaking in the aggregate, close observation of human behavior clearly demonstrates that people rarely act in a purely rational manner. Often, people use a variety of mental shortcuts to simplify and speed up their decisionmaking. Thus, people exhibit ‘bounded rationality’, which not only helps them make decisions but also introduces a range of nonrational psychological factors into their thinking.¹⁴

Foreign Policy Analysis

Moving on from Graham Allison’s groundbreaking work, a literature known as Foreign Policy Analysis (FPA) has evolved which is based upon breaking up policy processes into analysable sections such that decisions can be analysed by understanding the influences on the decision makers. A political arrangement, whether a national system of governance or an international regime, is considered as the sum of these decisions. It is worth noting that there is little written about effectiveness of international collaborative arrangements within the FPA literature, although there is a concept of ‘output legitimacy’ used in analysing policies. Rather than dealing with questions of effectiveness of achieving stated aims, this concept is more related to whether the aims are consistent with the policy-making process. In summary, the key assumption behind FPA is that the preferences expressed by governments in international interactions are derived, at least in part, from domestic bargaining and decision-making processes.¹⁵

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13. Amy Sands, ‘The impact of governmental context on negotiation and implementation’, *Contemporary Security Policy* [Special Issue — Nancy W Gallagher (ed.), ‘Arms Control. New Approaches to Theory and Policy’], vol 18, no 2, August 1997, pp 116-37 at p 116-17.
 14. Christopher J Lamb and Irving Lachow, ‘Reforming Pentagon Strategic Decisionmaking’, *Strategic Forum*, no 221, July 2006, Institute for National Strategic Studies, National Defense University, 8 pp at p 1.
 15. This is the key point other practical regime analysts take from FPA. See, for example, Thomas Bernauer, *The chemistry of regime formation*, (Geneva: United Nations Institute for Disarmament Research/Dartmouth Publishing, 1993), 480 pp at p 64 and p 90.

Challenges in policy analysis for the topics examined in this thesis not overcome by conventional methods

There is an extensive academic literature on policy analysis and it would be impossible to examine it all in the preparation in a thesis such as this. Much of what is written overlaps in key areas and so it is probably more fruitful to take a compilation of descriptions of policy analysis methods and take that as a starting point for developing ideas about the challenges that exist.

An oft-cited text for students of policy analysis is an edited volume by Paul Sabatier.¹⁶ This volume contains chapters on theories such as Institutional Rational Choice, the Multiple Streams Framework, and the Advocacy Coalition Framework.

A useful distinction is made within the book between policy processes and ‘authoritative decisions’:

The term process connotes temporality, an unfolding of actions, events, and decisions that may culminate in an authoritative decision, which, at least temporarily, binds all within the jurisdiction of the governing body. In explaining policymaking processes, the emphasis is much more on the unfolding than on the authoritative decision, with attention devoted to the structure, context, constraints and dynamics of the process, as well as to the actual decisions and events that occur.¹⁷

The regime to control biological weapons is not a field where policy is made around only a few major decisions, instead a myriad of smaller decisions come together to form policy practice.

The forms of analysis outlined in the Sabatier volume (and policy theories more generally) come with a number of challenges that can be easily identified from the policy world experience of the present author. Some apply across a range of policy areas while some are more specific to the type of issue area being dealt with in this thesis.

The first challenge is that much policy analysis implicitly assumes desirable policy is a static target, yet it is hard to find a policy area in which the desired outcomes do not

16. Paul A Sabatier, *Theories of the Policy Process*, (Boulder: Westview, 2007), 344 + vi pp.

17. Edella Schlager, ‘A comparison of frameworks theories and models of policy processes’, in: Paul A Sabatier (ed.), *Theories of the Policy Process*, (Boulder: Westview, 2007), pp 293-319, at p 293.

fluctuate in some way over time. Moreover timescales for policy analysis identified by Sabatier in his introduction to the volume¹⁸ are described in terms of decades. Can it be a reasonable assumption that a desirable policy outcome remains static over such a timescale? If so, it can only be on the broadest of terms, e.g., biological weapons are bad, wealth creation is good, etc.

The second challenge is that many policy areas are not subject to overarching decisions which are suitable for analysis as a make or break moment. Control of biological weapons falls precisely within this form of abstraction. Policy processes are ongoing and decisions, even at the level of Review Conferences for the BWC, are rarely make or break landmarks, although they may form critical junctures in policy development. A list of potential make-or-break landmarks would be relatively limited but would include the decision to open negotiations on the BWC (1970-71), adoption of the BWC text (1971), the Special Conference that adopted the mandate to negotiate a protocol (1994), the stalling of the protocol negotiations (2001), the suspension of the Fifth BWC Review Conference (2001), the resumption of the Fifth BWC Review Conference and adoption of the inter-sessional process (2002), and the creation of the Implementation Support Unit (2006). From this list it is possible to see that the first decade of the 21st century had more such potential make-or-break landmarks than three decades that preceded it. However, much of the practical activities to maintain or strengthen the regime – through activities such as domestic control of materials and technologies and export controls – went on regardless.

It is therefore more appropriate to look at policy processes in this issue area as ongoing flows of activity of various sorts, all interacting and interwoven, which may vary in their composition and direction as circumstances change. This is the third challenge.

The fourth challenge is that most policy analysis identifies influences *towards* particular outcomes. This has analytical utility but has limitations in that such forms of analysis may illustrate more than one influence in favour of a particular policy direction but be unable to identify whether any of the influences was more significant than another. Taking the example text examined here, all of the theories for understanding policy

18. Paul A Sabatier, 'The need for better theories', in: Paul A Sabatier (ed.), *Theories of the Policy Process*, (Boulder: Westview, 2007), pp 1-18.

processes examined in Sabatier are focused on factors pushing towards policy outcomes. This is a feature of commonly used established policy analysis theories. A useful step would be to identify a means of analysis that would allow for a separation of these influences and identification in which circumstances certain influences may have been critical to a particular outcome.

Overcoming the identified challenges - using hindrances to separate influences

It is possible to carry out a form of analysis that allows a separation of influences and which, in some cases, can identify whether a particular influence or driver was needed in an individual instance. This would be to identify potential obstacles to the particular policy outcome. Potential obstacles are more than simply negative influences. If an obstacle can be identified, together with the influence or driver that overcame that obstacle, then that influence or driver would have been required for that policy outcome to be achieved in that particular case.

Identifying obstacles in specific cases can sometimes be relatively simple — for example, there may be insufficient funding for a particular policy implementation or a particular policy option was not in the interests of those who hold power. However, in each of these situations there would be further questions about such hindrances — who decided funding allocations or who held those in power to account?

This ability to identify obstacles only in specific cases would have limited application as an analytical framework. Therefore, any analytical framework for separating influences would be most useful if it could be applied as a general theory rather than a special theory.

A second significant utility would be for it to have applicability across the policy making, policy shaping and policy implementing sectors (see page 137 onwards).

A third significant utility would be if it could be applied to decisions at multiple levels within any organizational structure.

Utility of a generic idealized policy decision

Wrapping up potential hindrances within policy processes such that they lie within a generic idealized policy decision would provide a useful tool to assist policy analysis.

For maximum utility, a generic idealized policy decision should make provision for or be applicable to:

- the activities of policy makers, policy shapers and policy implementers;
- individual decisions at any level of an entity; and
- policy processes that evolve over an extended time period, allowing changing circumstances to be taken into account.

With any general theory there may be clear limitations which are discovered during its application which may require its modification. There may also may be policy areas where these limitations do not apply. However the limitations in examining policies in relation to control of biological weapons appear to be minor.

Identifying the groups of generic hindrances

Three groups of factors relating to decision making were identified in Chapter 5 (see page 136 onwards) – power/status, finance/resources and intellect/knowledge. As noted earlier, much of the earlier writings on decision making can be understood within a broader framework in which most of the parsimonious theories apply only to decisions in which the most relevant group of these factors predominates. Indeed, it can be seen from the most cursory of examinations that the power/status group is the focus of most realist analysis, finance/resources the focus of neoliberal political economy approaches and intellect/knowledge the focus of normative thinking or constructivist approaches. Where one of these bodies of analysis is unable to explain a decision it is often referred to as that body of theory ‘breaking down’ at that point when all that has happened is that a different group of factors has been dominant.

When power, interests and intellectual concepts all drive policy development in the same direction there is sometimes little to distinguish between them. When the main influences (either positive or negative) on development of a particular policy derive from only one of these aspects — so that the key factors relate to a clash of power bases or of

interests, for example — then analysis of only that aspect may lead to an understanding of the policy development process in that instance.

As noted in Chapter 5 a significant point here is that these separate groups of factors are broadly incommensurable.

Interesting case studies of policy development occur when these three aspects are not coincident. A clear example of this would be the development of policy against slavery, in which an on-going intellectual (therefore knowledge-based) campaign had won over much of the public discourse on the subject, but which had not been able to overcome the interests of the plantation owners who exerted considerable influence in support of the status quo. It has been suggested that the true tipping point in this policy development was not when the economic interests were overcome in the traditional political sense, but when the slave owners came to realise that the costs of employing 'reliable' staff to guard and oversee the slaves was greater than employing staff to do the work of the slaves instead, and thus this interest-based opposition was reduced.¹⁹

It should therefore come as no surprise that when regimes are analysed, there is this same power/interest/knowledge separation in methods of analysis in which analysts focus on one or other of these aspects of influence.²⁰

The conjectured generic idealized policy decision

In light of the discussion above, in order to examine decision making, and influences upon decision making that might be identified, it would be useful to identify what a generic idealized policy decision might look like. The following conjecture relating to a generic decision will be useful in analysing policy processes:

if an entity recognises a challenge and identifies a course of action to tackle that challenge which brings appreciable benefit of one form or another at minimal cost — whether in resource terms, opportunity costs or political costs; which is coincident with the influences that those able to express power might bring to bear; which is coincident with interests of those affected; for which there is support from

19. James L Payne, *A History of Force: exploring the worldwide movement against habits of coercion, bloodshed, and mayhem*, (Sandpoint, Indiana: Lytton Publishing, 2004), 296 + vii pp.

20. Andreas Hasenclever, Peter Mayer and Volker Rittberger, 'Interests, Power, Knowledge: the Study of International Regimes', *Mershon International Studies Review*, vol 40, no 2, October 1996, pp 177–228.

the intellectual and moral arguments; and for which there is the knowledge/experience-based skills to carry it out, that entity will undertake this course of action.

For the sake of developing an argument, the collection of conditions within this generic decision might be conceptualized as an idealized policy decision. The challenge at the focus of the assumption can be anything that involves a change from an existing situation to one that is perceived to be preferable in some way to other possible outcomes.

The following table breaks down the suggested generic idealized policy decision to explain the elements:

Element	Explanation
'recognizes a challenge'	A challenge can be simply defined as something that is acknowledged that has to be changed or dealt with — a task to be done or a situation or set of circumstances to be modified.
'identifies a course of action'	The term 'course of action' is intended to encompass all policy options that might be decided upon and could include short-term and long-term elements
'benefit of one form or another'	There has to be a purpose that provides a gain of some sort, even if this is a very simple gain or a reduction in loss.
'cost — whether in resource terms, opportunity costs or political costs'	While broadly self-explanatory, it should be noted that costs can be measured in different ways.
'coincident with the influences that those able to express power might bring to bear'	Assumes policy develops in line with the consent of those that wield power.
'coincident with interests of those affected'	Assumes that those affected could exert some influence.
'support from the intellectual and moral arguments'	Assumes that anyone who might agree or disagree with ideas presented could exert some influence.

The conjecture is as follows, if all of the conditions in the assumption are not met, some possible courses of action will be either not identified or not be considered worthy of being carried out. Any condition that is not met will be considered for the purposes of examining this conjecture as a 'hindrance' or 'obstacle'.

Costs and benefits should not simply be regarded in a classic light of considerations for self-interested utility maximizers but should, in this circumstance, include non-utilitarian aspects such as perceptions relating to activities that give the entity legitimacy. The recognized challenge can also include how to implement legal obligations.

If the idealized policy decision is broken down into its sections, some potential hindrances become immediately apparent:

Element	Potential hindrance
'recognizes a challenge'	Policy area [and/or potential outcome] not seen as having sufficient priority. No sense of expectation upon/within entity Perceived as too large a challenge to deal with by any one entity [individual contribution not seen as achieving anything] If one entity puts in effort to tackle the challenge, other entities might benefit from this effort without having incurred any costs [freeriding]
'identifies a course of action'	Uncertainty whether any action could make a real impact on the challenge Uncertainty of process to be undertaken Uncertainty of what might be the optimum course of action Uncertainty of what the next step might be
'benefit of one form or another'	Benefit not perceived or understood Skills or capacities may be missing and creating them would be beyond the means available Benefit outweighed by cost
'cost — whether in resource terms, opportunity costs or political costs'	Costs of a course of action may be perceived as not worth pursuing. Costs outweigh the benefits True costs misunderstood or perceived incorrectly
'coincident with the influences that those able to express power might bring to bear'	Those in power lose power/status from the decision Those in power don't understand the purpose of the decision
'coincident with interests of those affected'	Costs and benefits do not fall in the same places. Costs and benefits may be of different types.
'support from the intellectual and moral arguments'	Not perceived as the correct thing to do. Intellectual arguments exist suggesting other courses of action. Lack of knowledge or skills available.

There are overlaps between these potential hindrances, most obviously in questions of cost/benefit calculations. Attempts to formulate an alternative construction which did not have such an overlap proved fruitless as costs and benefits can be considered in sufficiently diverse ways that anything more parsimonious risked oversimplification.

It should also be noted that there is a need to recognise not only those in power but those subservient to power as they often act in support of what they believe to be in the interests of those who hold power or have status.

A basic credibility test for the generic decision

The introduction of a conjecture of a generic idealized policy decision requires that some evidence be presented that it has some relevance to the real world. The paragraphs above illustrate that the conjecture has some internal coherence, but does it match real-world decisions?

During the elaboration of the conjectured generic idealized policy decision it was tested in a series of thought experiments against a number of policy decisions encountered

during the author's previous experience and modified to take into account those experiences.

As an additional test, a general policy area, education, was tested against the conjectured generic idealized policy decision. A simple test to check the credibility of the generic decision would be to test whether there are any aspects of policy decisions in education that would fall outwith the suggested hindrances.

In such a policy area, a challenge that might be recognized would be a need for skills amongst the population. The course of action that might be identified is that people should be provided with educational opportunities of a relevant nature.

While there may be many ways to measure benefits of educational policy options, if there was no substantial benefit of one form or another resulting from the policy implementation there would be opposition to it.²¹

Chapter conclusions

The material within this chapter, and in particular the conjectured generic idealized policy decision and identified potential hindrances, provides a basis to triangulate the top-down result, from analysis of the regime to control biological weapons, contained in the following chapter, Chapter 8, by looking at a bottom-up analysis of national and other policy processes. This test is carried in Chapter 9.

The first three of the four challenges identified in this Chapter that existing methods for policy analysis do not overcome in many cases (see page 182 onwards) — the implicit assumption that desirable policy is a static target (as opposed to movable objectives); that many policy areas are not subject to overarching decisions which are suitable for analysis as a make or break moment; and that policy processes can be viewed as ongoing flows of activity of various sorts, all interacting and interweaving — do not necessarily need new tools but potentially could be overcome through researchers seeking a broader conceptualization of the issues they are investigating.

21. This should not be taken to mean that all policies have to benefit those that are the supposed recipients. It may be that those who benefit most are those that are in power.

The fourth challenge — that most policy analysis is focused on influences *towards* particular outcomes — brings forth severe analytical limitations as correlation does not equate with causation. The conjectured generic idealized policy decision creates a means of analysis that allows for a separation of influences and identification in which circumstances certain influences may have been critical to a particular outcome.

In addition, the conjectured generic idealized policy decision can be used to study the roles of entities that fall within the categories of policy shapers and policy implementers as well as policy makers (see Chapter 5, page 137 onwards). This could prove valuable in examining policy development in some areas.

General conclusions on theory

As shown in Chapter 5, a thesis such as this must be informed from a variety of theoretical inputs as there are many influences on policy in issues under consideration. Following on from the identification of a significant theory/policy gap in Chapter 1, there is a clear need to develop policy-relevant theory in this issue area.

As Chapter 6 illustrated, the existing literature on understanding success or failure in a regime like that to control biological weapons is weak. Much of the assessment of effectiveness relates to whether a regime enhances cooperation between states, rather than whether the regime is effective at achieving its objectives. This can lead to the absurd situation where, according to this measure, a weapons-control regime in which over 99 per cent of the participants had been cooperating extremely well would be seen as effective by this ‘most fundamental’ measure, even if one country had caused millions of fatalities with the weapons that were supposed to be under control. As this proposition is clearly absurd, new suggestions for evaluating success/failure are required.

The proposed idealized policy decision, elaborated in this Chapter, is a second new framework of analysis, following the new framework of analysis to analyse effectiveness of regimes. As the major part of this thesis is about the creation of a new framework of analysis for evaluating effectiveness within the regime to control biological weapons, there has to be some hesitation in using a further new method as a means of triangulation.

The pre-eminent danger in using two new methods in the triangulation is there may be errors that may not be detected if there were to be related flaws in the two frameworks. While it might appear to be better to attempt triangulation of a new framework against an existing established framework, the limitations of the existing frameworks for the area under examination outweigh this benefit.

A final conclusion regarding the theories of policy analysis at a variety of levels is an observation that there are some commonalities in how policy development structures such as committees work whether they are local committees within an academic institution or the UN Security Council. Policy making has a fractal-like characteristic to it; as the level of magnification increases to increase the level of detail in how policy is derived, the nature of the underlying influences remains the same — the interaction of people following influences in the three areas identified — power/status, finance/resources and intellect/knowledge.

8. Proposed dimensions to conceptualize and analyse ‘effectiveness’ in the context of this thesis

Signposting

The Research Problem identified within this thesis is:

How should success or failure, and therefore ‘effectiveness’, in a regime such as that to control biological weapons be categorised and assessed?

As noted in the conclusions (see page 172 onwards) of Chapter 6, the existing academic literature on understanding effectiveness in a regime like that to control biological weapons is weak, with much analysis focused on cooperation and robustness rather than effectiveness in achieving the aims of the regime. The key conclusion of that section was that earlier analyses within Regime Theory to understand effectiveness are not suitable in their entirety for the task required in this thesis. For example, for a regime concerning promotion of international trade, the level of interaction between states may indeed be a suitable proxy for the effectiveness of the regime itself; but the regime to control biological weapons is very different and such a focus might bring about misleading results. A more suitable, but incomplete, model is the example given in Chapter 6 of the international efforts to control smallpox or polio (see page 155) in which cooperation and interaction between the major players are indeed key aspects of whether the eradication effort succeeds; however, the most significant measure of effectiveness relates to the numbers of cases of infections that occur in each year of the continuing effort. Moving such a model from disease eradication to weapons eradication brings additional complications and aspects to be considered, not least that many aspects of weapons control are impossible to quantify with certainty. This therefore requires that some form of new approach will be needed.

The approaches identified in earlier analyses of the regime all provide partial answers to broader questions relating to regime effectiveness. The problem-oriented approaches identified in Chapter 3 (see page 78 onwards) — scientific developments approach, terrorism approach and public health approach — are each focused on those particular aspects. Each approach may lead to an understanding of one form or another about regime effectiveness in that particular area, but not an understanding of effectiveness of the overall regime. The methodological approaches identified in that Chapter (see page

90 onwards) — events approach, critical period approach and sectoral approach — produce analyses that each contain aspects of regime effectiveness but with some limitations. The first two of these provide time-limited analyses of situations within which some assessment of regime effectiveness can be made, but limited to the parameters of the event or the critical period being studied. The sectoral approach can be used to discuss matters of effectiveness, but again it is not possible to translate any results of such analysis from one sector to another.

While all of the above can produce analysis that may contribute to understandings of regime effectiveness, what is missing from earlier analysis is any form of overarching measure for regime effectiveness that can consider the regime as a whole. With such a key gap in the body of theory relating to regimes and true measures of effectiveness, this Chapter includes an attempt to provide a system of assessing effectiveness of regime activities in order to partially plug this gap by developing understandings of aspects of the regime to control biological weapons which might enhance or diminish regime effectiveness. These aspects can be presented as dimensions for analysing regime effectiveness. For some of these dimensions it is possible to identify potential benchmarks or criteria for assessment of regime effectiveness. The dimensions, benchmarks and criteria are then tested against real policy suggestions put forward during inter-governmental meetings and examined in relation to earlier writings on principles, norms and rules (i.e., obligations) identified in the regime.

Conceptualizing and analysing ‘effectiveness’ in the context of this thesis

As noted earlier (see page 18), the first Research Question of this thesis is:

How can the concept of ‘effectiveness’ in relation to the regime to control biological weapons be broken down into separate dimensions in order to create a more rigorous framework of assessment?

This Research Question came about owing to the change of focus brought about in this thesis following the identification of the limitations in the use of measures of effectiveness within existing work in Regime Theory to understand effectiveness in the regime to control biological weapons. The regime to control biological weapons covers a broad spread of activities. If there was a single obvious measure of regime effectiveness available this would have been utilized long ago. It therefore follows that regime

effectiveness will have to be considered on more than one axis or dimension, taking into account that any individual axis will include positive as well as negative developments. These are sometimes best expressed as successes or failures in such a dimension.

There are two common meanings of the term ‘effectiveness’ that are relevant to the thesis. In the realm of traditional International Relations theory, if regime participants do not carry out any activity that they would not have done in any case had the regime not existed then the regime cannot be considered to be effective in terms of the theories of International Relations (see Chapter 6). Nonetheless, taking the other common meaning of effectiveness, activities undertaken by regime participants that they would have undertaken regardless of whether the regime existed, may, on aggregate, form an effective set of measures that have some effect in achieving the stated aims of the regime; thus in this case the regime may be interpreted in this second meaning as being effective even if it is not effective in an International Relations theory sense. It is not always possible to disentangle these two meanings of effectiveness as soon as some international cooperation takes place within a regime. The path taken to try to overcome these limitations can be summed up in the two sub-questions of the first Research Question:

Can the possible benchmarks or criteria suggested for use within this assessment of regime effectiveness be related to the considerations, lessons, perspectives, recommendations, conclusions and proposals put forward in presentations, statements, working papers and interventions during meetings of the BWC inter-sessional processes?

Can the possible benchmarks or criteria suggested for use within this assessment of regime effectiveness be related to principles, norms and rules (i.e., obligations) within the regime?

Deriving dimensions of effectiveness

In attempting to derive a system of dimensions to be assessed, it is worth considering what it is that should be answered or assessed to come to a conclusion about whether individual policies or activities might contribute to effectiveness or not. It is worth noting in this regard that any dimensions have to take into account that there is no unified or integrated, universally held, understanding of what effectiveness is within the regime to control biological weapons.

Taking the example of disease eradication noted above as a starting point, a simple measure of effectiveness of a regime such as that to control (or, indeed, eradicate) biological weapons would be to count how many times such weapons were actually used. As will be noted later in this chapter, the number of confirmed cases of use of these weapons is small.¹ Use would be a relatively limited measure on its own as it is the culmination of a process which starts with development and acquisition of the weapons; it would therefore be pragmatic to include these stages within a dimension as well. This leads to the derivation of the '*Threat Ambition*' dimension outlined below.

The next most obvious question relating to regime effectiveness might be cast in the following terms: if there are states, other entities or individuals that wish to use biological and toxin weapons, how easy is it for them to acquire the weapons and use them? This leads directly to a requirement to make an assessment of availability of relevant materials and technologies and the opportunities to exploit them. Therefore any system of assessment should include '*Availability/Opportunity*' aspects within the dimensions.

In following the disease eradication model of regime effectiveness, a further question that illustrates aspects of effectiveness would be: if the eradication effort is not successful at any particular time or place, how effective would the regime be to respond to an outbreak? In the terms of the regime to control biological weapons, such an 'outbreak' may not only be the use of deliberate disease, but might also result from other steps in the process of development or acquisition of prohibited weapons such as a leak from a production facility or an experimental release of a weapon under development that has a more readily detectable result than intended. Within traditional Regime Theory there is a concept of 'robustness' which, as noted in Chapter 6 (see page 172), may be defined as the ability of a regime to deal with external challenges and influences. Also noted in that chapter is that many analysts, focused on Regime Theory, do not see robustness as being a contributor to effectiveness (see page 167). The concept underlying this question is far broader than robustness and relates not only to questions of whether the regime itself is strong in itself to withstand shocks but, more importantly, to questions of whether the

1. Confirming whether an alleged use of biological or toxin weapons has indeed taken place can be a complex task; especially as there are many cases of spurious allegations being made during inter-state and intra-state conflicts that an opponent has used such weapons which are based on nothing more than a propaganda desire to portray the opponent as being unworthy and underhand.

regime improves ‘*Resilience*’ of societies to withstand attacks and whether the regime promotes or provides means by which the effects of breaches of key aims of the regime — acquisition or use of biological or toxin weapons being the key ones in this regard — can be militated against.

A fourth question that might be asked about regime effectiveness would be: how does this all fit together and are there gaps in policy implementation? This requires that any assessment of the effectiveness of a regime should include aspects of whether policies and activities prompted by the regime, or adopted under the aegis of the regime, form a coherent whole. Traditional studies of regimes follow a perspective that suggests the most important element of regime effectiveness: ‘is the enhancement of the ability of states to cooperate in the issue area’ (see page 154). While this level of cooperation is important, for a regime like that to control biological weapons the level of engagement in cooperation is only a partial measure of effectiveness; a better measure includes aspects of policy implementation and coherence as well as levels of engagement on the sub-national, national regional and global level. The final dimension proposed here is therefore one of ‘*Coherence/Engagement*’.

A potential further question, which might have led to an additional dimension, was also considered: does the regime make participants feel more secure? While classic Regime Theory would embrace questions of perception, the evaluation of effectiveness contained within this thesis is based upon actions rather than perceptions. If actions achieve a real reduction in threat, then this should be caught by one of the other dimensions — such as being reflected in an enhancement in countering *Threat Ambition* or enhancing the *Availability/Opportunity* dimension. After some consideration, this dimension was ruled out as a perception dimension would be influenced by changes in political and cultural circumstances outside of the regime and which did not necessarily reflect any substantive change in actual level of threat.² In this way, the regime could be seen to be defective simply because one constituency/grouping is more fearful or more confident at any particular moment than another.

2. See, for example, Debora MacKenzie, ‘Tilting at Windmills’, *New Scientist*, 28 November 2015, pp 30-31.

Once dimensions had been identified in their first iteration, there was a need to then identify a method to test whether these dimensions were a credible tool, not least by attempting to establish whether they were comprehensive enough to encompass differing perceptions of effectiveness.

It is possible to test the validity of the four selected dimensions through tabulation comparing them with two particular external bodies of text: proposals for strengthening and enhancing the regime that have been raised through the BWC inter-sessional processes and earlier analytical writings on the principles, norms and rules of the regime to control biological weapons. Key to this process is a deliberate effort to see if there are any aspects of regime effectiveness that fall outside of the four dimensions. Confidence in the applicability and comprehensiveness of the suggested dimensions can also be tested by comparing them with other statements and papers within the regime and the experiences of practitioners within the regime through informal discussions.

Proposed dimensions for evaluation

Following on from the discussion above, four dimensions are proposed in this chapter to create one element of a new framework of assessment of effectiveness for the overall regime to control biological weapons. These dimensions are drawn up in broad terms and should also be applicable in similar regimes such as that to control chemical weapons. The first part of this chapter will focus on the regime to control biological weapons. After examination of the proposed dimensions in this context, their potential suitability for other regimes will be examined. The four dimensions, in the order they will be examined in this chapter, are:

- *Threat Ambition;*
- *Coherence/Engagement;*
- *Availability/Opportunity;* and
- *Resilience*

In the analysis below, each proposed dimension will be outlined and then be described in relation to the other dimensions. The use of each dimension in evaluation of effectiveness is then examined.

Threat Ambition dimension

While it might be difficult to define effectiveness in non-proliferation, arms control and disarmament (NACD) regimes directly [recalling the differences between these regimes noted in Chapter 2 on page 46 onwards], there is a measure of effect that can be represented in a form of success/failure hierarchy that might be elaborated in terms that relate to the demand side of the threat posed by the type of weapon that has been prohibited:

- (Non-)use
- (Non-)integration
- (Non-)possession
- (Non-)acquisition
- (Non-)aspiration

Each of these is explored further below. To some extent, each of the levels of this success/failure hierarchy would apply to potential possessors whether they were states or non-state actors. The levels in this hierarchy are not homogeneous, as there may be variations within a level. For example, scales of effort towards acquisition or scales of usage might vary but would nevertheless fall within the same level within this hierarchy. Although the wording in the descriptions is somewhat repetitive, this repetition serves to reinforce the distinction between the levels.

Most of the levels suggested here relate directly to a principle, norm or rule identified within the regime. For example, non-use has a direct parallel with the provisions of the Geneva Protocol.³

However, if levels were only derived from any principle, norm or rule that was explicitly stated within the regime elements then the gaps between levels might be too great. For example, there is a wide gap between the first possession of a full set of components for a prohibited weapon and that possessor being in a position to use such a weapon. Hence the suggestion of an intermediate level between the two.⁴

3. A direct comparison between the dimensions and identified regime obligations appears later in this chapter.

4. An alternate intermediate step that might have been considered would be the testing of weapons and related devices. In the nuclear field, the prohibition of nuclear explosive testing has become an explicit element of the nuclear non-proliferation regime. However, in the biological field, testing of biological munitions or other delivery devices that did not involve human exposure to pathogens or

(Non-)use

While *use* of any prohibited weapon would be perhaps the most explicit and fundamental failure of a regime, any continued *non-use* of prohibited weapons by a *possessor* might be considered a limited success of that regime. Furthermore, if there might have been twenty *uses* of the prohibited weapons if a relevant regime had not existed, then only a single use under a regime could be considered a considerable, but not total, success.

(Non-)integration

If a *possessor* has *integrated* a type of prohibited weapon into its planning (through doctrine or other preparations for *use*) then this would be considered a failure of a regime, but not as severe a failure as *use* would constitute. On the other hand, if a *possessor* has a type of prohibited weapon available to it, but has not *integrated* it into its planning, this might be considered a partial success of a regime as this reduces the likelihood of such weapons being *used*.

(Non-)possession

If a *possessor* has a type of prohibited weapon available to it this would be considered a failure of a regime, but not as severe a failure as having such a type of weapon *integrated* into the planning process for possible *use*. On the other hand, if a potential *possessor* has expended effort into *acquisition* of a type of prohibited weapon available to it, but has not actually acquired a complete weapon system, this might be considered a partial success of a regime.

(Non-)acquisition

If a potential *possessor* has expended effort into *acquisition* of a type of prohibited weapon this would be considered a failure of a regime, but not as severe a failure as a *possessor* having completed *acquisition* of such a type of weapon. On the other hand, if a potential *possessor* has aspired to *acquisition* of a type of prohibited weapon, but has not actually expended effort into such *acquisition*, this might be considered a partial success of a regime.

toxins might fall under the rubric of 'research' which is not explicitly prohibited under the BWC, although the general purpose criterion would still apply.

(Non-)aspiration

If a potential *possessor* aspires to *acquire* a type of prohibited weapon this might be considered a failure of a regime, but not as severe a failure as that potential *possessor* actually expending effort into such *acquisition*.

The highest level of success of a regime on the threat hierarchy measure would be that no state or non-state actor has a *desire* to *acquire* nor, in an ideal world, senses or perceives any pressure (either internal or external) to *acquire* a type of prohibited weapon.

Relation to other proposed dimensions

This dimension relates to the most fundamental measure of the effectiveness of the regime — that of the acquisition or use of the prohibited weapons. Yet even a cursory examination of policies that are contributors to the regime show that there is little that can be done through any individual policy to influence directly another state to move to the non-aspiration end of this hierarchy. As the question of influences on policies of decision-making bodies within governments is core to the very concept of regime effectiveness, this can be seen as a significant limitation. For example, the most obvious related policies, such as export control measures, merely delay or hinder the acquisition of materials or technologies with no guarantee that these will not be acquired eventually. Nevertheless, the implementation of export control policies, for example, may influence decisions by making acquisition more difficult and costly; or introduce delays in procurement or research through lack of available items, and thus less attractive as a policy option. However, while anything that might reduce availability could conceivably impact upon *Threat Ambition*, it is important to keep these dimensions distinct where possible.

A major influence of states on each other in this regard can be considered as normative.

Use of this dimension in evaluation of effectiveness

The first point worth noting is that the regime lacks formal verification arrangements. Where there is a verification system, it is much simpler to evaluate compliance (see page 52) and it is much more difficult to evaluate without. However, even if the Biological Weapons Convention were to have universal membership and a set of comprehensive

verification arrangements, there would still be no absolute guarantee that no covert acquisition efforts were taking place.

A policy development, or a proposal for a policy development, would be assessed as enhancing effectiveness if it contributes to policies of a state or relevant non-state entity moving down this hierarchy towards the non-aspiration end.

The other extreme of this hierarchy is the question of use. The UN Secretary-General's mechanism for investigation of alleged use of biological weapons has existed since the 1980s but has not been triggered for any alleged use of pathogens as weapons in that time (see page 70).⁵ In a 2004 publication, the World Health Organization (WHO) lists only three occurrences of biological or toxin weapons in its table 'Antipersonnel toxic and infective agents whose hostile use since 1918 has been verified'. These occurrences are: the use of *Yersinia pestis* in Manchuria within the period 1937–1945, the use of *Salmonella enteritidis* serotype *typhimurium* in the United States in 1984 and *Bacillus anthracis* used in the anthrax letters in the United States in 2001.⁶

Other analyses of alleged use have been made, most of which has been centred on work by the Center for Nonproliferation Studies (CNS)⁷ or the Harvard Sussex Program (see page 78). Indeed, the WHO list is based on a list originally compiled by HSP.⁸ While some CNS compilations, including some of those hosted by the Nuclear Threat Initiative, include large numbers of threats and hoaxes, none adds a significant number of confirmed incidents to those referred to in the WHO report. A key aspect of the list in the WHO report is that drafts of the report were seen by representatives of many WHO

5. Toxins, being poisonous substances produced by living things, are also chemical weapons and so an investigation into alleged use of hydrogen cyanide in Azerbaijan is commonly regarded as an investigation of alleged use of chemical weapons although it could also be regarded as an investigation into alleged use of toxins. The investigation report can be found in UN document S/24344, dated 24 July 1992.

6. World Health Organization, *Public health response to biological and chemical weapons - WHO guidance*, [2nd edition], 2004, 340 + xix pp at p 35.

7. See, for example, pages on the CNS website on CBW Past Use at <<http://cns.miis.edu/cbw/pastuse.htm>> or Jonathan B. Tucker (ed.), *Toxic Terror: Assessing Terrorist Use of Chemical and Biological Weapons*, (Cambridge, MA: MIT Press, 2000), 320 pp.

8. Full disclosure: the current author was working with HSP when this list was compiled.

member states and it would have been difficult to include the list in the final publication if any of these representatives had objected to it.

The WHO puts this low level of confirmed activity in a broader context:

The long and continuing period during which no substantial biological attack has occurred suggests that the number of competent groups or states actually intending to use biological weapons must be small.⁹

Taken together with the work of researchers such Leitenberg, (see page 84), this evidence would suggest that, taken at a global level, the overall *Threat Ambition* is relatively low. This does not, of itself, mean the regime is necessarily effective unless this situation of low *Threat Ambition* is difficult to reverse.

Coherence/Engagement dimension

A second dimension might be elaborated in terms which relate to the coherence of participants' policies and implementation of the regime, which looked at from another perspective could be seen as relating to the level of engagement of States Parties in the regime. This is closest to the more classic understanding of regime effectiveness, in that it refers specifically to co-operative elements of the regime.

Governments, or any other body of governance or authority, cannot be active participants in any regime if they do not take steps to implement the provisions of such a regime. As noted earlier (see pages 59 and 68), the regime to control biological weapons is broad. Implementation provisions include, for example, transfer controls on materials and technologies; national controls for securing pathogens; measures for responses to deliberate outbreaks; and training for military forces so that they are aware of their government's position on prohibition of biological methods of warfare. This list is in no way extensive, but these measures have been selected simply to illustrate the breadth and variety of implementation activities. This selection also serves to illustrate the variety of actors within governmental structures that a regime must interact with or influence. Transfer controls would normally fall within the remit of a trade ministry, pathogen security within an interior ministry, outbreak response within a health ministry and

9. World Health Organization, *Public health response to biological and chemical weapons - WHO guidance*, [2nd edition], 2004, 340 + xix pp at p 21.

military training within a defence ministry. Furthermore, this selection provides a useful counterpoint to assumptions that the agencies within governments most involved with international regimes are foreign ministries.¹⁰

The following table illustrates the diversity of government departments and agencies represented on the UK delegation to the inter-sessional meetings in the period under consideration.

	2003		2004		2005		2007		2008		2009		2010	
	MX	MSP												
Foreign & Commonwealth Office	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Ministry of Defence [including Dstl]	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Department of Trade & Industry [Department for Business, Enterprise and Regulatory Reform (from 2007), Department of Energy and Climate Change (from 2009)]	X	X	X	X	X	X	X	X	X	X		X		X
Department for Environment Food and Rural Affairs			X									X		
Department of Transport	X													
Food and Environment Research Agency												X		
Health and Safety Executive	X				X				X					
Health Protection Agency	X		X						X		X			
Home Office	X													
Office of Science and Technology					X									
Veterinary Laboratories Agency [later Animal Health and Veterinary Laboratories Agency]												X		

Information derived from the affiliations given in the list of participants published at each meeting. The list for MX 2010 was not published and so there may have been further representation at that meeting not reflected in this table.

On occasion, meetings have sometimes been held in parallel to an MX or MSP, such as meetings of the G8 Global Partnership, and UK officials may have been in Geneva and attended these without being registered for the MX or MSP but would have been able to participate in a variety of interactions in side events and in corridor discussions with MX and MSP participants.

10. The OPCW, in a presentation to the BWC Meeting of Experts on 23 August 2007, suggested that National Authority/inter-ministerial coordination for implementation of the CWC can involve: Ministry of Foreign Affairs, Ministry of Defence, Ministry of Economy and/or Industry or Commerce, Ministry of Health, Ministry of Environment, Ministry of Agriculture, Ministry of Labour, Ministry of Justice or Attorney-General, Ministry of Finance and Central Bank, and Customs.

Similar issues apply between levels of governance, such as local or provincial governments where there have responsibilities for relevant activities and national government.

It follows that for an entity (usually a state) to be an active participant in the regime it must not only be involved in policies relating to the selected issues in the paragraph above, but that these policies are more effective if they are within a coherent policy framework in which relevant actors interact.

Further coherence issues relate to relationships between national governments and inter-governmental bodies and relationships between inter-governmental bodies. These have been included within this dimension rather than create a separate dimension for inter-governmental coherence.

A straightforward success/failure hierarchy is less appropriate in this dimension than that of *Threat Ambition*.

Relation to other proposed dimensions

Enhancements within the *Coherence/Engagement* dimension make it make it easier to employ measures to reduce *Availability/Opportunity* possibilities for misuse and so there is some overlap and mutual reinforcement between these dimensions. In addition, transparent and active implementation of a coherent set of regime provisions means a state is more likely to have fewer barriers to access to materials and technologies for peaceful purposes from other states. This results in a further enhancement of the *Availability/Opportunity* dimension.

Coherent policies can also contribute to *Resilience* within a state.

Enhancements within this dimension can raise costs for acquisition for non-state actors and so therefore contribute to a reduction in *Threat Ambition* in regard to these actors.

Use of this dimension in evaluation of effectiveness

A policy development, or a proposal for a policy development, would be assessed as enhancing effectiveness if it contributes to an under-developed policy or if it has the effect of promoting coordination or interaction between the policy areas on relevant issues, such as between health and law enforcement agencies on handling of possible medical evidence of alleged use of biological weapons.

Analysis later in this Chapter will highlight selected suggestions made during the inter-sessional meetings that directly impinge upon this dimension.

Availability/opportunity dimension

The dimension focuses on the availability of materials and technologies for potential misuse. It is an obvious statement, but seems often overlooked, that misuse of materials and technologies requires access to those materials and technologies in the first place.

The dimension takes into account more than traditional aspects of technology control such as controls on exports. The dual-use nature of the materials and technologies relevant to the regime to control biological weapons means that controls on access to them has to be carried out at many levels. It would be within this dimension that issues of biosafety and biosecurity would be included.

Again, a straightforward success/failure hierarchy is less appropriate in this dimension than that of *Threat Ambition*. However a few benchmarks can be identified at a basic level in which relevant materials and technologies are:

- easily available to possible or potential possessors
- costly and/or difficult to acquire
- impossible to acquire illegitimately

This dimension needs to take account of Article X and related issues as the flipside of the question of technology availability. A particular controversy with Article X is a question of how much needs to be done to fulfil obligations undertaken under its rubric:¹¹

The adjective used by most declared supporters of a mechanism for Article X implementation is 'full', yet it is not clear what 'full implementation' really means.

11. Richard Guthrie, 'The Fifth Day: conclusion of the meeting', *MSP report no 6*, BioWeapons Prevention Project, 14 December 2009, p 2.

Clearly, the desire is to have something that means greater implementation in the form of more activity by donor states which would lead to greater capacities and capabilities within recipient states. But how much does this greater implementation have to be to constitute ‘full implementation’ at any particular time? ... It is unlikely that any Western countries would be ready to agree to any form of mechanism unless the issue of what is expected by ‘full implementation’ is clarified.

Relation to other proposed dimensions

A reduction in *Availability/Opportunity* has an impact on *Threat Ambition* calculations within any entity as it influences cost/benefit analyses. A follow-on impact on *Threat Ambition*-related activities is that reduced *Availability/Opportunity* is key to robustness in the regime in making non-acquisition policies less reversible.

Use of this dimension in evaluation of effectiveness

A policy development, or a proposal for a policy development, would be assessed as enhancing effectiveness if it reduces access to relevant knowledge, materials or technologies for possible hostile use. However, owing to the provisions of Article X, any contribution to effectiveness should allow for access for legitimate peaceful purposes. The balance between these two issues is at the centre of a number of discussions within the BWC meetings and Review Conferences and it is possible that an individual policy suggestion may be enhancing effectiveness in one of these at the same time as degrading effectiveness in another.

Analysis later in this Chapter will highlight selected suggestions made during the inter-sessional meetings of the Biological Weapons Convention that directly impinge upon this dimension.

Resilience dimension

This dimension focuses on the ability of the regime to respond to breaches of regime obligations. This bears some relation to the traditional Regime Theory concept of robustness, but the robustness concept focuses more specifically on shocks rather than more general external influences.

As use of biological weapons is the most overt breach of the regime, a simple benchmark is to assess how effective the regime is in withstanding challenges such as

deliberate release. However, this is impossible to provide an absolute value for. Moreover, response capacities may only be truly known once a deliberate release has taken place.

As use of biological weapons is nothing more than inducing deliberate disease, many responses to use rely on measures to improve public health responses to natural disease outbreaks. While public health enhancements are valuable contributions to the regime to control biological weapons, general public health issues are beyond the scope of the regime to control biological weapons. Lessons have been learned for dealing with deliberate disease outbreaks from the natural outbreaks of SARS and H1N1A influenza in the period under consideration in this thesis.¹²

Key to mobilising response capabilities for deliberate release is the ability to detect and identify suspicious outbreaks. Indeed, much assistance activity in the event of use may be predicated on an internationally accepted confirmation of use. This means that methods of determining if a deliberate release has taken place are relevant to this dimension as well as direct response efforts combatting any deliberate disease.

Relation to other proposed dimensions

This dimension has an interaction with the *Threat Ambition* dimension. A reduced global *Threat Ambition* reduces the probability that *Resilience* activities would be called into play. Conversely, effective *Resilience* preparations would reduce the impact of any use, making such use less attractive; this in turn would then make acquisition less attractive.

A further interaction occurs with the *Availability/Opportunity* dimension as many items required for *Resilience* preparation, such as components for diagnostic tests, are dual-use and may therefore be constrained by measures designed to reduce *Availability/Opportunity*. This is an illustration of the significance of Article VII and Article X of the BWC.

12. Moreover, between the period under consideration in this thesis and the preparation of this thesis there has been a significant outbreak of Ebola Virus Disease (EVD) in west Africa and sporadic emergence of Middle East Respiratory Syndrome.

Use of this dimension in evaluation of effectiveness

A policy development, or a proposal for a policy development, would be assessed as enhancing effectiveness if it contributes to the ability to respond to breaches of the obligations of the regime.

Analysis later in this Chapter will highlight selected suggestions made during the inter-sessional meetings of the Biological Weapons Convention that directly impinge upon this dimension.

Conclusions relating to the four dimensions

The four dimensions suggested are not mutually-exclusive axes. The four dimensions each have some influence on each other. For example, improved *Resilience* to deliberate release in most jurisdictions leads to reduced effect of any such release; such a reduced effect leads to a reduced advantage of use which should lead to a reduced *Threat Ambition*.

Just because a State Party has no *Threat Ambition* in relation to biological weapons does not mean it is doing all that may be seen as desirable. For example, it may be complacent with regards to technology availability issues.

It is possible to argue that three of the dimensions — *Coherence/Engagement*, *Availability/Opportunity* and *Resilience* — are directly related to implementation of the regime within any entity's jurisdiction while the fourth — *Threat Ambition* — is rooted in the policy outcomes of other entities that may be inside or outside of the regime.

Comparison with suggestions by States Parties for strengthening the regime

The comparison with proposals for strengthening and enhancing the regime that have been raised through the first two BWC inter-sessional processes is of particular significance. As part of the inter-sessional processes there were seven pairs of annual meetings with each year discussing an allocated topic.

As noted earlier, the first sub-question of the first Research Question of this thesis is:

Can the possible benchmarks or criteria suggested for use within this assessment of regime effectiveness be related to the considerations, lessons, perspectives, recommendations, conclusions and proposals put forward in presentations,

statements, working papers and interventions during meetings of the BWC inter-sessional processes?

The Meeting of Experts in each year includes opportunities for BWC states parties to discuss in a frank manner the allocated topic. There have been these annual meetings in the periods 2003-05 and 2007-10, known as the first and second inter-sessional processes, respectively. Other than at the 2003 Meeting of Experts, the meeting secretariat has collated ‘considerations, lessons, perspectives, recommendations, conclusions and proposals put forward in presentations, statements, working papers and interventions during the meeting’. This collation was appended to the report of the Meeting and later summarized into a *Synthesis Paper* presented to the Meeting of States Parties later that year. In 2003, the secretariat instead produced a 172-page compilation of statements and interventions in the Meeting.

The reports of the Meetings of Experts are made available to participants in the meetings in draft form, they are then also made available online via the BWC Implementation Support Unit website at <<http://www.unog.ch/bwc>> as well as from the UN online document server at <<http://documents.un.org>>.¹³

While the suggestions embodied in these documents will inevitably be biased towards the topics discussed in each meeting (listed below), collectively they represent the most comprehensive compilation available of indications of what BWC states parties would consider to be policies or activities that could strengthen or enhance the regime — in other words, they are directly related to understandings of effectiveness of those that proposed them. Although the meetings were of the BWC, many of the suggestions relate to the broader regime beyond the BWC itself. The proposed dimensions for evaluating effectiveness can then be set against these suggestions to establish whether the dimensions capture all of the suggestions — if they do not, then modification to the existing

13. The reports are: Report of the Meeting of Experts, BWC/MSP.2003/MX/4 (Part I), dated 18 September 2003, 10 pp; Report of the Meeting of Experts, BWC/MSP.2003/MX/4 (Part II) [Statements, Presentations and Contributions Made Available to the Chairman], dated 18 September 2003, 172 pp; Report of the Meeting of Experts, BWC/MSP/2004/MX/3, dated 11 August 2004, 56 pp; Report of the Meeting of Experts, BWC/MSP/2005/MX/3, dated 5 August 2005, 50 pp; Report of the Meeting of Experts, BWC/MSP/2007/MX/3, dated 3 September 2007, 30 pp; Report of the Meeting of Experts, BWC/MSP/2008/MX/3, dated 8 September 2008, 51 pp; Report of the Meeting of Experts, BWC/MSP/2009/MX/3, dated 16 October 2009, 42 pp; and Report of the Meeting of Experts, BWC/MSP/2010/MX/3, dated 8 September 2010, 38 pp.

dimensions or an additional dimension might have to be considered — and whether the dimensions can be used to indicate relative effectiveness of different proposals.

In some ways, the analysis below follows Karl Popper's thinking about 'black swans',¹⁴ — no matter how many proposals from the BWC meetings that pass the test of being examined to check that they fall within the scope of the dimensions, this provides good evidence, but not proof, that the dimensions are comprehensive. There has therefore been a deliberate and active search within this process to try and identify any 'black swan' in order to be able to falsify the proposed dimensions. Additional sources have included general debate statements from BWC meetings and Working Papers presented by States Parties to BWC meetings as well as public presentations at side events. No black swan has yet been found.

The topics of the annual meetings

The topics under consideration in the various annual meetings have been as follows:

the adoption of necessary national measures to implement the prohibitions set forth in the Convention, including the enactment of penal legislation [2003]

national mechanisms to establish and maintain the security and oversight of pathogenic microorganisms and toxins [2003]

enhancing international capabilities for responding to, investigating and mitigating the effects of cases of alleged use of biological or toxin weapons or suspicious outbreaks of disease [2004]

strengthening and broadening national and international institutional efforts and existing mechanisms for the surveillance, detection, diagnosis and combating of infectious diseases affecting humans, animals and plants [2004]

the content, promulgation, and adoption of codes of conduct for scientists [2005]

ways and means to enhance national implementation, including enforcement of national legislation, strengthening of national institutions and coordination among national law enforcement institutions [2007]

regional and sub regional cooperation on BWC implementation [2007]

14. See, for example, Karl R Popper, *Conjectures and Refutations: The growth of scientific knowledge*, (New York: Basic Books, 1962), 412 + xii pp.

national, regional and international measures to improve biosafety and biosecurity, including laboratory safety and security of pathogens and toxins [2008]

oversight, education, awareness raising, and adoption and/or development of codes of conduct with the aim to prevent misuse in the context of advances in bio science and bio technology research with the potential of use for purposes prohibited by the Convention [2008]

with a view to enhancing international cooperation, assistance and exchange in biological sciences and technology for peaceful purposes, promoting capacity building in the fields of disease surveillance, detection, diagnosis, and containment of infectious diseases: (1) for States Parties in need of assistance, identifying requirements and requests for capacity enhancement, and (2) from States Parties in a position to do so, and international organizations, opportunities for providing assistance related to these fields [2009]

provision of assistance and coordination with relevant organizations upon request by any State Party in the case of alleged use of biological or toxin weapons, including improving national capabilities for disease surveillance, detection and diagnosis and public health systems [2010]

Analysing the suggestions

The compilations of the suggestions made in each meeting are substantial documents which are repetitive as some suggestions are made by more than one State Party and some others are no more than rhetorical debating points. In some cases the political nature of international diplomacy makes this inevitable. For example, if ‘Anywhere’ makes a statement the delegate may indicate afterwards that they would like to see a particular paragraph reflected in the suggestions compilation — notwithstanding that this paragraph boils down to a general statement — the meeting secretariat has essentially no choice but to accede to this request.

With these practical factors in mind, the following criteria for elimination of any individual suggestion in the compilation for the purposes of testing the validity of the proposed dimensions are as follows:

- *Rhetorical/Political ‘R’* — any suggestion that is essentially rhetorical, political or a simple restating or rephrasing of a basic obligation of the Convention or the broader regime; e.g., that use of biological weapons might be considered a bad thing.

- *Descriptive ‘D’* — any suggestion that is essentially descriptive such as providing a comment on a contextual aspect such as global threat levels. Sometimes proposed definitions of terms are included in the compilations and these are counted as descriptive entries unless they are used to guide policy.
- *Process/Procedural ‘P’* — any suggestion that suggests the process for something rather than whether that something is required or not. Such suggestions may also be used to divert attention about a political aspect of an issue.

General potential diminution, such as straightforward opportunity costs, are not included unless there is a specific potential for this to happen.

With over a thousand suggestions being made, and therefore captured in the tabulation, it is beyond the scope of this tabulation to detail how every individual policy, activity or other suggestion enhances effectiveness in each particular dimension, merely to note that it does. However, sample entries from the tabulation are included below in order to illustrate the assessment under the dimensions.

As it took considerable time to collate and annotate these compilations of suggestions, there were ample opportunities for the present author to interact with practitioners to discuss possible subtleties of meanings of individual suggestions.

Selection bias issues

With any research, there is always potential for an inadvertent bias in selecting data to test any question. The inclusion of the full list of suggestions in Volume II avoids selection bias in the process of this thesis. As the list is circulated in draft in each meeting before the publication of the meeting report there is a chance for every participant to ensure that what they have said/presented is included so there is no selection bias in this regard. However, as noted earlier, as the meetings followed the preset topics, there is a bias in the suggestions towards those topics. However, at each of the inter-sessional meetings, and in particular the Meetings of States Parties, there were opportunities for delegations to make general statements which could cover any topics within the remit of the Convention, but also any topics outside of the remit of the Convention, but which might have an impact on the Convention. There were also many opportunities for delegations to raise issues

within the five-yearly Review Conferences. This means that if a State Party were to feel strongly that some aspect of activities under the Convention (or the broader regime) that might contribute to effectiveness were not being given attention within the themed interactions of the inter-sessional process there would be ample opportunity to raise this.

It is worth noting that many of the suggestions made within the Meetings of Experts fall outside of the Biological Weapons Convention *per se* but fall within the wider regime.

Entry formats

Each of the suggestions made in the meetings and added to the compilation by the meeting secretariat is listed in Volume II in the following format:

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/Engagement	Availability/Opportunity	Resilience	

For every proposal, each dimension is marked 'X' for relevant or '-' not significantly relevant,¹⁵ so that a suggestion that is relevant in the *Threat Ambition* and *Availability/Opportunity* dimensions would be annotated in the following way:

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/Engagement	Availability/Opportunity	Resilience	
	X	-	X	-	

This can be summarized as 'X – X –' to save space where necessary.

Entries listed in this section are simply samples for illustrative purposes. The full listings are provided in Volume II.

Themes from the meetings

Before looking at specific sample entries, it is worth taking a brief overview of the relationship between the topics under consideration in each of the annual meetings and the proposed dimensions as, for some topics, many of the proposals will fall only within certain dimensions. While broad themes are identified here which may include many of

15. Strictly speaking, it would be simpler to have a label of 'not relevant', however there are a number of cases where a suggestion impinges on a dimension in a very minor way which might lead to less clarity than if the threshold was 'not significantly relevant'.

the suggestions for particular years, there are always some suggestions that don't follow the trend. These are often the ones that provide the most interesting lessons.

The two topics in 2003 were about national implementation and pathogen security. While the discussion under the national implementation topic included much on export control issues which would clearly fall within the *Availability/Opportunity* dimension, there was much discussion on other aspects of national implementation including legislation on prohibitions that would have an impact on *Threat Ambition*. Most of the discussion on pathogen security would fall within the *Availability/Opportunity* dimension. In both cases, there were elements of cross-government activities that would fall within the *Coherence/Engagement* dimension. Although there was no tabulation of suggestions made in 2003, most of the proposals for the first topic in the 2003 Meeting of Experts would have been defined in the following way:

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/Engagement	Availability/Opportunity	Resilience	
	X	X	X	-	

Most of the proposals for the second topic in the 2003 Meeting of Experts would have been defined in the following way:

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/Engagement	Availability/Opportunity	Resilience	
	-	X	X	-	

The two topics in 2004 were about responses to disease outbreaks. Clearly these primarily fall within the *Resilience* dimension. As the first topic deals with international capabilities and the second with national and international institutions dealing with disease surveillance there are many proposals that fall within the *Coherence/Engagement* dimension. Improvements in effectiveness of measures to investigate alleged use would also impinge upon the *Threat Ambition* dimension in general terms. The proposals relating to disease surveillance have considerable overlap with each other. In general terms, the dimension relating to *Threat Ambition* is enhanced as rapid detection of an deliberately induced outbreak of a disease would not only increase the ability for rapid response but also reduce levels of panic and concern within the general public. This would make the potential use of deliberate disease less attractive and therefore the

acquisition of biological weapons perceived to be less beneficial. Enhanced disease surveillance would add to coherence of the regime by bringing different responsible actors together. The impact of enhanced disease surveillance on technology availability is double-sided; by enhancing laboratory capabilities would make the security of pathogens more secure, but with the downside that an expansion of laboratory capacities would widen the access of individuals to pathogens and technologies used to handle them. *Resilience* of the regime would increase with better disease surveillance. Therefore, most of the proposals for the first topic in the 2004 Meeting of Experts would be defined in the following way:

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/Engagement	Availability/Opportunity	Resilience	
	X	X	-	X	

Most of the proposals for the second topic in the 2004 Meeting of Experts would be defined in one of the following ways:

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/Engagement	Availability/Opportunity	Resilience	
	-	X	-	X	
	-	-	-	X	

The topic for 2005 was on codes of conduct. Much of the discussion in the meetings was about ensuring that scientists and engineers had levels of awareness of relevant issues so as not to allow their work to be misused either deliberately or inadvertently. Much of this work would therefore fall within the *Availability/Opportunity* dimension, with aspects of the *Coherence/Engagement* dimension also being relevant as codes establish benchmarks against which activities can be assessed and this enhances engagement. Efforts towards awareness raising would also impinge upon the *Threat Ambition* dimension in general terms. While codes of conduct might make it more difficult for an entity to recruit scientists to work on a biological weapons programme, the contribution towards the *Resilience* dimension would be minimal. It therefore follows that most of the proposals within the 2005 Meeting of Experts would be defined in one of the following ways:

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/Engagement	Availability/Opportunity	Resilience	
	–	X	X	–	
	X	X	X	–	

The two topics in 2007 were about national implementation and regional and sub regional cooperation on BWC implementation. The discussion under the first of these included much on technology control issues which would clearly fall within the *Availability/Opportunity* dimension. While much of the second topic also fell within the *Availability/Opportunity* dimension, the main focus fell within the *Coherence/Engagement* dimension. There were few proposals that impinged upon the *Threat Ambition* and *Resilience* dimensions under either topic. Therefore, most of the proposals for the topics in the 2007 Meeting of Experts would be defined:

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/Engagement	Availability/Opportunity	Resilience	
	–	X	X	–	

The two topics in 2008 were about pathogen security and codes of conduct. Most of the suggestions under pathogen security fall within the *Availability/Opportunity* dimension, there are also aspects that fall within the *Coherence/Engagement* dimension. The codes of conduct discussions followed on from those in 2005 where again much of this work falls within the *Availability/Opportunity* dimension, with aspects of the *Coherence/Engagement* dimension also being relevant. Again, efforts towards awareness raising would also impinge upon the *Threat Ambition* dimension in general terms. It therefore follows that most of the proposals within the 2008 Meeting of Experts would be defined in one of the following ways:

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/Engagement	Availability/Opportunity	Resilience	
	–	X	X	–	
	X	X	X	–	

The topic in 2009 related to disease surveillance. As disease surveillance is a key element in response to deliberate release, the proposals primarily fall within the *Resilience* dimension with elements that fall within the *Coherence/Engagement* dimension.

Improvements in measures that would identify a deliberate release would only impinge upon the *Threat Ambition* dimension in very general terms. Very little within this topic falls within the *Availability/Opportunity* dimension except in very general terms that there might be fewer possibilities to handle pathogens without being detected. Therefore, most of the proposals in the 2009 Meeting of Experts would be defined as:

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/Engagement	Availability/Opportunity	Resilience	
	-	X	X	-	

The topic in 2010 was about responses to allegations of deliberate use of disease as a weapon which primarily falls within the *Resilience* dimension with aspects that fall within the *Coherence/Engagement* dimension. Therefore, most of the proposals in the 2010 Meeting of Experts would be defined as:

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/Engagement	Availability/Opportunity	Resilience	
	-	X	-	X	

Sample entries

The entries listed in this section are simply samples for illustrative purposes. Some were selected because they illustrated a particular point, but about half were deliberately chosen in a random process to ensure there was a spread of topics. The full listings are provided in Volume II.

This analysis is made on the assumption that each suggestion being examined is acted upon, rather than being simply stated in a meeting.

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/Engagement	Availability/Opportunity	Resilience	
Those that conduct, fund, administer and regulate biosciences and biomedicine have an ethical, social responsibility and obligation to actively deliberate measures necessary to minimize risk that their work could be employed for hostile ends [Malaysia, presentation, 14 June 2005]	-	X	X	-	

In this example suggestion, the regime would be enhanced in the *Coherence/Engagement* dimension as there has been less than perfect interactions between those agencies

involved in research funding and those looking at hostile implications of research in many parts of the life sciences and related fields. In the past, some funders have assumed that regulation is the responsibility of governing authorities, yet these authorities cannot regulate what they don't know. Active deliberation of measures should improve coherence of policies and engagement of policy-making bodies on issues relevant to the regime. The *Availability/Opportunity* dimension is enhanced as deliberations on measures to minimize risk should identify means to reduce the possibility that unauthorized persons would get access to sensitive materials and to reduce the possibility that those authorized to have access would misuse their access. There is no aspect of this suggestion that falls outwith the proposed dimensions.

Suggestions	Dimensions				Other aspects
	Threat Ambition	Coherence/Engagement	Availability/Opportunity	Resilience	
National implementation of the BTWC does not only mean to transform legally binding BTWC obligations into legislative and administrative measures. It also includes the full implementation of measures agreed at BTWC Review Conferences [Germany, BWC/MSP/2007/MX/WP.4, 7 August 2007]	-	X	X	X	

In this example suggestion, the regime would be enhanced in three dimensions. Overall enhancement comes from including the politically binding measures as well as the legally binding ones. Such measures include the system of Confidence-Building Measures (CBMs) and action on universality. Enhancements in the *Coherence/Engagement* dimension would stem from the process of producing a CBM return as this process prompts governments to ensure they have an understanding of relevant activities taking place under their jurisdiction. This includes interactions between a variety of departments and agencies. The regime would also be enhanced in the *Availability/Opportunity* dimension as the Review Conferences have noted the importance of transfer controls which fall within legislative and administrative measures together with other aspects relating to security of relevant materials. The *Resilience* dimension is enhanced as the 2006 Review Conference noted the importance of measures such as disease surveillance. There is no aspect of this suggestion that falls outwith the proposed dimensions.

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/Engagement	Availability/Opportunity	Resilience	
Code of conduct is voluntary [Nigeria, statement, 21 June 2005]	X	X	X	–	
Codes of conduct should be voluntary at all levels [India, intervention, 15 June 2005]	X	X	X	–	
Code should be voluntary at the national level; no mandatory enforcement [USA, presentation, 20 June 2005]	X	X	X	–	
Voluntary codes do not achieve much [ABPI, presentation, 16 June 2005]	X	X	X	–	

One reason for selecting this connected group of proposals is that they rest on the cusp of being marked as ‘procedural’ owing to the focus on the voluntary nature of codes. However, this set of suggestions is useful to illustrate that suggestions were made in the inter-sessional processes from a variety of perspectives and so many suggestions disagreed with each other. Notwithstanding this, the codes suggestions have the potential to enhance regimes ability to deal with the *Threat Ambition* dimension by enhancing norms against misuse of the life sciences. The *Availability/Opportunity* dimension would be enhanced by codes of conduct as they should reduce the availability of life scientists to work on prohibited programmes. The *Coherence/Engagement* dimension would be enhanced through the process of maintaining codes and utilising them in an on-going education and outreach programme. There are no aspects of these suggestions that fall outwith the proposed dimensions.

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/Engagement	Availability/Opportunity	Resilience	
Informal cross-border network[s] among experts, etc, can be useful. [Japan, statement, 22 August 2007]	X	X	X	X	

All four dimensions are relevant in this example suggestion, which is relatively rare in the compilation. However, some of these rare cases can provide interesting illustrations. Cross-border networks have the potential to enhance the ability of regime participants to deal with the *Threat Ambition* dimension not only by enhancing norms against misuse of the life sciences but also by the greater potential for detection of misuse. The *Coherence/Engagement* dimension would be enhanced through the process of creation of a community dealing with relevant issues, although this author would hesitate in using the term ‘epistemic community’ in this context. The *Availability/Opportunity* dimension would be enhanced though network interactions which should enable technology controls to be more effective and by greater interactions prompting an earlier identification of

potentially anomalous or suspicious situations. If such networks also included experts relating to response to deliberate use, for example, it would also contribute to the effectiveness of the *Resilience* dimension. There is no aspect of this suggestion that falls outwith the proposed dimensions.

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/Engagement	Availability/Opportunity	Resilience	
A single regulatory framework should govern work with human and animal pathogens. [UK, BWC/MSP/2008/MX/WP.7, 30 July 2008, and statement, 19 August 2008]	–	X	X	–	
A common set of containment measures should apply to both animal and human pathogens. [UK, BWC/MSP/2008/MX/WP.7, 30 July 2008, and statement, 19 August 2008]	–	X	X	–	

In these related example suggestions, the *Coherence/Engagement* dimension is enhanced through ensuring systems work together and that there are no gaps between controls on the two groups of pathogens. The regime to control biological weapons covers threats to humans, animals and plants, a point which is sometimes overlooked. The *Availability/Opportunity* dimension would be enhanced as better pathogen controls should reduce availability for misuse. The *Threat Ambition* dimension would be enhanced only indirectly so is not indicated here. There is no aspect of these suggestions that falls outwith the proposed dimensions.

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/Engagement	Availability/Opportunity	Resilience	
Scientists who become aware of activities that violate the Biological and Toxin Weapons Convention or international customary law should raise their concerns with appropriate people, authorities and agencies. [IAP, statement, 20 August 2008]	X	X	X	X	

This sample suggestion is another rare example of a suggestion that falls within all four proposed dimensions. The *Threat Ambition* dimension may be enhanced as potential perpetrators may have increased concerns about getting caught. The *Coherence/Engagement* dimension would potentially be enhanced as this contributes to the coherence of policies. The *Availability/Opportunity* dimension as it would contribute to reluctance of people to provide skills or materials to a possible perpetrator in case they were caught. Enhancements to the *Resilience* dimension would derive from increased

abilities of relevant authorities to deal with a situation of non-compliance. There is no aspect of this suggestion that falls outwith the proposed dimensions.

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/ Engagement	Availability/ Opportunity	Resilience	
Incorporating environmental values into codes of conduct (could be accomplished by focusing on) <ul style="list-style-type: none"> • post-materialist values • deep ecology and the Gaia hypothesis • stewardship • sustainable development • the precautionary principle • quality of life [Australia, presentation, 21 June 2005] 	-	X	-	-	

In this example suggestion only the *Coherence/Engagement* dimension is directly impinged upon, although an argument could be put forward to contest the relevance to that dimension. This suggestion is on the cusp of being labelled ‘rhetorical/political’ as it represents more of a viewpoint of what the world should be like rather than a suggestion for an enhancement to the implementation of the regime. There is no aspect of this suggestion that falls outwith the proposed dimensions.

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/ Engagement	Availability/ Opportunity	Resilience	
In assessing the overall effectiveness of an enforcement strategy, it is useful to measure that strategy against the likely scenarios law enforcement and public health authorities may encounter concerning the release of biological agents. Viewed collectively, the threats posed by the illicit use or transfer of biological agents or toxins may manifest themselves in one of five different scenarios. Listed in order of decreasing frequency of occurrence (and increasing severity of risk to public health), these scenarios include (1) “hoaxes” or false reports of biological agents being released; (2) illicit transfers involving certain particularly dangerous pathogens; (3) possession of an unreasonable quantity or type of a biological agent; (4) possession of a biological agent (or toxin) with the intent to use it as a weapon; and (5) the actual use or deployment of a biological agent or toxin as a weapon of mass destruction. [USA, BWC/MSP/2007/MX/WP.11, 15 August 2007]	-	X	X	X	

In this example suggestion the *Coherence/Engagement* dimension is potentially enhanced through bringing together public health and law enforcement authorities. The *Availability/Opportunity* dimension would be enhanced, notwithstanding that much of this suggestion relates to after-event issues. However, systems to identify what might be ‘unreasonable quantities’ would reduce availability. The *Resilience* dimension would be enhanced as the suggestion deals with issues relating to responses to misuse. The *Threat*

Ambition dimension is only indirectly impinged upon and so is not indicated. There is no aspect of this suggestion that falls outwith the proposed dimensions.

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/Engagement	Availability/Opportunity	Resilience	
[Impose] effective export controls on dual-use biological agents and related equipment and technology. [Attach] great importance to the establishment of... effective [national] export control mechanism[s]. [China, statement, 21 August 2007]	-	-	X	-	

This suggestion is entirely captured in the *Availability/Opportunity* dimension. There is no aspect of this suggestion that falls outwith the proposed dimensions.

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/Engagement	Availability/Opportunity	Resilience	
Media management: <ul style="list-style-type: none"> • Decide what information will reach media • Joint elaboration of reports • Presentation of exact and precise information to the media • Open and honest about actual threat assessment • Pro-active in order to prevent panic and/or irresponsible or tendentious use of information. [Interpol, presentation, 25 August 2010]	-	X	-	X	

In this example suggestion provides some interesting illustrations. It is clear that the *Coherence/Engagement* dimension would be enhanced as acting on this suggestion would bring different parts of government structures together. It is also clear that the *Resilience* dimension would be enhanced as the suggestion would improve responses to incidents. Aspects of the *Threat Ambition* dimension are more difficult to assess. The possibility that impression within the minds of potential perpetrators that there would be an effective media response to an incident and thus reduce the impact of that incident might lead to a reduced *Threat Ambition*. However, would this be a direct enhancement or just an indirect impingement as the *Resilience* dimension had been enhanced? In the end this is a judgment call. As the key test in this analysis is whether the dimensions form a comprehensive set, this difficulty of assessment of the *Threat Ambition* dimension does not have any implications on the assessment that there is no aspect of this suggestion that falls outwith the proposed dimensions.

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/Engagement	Availability/Opportunity	Resilience	
Outreach and awareness activities should have the following goals, among others: (i) to inform businessmen on existing government controls in the area of non-proliferation of weapons of mass destruction, and to stress the importance of working with the Government at a national level; (ii) to increase the quality of biosafety and biosecurity controls; (iii) to identify and analyse the potential occurrence of any commercial activity that might be considered illegal and/or prohibited under the international mechanisms that regulate transfers (exports or imports) of sensitive products or controlled technologies; (iv) to publish and publicize the lists of sensitive goods; (v) to help identify any implications of exports or imports in areas of concern. [Brazil, BWC/MSP/2008/MX/WP.28, 15 August 2008]	-	X	X	-	

In this suggestion, the *Coherence/Engagement* dimension would be enhanced through improvements to government-industry interaction and the *Availability/Opportunity* dimension would be enhanced through more effective transfer controls. The *Threat Ambition* dimension is only indirectly impinged upon owing to the enhancement of the *Availability/Opportunity* dimension. There is no aspect of this suggestion that falls outwith the proposed dimensions.

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/Engagement	Availability/Opportunity	Resilience	
Criminal investigations: the response to CBRN incidents, in particular terrorist acts, also includes the necessity to conduct criminal investigations with a view to bringing the perpetrators to justice. The importance of judicial cooperation with regard to terrorist activities involving CBRN materials should be underlined. [Belgium/EU, BWC/MSP/2010/MX/WP.3, 12 August 2010]	-	X	-	X	

In this suggestion, the *Coherence/Engagement* dimension is enhanced through the identification of the need for cooperation. The *Resilience* dimension would be enhanced through better responses to incidents of misuse. The *Threat Ambition* dimension is only indirectly impinged upon owing to the enhancement of the *Resilience* dimension. There is no aspect of this suggestion that falls outwith the proposed dimensions.

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/Engagement	Availability/Opportunity	Resilience	
(Codes should be) Addressed to the individual conscience of the scientist... (with) no judicial implications; Focus on individual responsibility of scientists and on the principle that ethical values shall overcome hierarchy; Life scientist(s) is in a position to follow the complete procedure related to the potential misuse of the experiment; Not a definition of permissible or forbidden experiments but the concept of acceptable or unacceptable intents of the research; (and) Not aimed at establishing principles of self-censorship but example of self-governance by the scientific community [ICGEB, presentation, 13 June 2005]	X	X	X	–	

This suggestion provides a useful illustration in relation to issues that arise regarding the dimensions and suggestions regarding codes of conduct. In most cases, the *Availability/Opportunity* dimension is enhanced through reducing the possibility that scientists would contribute, willingly or inadvertently, to misuse activities. This would then indirectly impinge upon the *Threat Ambition* dimension. However, there were some codes suggestions, especially in 2005 that carried the implication of preventing scientists themselves as instigators of misuse. In such cases this would specifically indicate the *Threat Ambition* dimension in this analysis. The *Coherence/Engagement* dimension is enhanced through bringing scientists together. There is no aspect of this suggestion that falls outwith the proposed dimensions.

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/Engagement	Availability/Opportunity	Resilience	
A key area for action is the need to work for better global health security, which includes reducing the threat from infectious disease. In this context... promoting wider adherence to the Convention and agreeing practical measures to enhance its effectiveness are key objectives, and this includes capacity building in the fields of disease surveillance, detection, diagnosis, and containment. [UK, BWC/MSP/2009/MX/WP.3, 27 July 2009]	–	X	–	X	

In this example suggestion, the *Coherence/Engagement* dimension is enhanced through capacity building and the *Resilience* dimension is enhanced through aspects such as better detection and diagnosis. The *Threat Ambition* dimension is only indirectly impinged upon owing to the enhancement of the *Resilience* dimension. There is no aspect of this suggestion that falls outwith the proposed dimensions.

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/Engagement	Availability/Opportunity	Resilience	
It is necessary ... to have a national and international network for the dissemination of knowledge, technologies and protocols, aimed at building the necessary national capacities whose results (can be) accepted by all. [France, BWC/MSP/2004/MX/WP.55*, 28 July 2004]	-	X	-	X	

This suggestion was made in the context of laboratories that might be used to analyse samples gathered in response to misuse incidents. Enhancing laboratory capabilities through networking activities has clear implications for the *Resilience* dimension and the networking aspect clearly enhances the *Coherence/Engagement* dimension. There is no aspect of this suggestion that falls outwith the proposed dimensions.

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/Engagement	Availability/Opportunity	Resilience	
[There is a need for] individual countries to further enhance ... capabilities in addressing challenges such as emerging and re-emerging diseases which affect human, animal, and plants. These efforts to enhance capabilities must be adapted to local needs. [Indonesia, statement, 19 August 2008]	-	X	-	X	

In this example suggestion, the *Coherence/Engagement* dimension is enhanced by bringing together responses to naturally occurring infectious disease with those for deliberate disease. The *Resilience* dimension is enhanced as it has long been recognized that effective responses to deliberate disease are enhanced through better responses to naturally occurring infectious disease. There is no aspect of this suggestion that falls outwith the proposed dimensions.

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/Engagement	Availability/Opportunity	Resilience	
Intensify risk communication. [Netherlands, BWC/MSP/2004/MX/WP.74, 29 July 2004]	X	X	X	X	

This suggestion was made in the context of food safety and issues around possible deliberate contamination. Good risk communication brings departments and agencies together and so impacts upon the *Coherence/Engagement* dimension. The *Availability/Opportunity* dimension would be enhanced as good risk communication helps decision making on protection of foodstuffs. The *Resilience* dimension would be enhanced through good risk communication should an incident arise. With all of the above factors, it is a judgement whether any impact upon the *Threat Ambition* dimension

might be entirely through the enhancement of the *Availability/Opportunity* and the *Resilience* dimension or whether there was a separate influence on potential perpetrators to reduce their *Threat Ambition*. There is no clear answer to this, but it is the sense of this author that it would. As noted earlier, in some ways this sort of uncertainty with this analysis is a moot point as the key test is for comprehensiveness of the set of dimensions and there is nothing in this uncertainty that would indicate that there is any aspect of this suggestion that falls outwith the proposed dimensions.

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/Engagement	Availability/Opportunity	Resilience	
Facilitate the development of human resources in developing States Parties in the implementation of the Convention, taking into account the special situation faced by them [Cuba/NAM, statement, 24 August 2009 and BWC/MSP/2009/MX/WP.24, 25 August 2009]	–	X	–	X	

This suggestion was made in the context of Article X (BWC/MSP/2009/MX/WP.24 contains the group's call for a mechanism to implement this article). The *Coherence/Engagement* dimension would be enhanced through capacity building. The *Resilience* dimension would be enhanced as many outcomes of Article X developments are improved responses to infectious disease. There is no aspect of this suggestion that falls outwith the proposed dimensions.

Extraction of rhetorical/political, descriptive or process/procedural statements

In order to ensure that suggestions are not incorrectly labelled as rhetorical/political, descriptive or process/procedural, and thus ensuring such statements are correctly identified to avoid the case that proposals that don't fall within the four dimensions aren't inadvertently labelled in one of these categories.

Below is a selection of the proposals highlighted with one of these labels and an explanation of why the label was applied. Quotations are as given in the proposals compilation, but additional information, where available, on the the source of the proposal is given here where it helps inform understanding of the context.

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/Engagement	Availability/Opportunity	Resilience	
Resorting to the UN Security Council under Article VI, convening a formal consultative meeting under procedures developed to implement Article V, and conducting international investigations authorised by the UN Secretary-General... all three of these mechanisms remain viable and... revisions to their scope or procedures are neither necessary nor appropriate. [USA, Guy Roberts, plenary statement, 26 July 2004]					R

The issue of how to investigate allegations of use was highly contested during the 2004 Meeting of Experts. The US position as elaborated above was broadly held by the Western Group states but was countered by many others that indicated that they believed that use of mechanisms such as that of the UN Secretary-General were not ‘appropriate’¹⁶ and there was a need for a comprehensive verification arrangement. Hence, this suggestion is categorised as rhetorical/political.

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/Engagement	Availability/Opportunity	Resilience	
It is obviously necessary to use the potential of the UN Security Council for investigating alleged use of biological weapons. [Russia, BWC/MSP/2004/MX/WP.44, 23 July 2004]					R

Possible roles of the Security Council in any investigation of alleged use are deeply political. While the high level of political significance embodied within the Security Council is of importance, there could be difficulties if a member of the Council, especially a Permanent Member, were to be one of the parties in the allegation. Hence, this suggestion is categorised as rhetorical/political.

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/Engagement	Availability/Opportunity	Resilience	
The BTWC can never disregard one of the characteristics of its membership: the difference between its States Parties regarding the level of development and their national capabilities and resources. [Cuba/NAM, 2010]					R

While a recognition of differences between participants within the regime could help inform activities that might enhance effectiveness of the regime, this statement was made in the context of disputes over Article X. Hence, this suggestion is categorised as rhetorical/political.

16. See, for example, Iran, ‘Investigation’, BWC/MSP/2004/MX/WP.68, 28 July 2004, para 5.

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/Engagement	Availability/Opportunity	Resilience	
The only sustainable method to achieve this goal is through multilateral negotiations aimed at concluding a non-discriminatory, legally binding agreement, dealing with all the Articles of the Convention in a balanced and comprehensive manner that can not exclude the negotiation and establishment of a verification mechanism. [Cuba/NAM, plenary statement, 23 August 2010]					R

The goal in question is ‘the particular importance of strengthening the Convention’. This suggestion is a political description of a potential means of strengthening the Convention. Even if this suggestion was not annotated as rhetorical/political, there is nothing within it that would fall outwith the proposed dimensions.

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/Engagement	Availability/Opportunity	Resilience	
Any cooperation on primary notification... (or a) call for international assistance and response must be based on national mechanisms. [Norway, 2004]					P

This suggestion is annotated as procedural as it deals with the process of notification of unusual patterns of disease rather than whether such notifications should be given at all. However, the subject matter is highly political as a number of governments wish to retain control over notifications of unusual patterns of disease. This was particularly strongly illustrated in the reactions in the first inter-sessional process from China to the early reporting of SARS cases via ProMED rather than through official channels.

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/Engagement	Availability/Opportunity	Resilience	
Scientific research remains essential and requires sustained efforts because: (of) threats from unexpected or unexplored risks; the pace of scientific progress in clandestine laboratories cannot be objectively measured; the access of terrorist groups to training, expertise, source material and equipment is difficult to map; (and) the validity of risk inventories, priority ranking and risk assessment is time-limited. [Netherlands, 2004]					D

This statement is essentially an outlining of the problem rather than a suggestion for solutions and is therefore marked as descriptive.

Suggestion	Dimensions				Other aspects
	Threat Ambition	Coherence/Engagement	Availability/Opportunity	Resilience	
Capacity must be developed within existing national structures. [Norway, 2004]					D

As the topic under discussion was about enhancing capacities, this suggestion is categorised as descriptive as it is a general statement of the issue.

Section conclusions

The analysis above indicates that there are no aspects of the suggestions made to the Meetings of Experts that fall outside the proposed dimensions, although in some cases the suggestions prompted clarifications in the descriptions of the dimensions as the research work for this thesis progressed.

It is notable how few of the suggestions relate directly to the *Threat Ambition* dimension — a key measure of regime effectiveness. However, as noted in the section on the *Threat Ambition* dimension, it is difficult for governments to be directly influenced in this manner and such influence is primarily normative.

International diplomacy is a complicated process and it is relatively rare for a state to directly prompt another to a particular action or to directly accuse another of improper activities relating to the regime. This can make suggestions directly related to the *Threat Ambition* dimension difficult to bring forward other than in a general rhetorical manner.

Comparison with earlier writings on the regime

As noted earlier, the second sub-question of the first Research Question of this thesis is:

Can the possible benchmarks or criteria used within assessment of regime effectiveness be related to principles, norms and rules (i.e., obligations) within the regime?

An initial working premise underpinning this question is that the greater the number of the principles, norms and rules encompassed within the dimensions, benchmarks and criteria the more that might be learned from understanding effectiveness.

To tackle this question, the first task was the identification of the principles, norms and rules within the regime to control biological weapons. As the distinction between

principles, norms and rules is not always easy to make (see page 144), there is some utility in understanding these obligations together.

The identification of obligations within the regime was carried out in Chapter 3. These identified obligations can be compared with the proposed dimensions.

The Sims elaboration of obligations (see page 94) are presented in the table below, together with identification of applicable dimensions.

Identified obligation	Applicable dimensions
Article I — Never in any circumstances to develop, produce, stockpile, or otherwise acquire or retain, biological or toxin weapons (defined as: (a) microbial or other biological agents, or toxins whatever their origin or method of production, of types and in quantities that have no justification for prophylactic, protective or other peaceful purposes; and (b) weapons, equipment or means of delivery designed to use such agents or toxins for hostile purposes or in armed conflict)	Threat ambition
Article II — To destroy them, or divert them to peaceful purposes, not later than 9 months after the entry into force of the convention	Threat ambition
Article III — Not to transfer them to any recipient whatsoever, and not in any way to assist, encourage or induce anyone else to acquire them	Availability/opportunity, threat ambition
Article IV — To take any necessary measures to give domestic legal effect, within each state party, to its international obligations under the convention	Coherence/engagement, availability/opportunity
Article V — To consult and cooperate as necessary, bilaterally and multilaterally, in solving any problems that may arise, including the use of 'appropriate international procedures within the framework of the United Nations and in accordance with its Charter'	Resilience, coherence/engagement
Article VI — To cooperate with the UN Security Council in any investigation which it may 'initiate' (English text) or 'entreprendre' (French text), should it receive a complaint that one state party finds another state party to be acting in breach of its obligations	Resilience, coherence/engagement
Article VII — To assist victims, again in cooperation with the Security Council, if biological or toxin weapons are used against a state party	Resilience, coherence/engagement
Article IX — To continue negotiations in good faith 'with a view to reaching early agreement' on a chemical disarmament treaty	
Article X — To pursue international cooperation in the peaceful uses of micro-biology, through the 'development and application of scientific discoveries' for the prevention of disease and for other peaceful purposes; and to implement the BTWC in such a way as 'to avoid hampering the economic or technological development of States Parties to the Convention' or international cooperation in the peaceful uses of microbiology	Availability/opportunity

It can be seen from this table that only one of the obligations identified by Sims falls outside of the proposed dimensions, that of negotiating a chemical weapons convention. While it might be possible to argue that the *Coherence/Engagement* dimension would cover this at a stretch, the point would be somewhat moot as the Chemical Weapons Convention has been negotiated and is now in force (see page 13). It could also be argued that the regime to control chemical weapons, while it impinges on the regime to control biological weapons, is a separate regime.

The Kelle elaboration of obligations (see page 95) are presented in the table below, together with identification of applicable dimensions.

Identified obligation	Applicable dimensions
'non-use'	Threat ambition
'non-acquisition'	Threat ambition
'disarmament'	Threat ambition
'non-transfer'	Availability/opportunity
'cooperation'	Availability/opportunity
'assistance'	Resilience, coherence/engagement
'consultation'	Resilience, coherence/engagement
'harmonization'	Coherence/engagement
adaptation	Coherence/engagement
internalization	Coherence/engagement
use	Threat ambition
peaceful uses	Availability/opportunity
defences	Resilience, coherence/engagement

It can be seen from this table that all of the obligations in the Kelle interpretation are captured within the four dimensions proposed within this thesis.

Section conclusions

The four proposed dimensions match well with earlier writings on identified norms and other obligations within the regime to control biological weapons. It is clear that there is much that has been learned, and much more to be learned, looking at the uptake/implementation of individual regimes norms or obligations. While there will be utility in analysis of specific regime obligations highlighted in earlier analyses, it is also clear that such analysis does not cover the breadth of regime obligations in the way that the suggested dimensions do.

Chapter conclusions

Four dimensions have been successfully identified, defined in detail and tested. Each of the dimensions has embodied specific characteristics and there have been some identified overlaps between them, but all dimensions are represented in the tables of suggestions showing all have relevance to the regime. The first of these tests was against the body of suggestions made through the BWC inter-sessional processes. No aspects of any of the suggestions tabulated in Volume II has been found to fall outside the four dimensions and so this provides high confidence that they represent a comprehensive coverage of regime effectiveness.

While the use of the ‘coherence/engagement’ dimension contains within it the traditional IR concept of regime effectiveness measured as a proxy of cooperation within the regime, this dimension has been shown to be much broader than this. The situation is similar with the inclusion of the IR concept of regime robustness within the resilience dimension.

There are two common meanings of the term ‘effectiveness’ that are relevant to the thesis. In the realm of traditional IR theory, if regime participants do not carry out any activity that they would not have done in any case had the regime not existed then the regime cannot be considered to be effective in IR terms. Nonetheless, taking the other common meaning of effectiveness, activities undertaken by regime participants that they would have undertaken regardless of whether the regime the regime existed, may, on aggregate, form an effective set of measures that have some effect in achieving the stated aims of the regime; thus in this case the regime may be interpreted in this second meaning as being effective even if it is not effective in an IR sense. It is not always possible to disentangle these two meanings of effectiveness as soon as some international cooperation takes place within a regime.

A limitation of the research approach identified in Chapter 1, that suggestions mainly followed the scope of the topics allocated to each of the meetings in the inter-sessional processes, and so potentially did not cover all issues within the regime proved to be only a partial limitation. While these topics did not cover all aspects of the regime to control biological weapons, a read through of other sources such as general debate statements at the Review Conferences was also carried out in order to see if any aspects could be identified that would fall outwith the proposed dimensions. No such aspect could be found, strengthening the confidence in the comprehensive nature of the dimensions. This could be regarded as the second test of these dimensions.

With the dimensions also being tested against external writings analyzing the regime and being found to be able to accommodate all of the obligations as elaborated in selected writings provides further confidence in the comprehensive nature of the proposed dimensions. This could be regarded as the third test of the dimensions.

As the proposed dimensions have been tested in three ways, with results indicating that there are no aspects of the regime that fall outwith them in each of the tests, it is reasonable to state that this provides a strong indication that the proposed dimensions are comprehensive in their coverage of regime activities.

9. Analysing obstacles/hindrances to ‘effectiveness’ within policy processes and regime contributions to diminishing or reinforcing them

Signposting

This Chapter brings some of the separate threads explored through the thesis together. It is therefore useful at this point to recap how the preceding chapters contribute to this.

The introductory material in Chapter 1 outlined some assumptions that underpin the research undertaken and elaborated what this work seeks to achieve. This included identifying where this work is intended to add value to existing understandings. At this point, an outline of the research problem and related research questions was provided. The regime to control biological weapons was examined in Chapter 3, including a review of how this regime has been understood in earlier analysis. The background to general theory relevant to investigating the research problem was provided in Chapter 5 with details of theories regarding international regimes explored in Chapter 6. The concept of regime effectiveness and the different theoretical understandings that have been developed in this area were explored in that Chapter. Earlier theoretical work regarding national policy processes was explored in Chapter 7 and that provided an opening to present a conjecture of a generic idealized policy decision. As a regime can only be considered to be effective in IR theory terms if it has some form of influence on the behaviour of participants within it, such a generic decision becomes a useful tool for analysis of regime effectiveness. The material in Chapter 8 illustrated that effectiveness has more than one dimension and identified four such dimensions along which aspects of success or failure within the regime might contribute to or diminish regime effectiveness. These dimensions were then examined in comparison with suggestions for strengthening the regime made during meetings of the BWC inter-sessional processes, allowing for a more informed understanding of how regimes may be considered to be effective.

The approaches pursued in this chapter

As noted earlier (see page 18), the second Research Question of this thesis is:

Can analysis of policy processes within governmental structures identify whether activities within the regime to control biological weapons impinge upon such policy processes?

This had one sub-question:

Can the selected policy analysis methods indicate how obstacles to policy development be overcome using the considerations, lessons, perspectives, recommendations, conclusions and proposals put forward in presentations, statements, working papers and interventions during meetings of the BWC inter-sessional processes?

As the thesis reaches this point, there are four bodies of understanding that have been developed:

- the proposed dimensions relating to effectiveness;
- the conjectured generic idealized policy decision
- the dataset of suggestions made within the BWC Meetings of Experts; and
- the dataset of statements, presentations and papers made or published within the regime.

In Chapter 8 the proposed dimensions of effectiveness were compared with the dataset of MX suggestions which might be regarded as examining the effectiveness of the regime from the international perspective. This Chapter provides a chance to carry out other comparisons and contrasts between these bodies of understanding which might be regarded as examining the effectiveness of the regime from the perspective of regime participants. This exercise provides useful triangulation to increase confidence in the results from the top-down approach.

Following on from Chapter 8, a logical approach might be to examine the conjectured generic idealized policy decision proposed in Chapter 7, against the dataset of statements and proposals made within the regime to control biological weapons and through this process establish whether the regime appears to have potential for influence on national policy processes.

As the conjectured generic idealized policy decision has many aspects to it, a tabulation analysis could become so detailed as to cause confusion. A simplified analysis looking only at the three policy influence groupings would produce tables in this form:

2004 suggestions	Generic Policy Decision		
	Power/status	Cost/benefits	Intellectual
The States Parties to the Convention with the assistance of relevant international institutions should strengthen the existing global networks for disease surveillance and build up their capabilities including national networks in order to respond to disease outbreaks in a timely manner particularly in humanitarian assistance to the States Parties affected by disease outbreaks. [Iran]	-	-	X
States Parties should be encouraged to improve disease surveillance and response capabilities. [South Africa]	-	X	X
States should be encouraged to improve their disease surveillance capabilities. [South Africa]	-	X	X
Strengthen the capacity to conduct effective surveillance activities. [Nigeria]	-	-	X
Improved national and co-operative international disease surveillance is consistent with the object and purpose of the Convention which is the elimination of biological weapons. [USA]	-	-	X
Participation in local, national or global disease surveillance systems represents one way of making progress on biological weapons non-proliferation through cooperation and transparency. [USA]	-	-	X
Strengthening surveillance should not be automatically associated with increasing the number of health conditions included in the system. [USA]	-	X	X
Ensure national disease surveillance systems cover the whole of the country. [India]	-	-	X
Animal disease surveillance should rely on existing standards and recommendations wherever possible, rather than 'reinventing the wheel'. [Australia]	-	-	X
(The) possibility of, and opportunity to, broaden (and improve) surveillance activities (includes): increasing appreciation and understanding by both the public and politicians of the effects of animal diseases on human health; increasing appreciation and understanding by both the public and politicians of the economic and social impacts of animal diseases based upon experiences derived from outbreaks of avian influenza, closer cooperation amongst countries E.g. Australia and the Asian regional reference laboratory for Foot-and-Mouth disease, or proficiency tests of Leptospirosis, Brucellosis and the USA and offers of training and strengthening national programmes; (and) the provisional offer of assistance by International Organizations, e.g. FAO and OIE. [Thailand]	-	-	X
The States Parties, acting nationally or collectively, should actively support the WHO, FAO and OIE. [South Africa]	-	-	X
States Parties are urged to support the WHO's efforts to strengthen the global system for disease surveillance. [USA]	-	-	X
Effective global biosecurity can only be achieved if all OIE and FAO Member Countries conscientiously comply with the standards and guidelines of the OIE, effectively train stakeholders and ensure the availability of adequate human and material veterinary resources. [FAO/OIE]	-	-	X
It is necessary to separate clearly the spheres of competence and responsibility of the WHO, OIE and FAO and the Convention, as well as clearly define the field of activities where joint efforts are possible according to the mandates of these organizations and the spheres covered by the Convention. [Russia]	X	X	X

From these examples it can be seen that the information provided is not particularly illuminating.

Any more detailed approach that examined the relevance of the conjectured generic idealized policy decision would need to be done at least twice as it would be reasonable to assume that the influences of the regime may be different whether the conjectured generic idealized policy decision was either in support of or in opposition to the obligations of the regime. To do this would be an extensive body of work.

Therefore, a more condensed approach has been taken, using selected materials from the BWC meetings and elsewhere to analyse obstacles to regime effectiveness and how the regime might contribute to overcoming them. A part of this examination is to reference the dimensions for assessment of effectiveness conjectured in Chapter 8 in the analysis the generic idealized policy decision proposed in Chapter 7 and through this process connect aspects of the two elements of the proposed framework of assessment.

An additional source of data used within the second half of this Chapter is an identification by SIPRI of seven categories of activities taken by states or other entities to acquire biological weapons. These seven categories are useful counterpoint to the obstacles identified within the process of development of the conjectured generic idealized policy decision.

Conjectured generic idealized policy decision assumptions and hindrances compared with regime activities

The concept of a generic idealized policy decision was conjectured in Chapter 7 (see page 186 onwards) as a tool to help analyse policy processes within a state or any other entity with a governance process. A key assumption for the analysis was that in any circumstances that a course of action to deal with an issue area was identified by an entity, the entity will undertake the course of action unless one or more potential hindrances did not inhibit the policy process or impact upon the character of a course of action. These hindrances were summarized in table 7.2 (see page 187), reproduced below.

Conjectured generic idealized policy decision potential hindrances	
Element	Potential hindrance
'recognizes a challenge'	Policy area [and/or potential outcome] not seen as having sufficient priority. No sense of expectation upon/within entity Perceived as too large a challenge to deal with by any one entity [individual contribution not seen as achieving anything] If one entity puts in effort to tackle the challenge, other entities might benefit from this effort without having incurred any costs [freeriding]
'identifies a course of action'	Uncertainty whether any action could make a real impact on the challenge Uncertainty of process to be undertaken Uncertainty of what might be the optimum course of action Uncertainty of what the next step might be
'benefit of one form or another'	Benefit not perceived or understood Skills or capacities may be missing and creating them would be beyond the means available Benefit outweighed by cost
'cost — whether in resource terms, opportunity costs or political costs'	Costs of a course of action may be perceived as not worth pursuing. Costs outweigh the benefits True costs misunderstood or perceived incorrectly
'coincident with the influences that those able to express power might bring to bear'	Those in power lose power/status from the decision Those in power don't understand the purpose of the decision
'coincident with interests of those affected'	Costs and benefits do not fall in the same places. Costs and benefits may be of different types.
'support from the intellectual and moral arguments'	Not perceived as the correct thing to do. Intellectual arguments exist suggesting other courses of action. Lack of knowledge or skills available.

In order to establish whether the regime to control biological weapons might influence national policy processes, it is a useful exercise to identify regime activities that might impact upon the hindrances outlined above. In this way it is then possible to illustrate whether the regime may influence the behaviour of participants within it. As noted earlier, if a regime does not influence in any way the behaviour of participants it cannot be considered to be effective in strict Regime Theory terms. Regime influences on national policy processes could enhance the effectiveness of the regime in practical terms.

In order to carry out this exercise it is essential to indicate how the identified hindrances might apply and how activities within the regime might have an influence. For the purposes of this analysis, regime activities include communications and meetings as well as activities by participants within the umbrella of the regime.

As noted in Chapter 1 (see page 59) and Chapter 3 (see page 68), the regime to control biological weapons is much broader than the Biological Weapons Convention that resides at its core. However, most on-the-record comments by government representatives regarding the regime to control biological weapons have been made in statements to

public sessions of meetings of the BWC or in written submissions, such as in the form of working papers, to such meetings.

Norm compliant and non-norm compliant entities

It is immediately apparent that not all entities¹ that might be examined within this analysis would share common characteristics. The most obvious distinction that might be made between entities is that most should be making decisions *in compliance* with the norms of the regime while others may be making deliberate decisions *to operate against* the norms of the regime. If the regime is exhibiting forms of effectiveness, the influences on the hindrances to an idealized policy decision should be operating in different manners in these two distinct cases — diminishing hindrances against norm compliant decisions and reinforcing hindrances against norm non-compliant decisions.

If this analysis were to be carried out on case studies of states, as states are the primary governance bodies within the regime to control biological weapons, there would be a need to positively identify states that do not follow the norms of the regime. However, it is not always possible from outside of a state to identify with certainty which category — norm compliant or norm non-compliant — a state is in.

There is potential additional complexity as the compliant/non-compliant distinction has a number of possible layers of differentiation as highlighted in the discussion of the *Threat Ambition* dimension identified as a form of success/failure hierarchy of the demand side of the threat posed by biological weapons (see page 199 onwards). This five point plus null hierarchy would split states into six groups — users, integrators, possessors, acquirers, aspirers, and regime compliant. Any analysis would need to take into account that these categories will include some states that are within the formal elements of the regime to control biological weapons and some that are outside. This therefore would create twelve *de facto* categories for analysis. For the analysis within this Chapter, such a large number of categories would become too complex and would prove highly repetitive without the benefit of necessarily providing any usable further

1. The term 'entities' is used with some caution. While the most obvious entities are governments as a whole as well as ministries and agencies within governments there are also other entities involved with governance in some form that is relevant to the regime in question; these would include inter-governmental structures and professional bodies.

information. If, at some future time, new information became available about entities having been at particular stages of the *Threat Ambition* hierarchy at specific times, this might form the basis of future research.

An alternative to creating such a large number of categories would be to reduce this to three categories of states for the first stage of this examination — norm compliant states, hedging states and norm non-compliant states. Such categories might be defined in the following terms:

- *norm compliant* — states which fully abide by the norms embodied in the regime;
- *hedging* — aspirant states which consider or act upon policies to acquire materials, technologies and knowledge that can have legitimate uses in order that a latent weapons capacity might be established or maintained without the necessity of a specific decision to acquire biological weapons being taken.² This may not be with the full knowledge or agreement of the entire structure of government but might result from the activities of just a few individuals within that structure;³ and

Another way to interpret hedging might be to consider it a distinguishing feature between committed non-compliance and hesitant non-compliance with hedging falling in the second category.

- *norm non-compliant* — states which have taken steps to act against the norms of the regime. Again, this may not be with the full knowledge or agreement of the entire structure of government but might result from the activities of just a few individuals within that structure.

While the categories of norm compliant and norm non-compliant would be unlikely to be contested, the hedging category would be likely to be contested as not being clearly defined; this would probably be a fair criticism. On the other hand, as has been shown in

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2. This ambiguity of a possibly hedging state is clearly illustrate by events in the regime to control nuclear weapons surrounding the activities of Iran. Much of the difficulty in independently determining the intentions of Iran with regard to its nuclear programme is that projects to acquire relevant technical experience and expertise for a weapons programme can be carried out within a peaceful energy-generation programme.
 3. Examples of allegations of individuals in government labs carrying out activities prohibited by the CBW regimes and seemingly without the knowledge of the relevant authorities include the case of Wouter Basson in South Africa and Bruce Ivins in the USA. In such cases, it can be difficult to define in which category a government should be placed.

the discussion on *Threat Ambition*, there are gradations of norm non-compliance and so there may be the possibility that unless analysis takes this into account such analysis may be flawed.

After much consideration, only the two categories of compliant and non-compliant are utilized in the analysis in the following paragraphs. The influences of the regime are likely to be different if any particular decision was in support of or in opposition to the obligations of the regime. The underlying assumption in any analysis would be that the overarching policy decisions being taken in any given country are consistent with the compliant/non-compliant perspectives of the state. Within any hedging entities, individual decisions would be either in support of or in opposition to the obligations of the regime.

Hindrances for decisions in favour of regime compliance

Although this analysis primarily relates to decisions within governance systems participating in the regime, many of the points also relate to non-members of the regime. This will potentially be contested by those keen on a pure International Relations theory view of regimes. However, in the real world, members of a regime such as that to control biological weapons hope through regime activities to influence the behaviour of those outside of the regime — to comply with the norms of the regime and to join the regime. Perhaps the classic example of this last point is the desires of those states that were within the Chemical Weapons Convention to persuade Syria join that Convention after the use of sarin nerve agent in Ghouta on 21 August 2013.⁴

In each of the hindrance/obstacle areas analysed below, any identification that the regime contributes to overcoming obstacles should not be taken to imply that more could not be done in that particular area.

4. Syria wrote to the UN Secretary-General on 12 September 2013 indicating its intent to be bound by the provisions of the CWC. The letter is sent by the Syrian Ambassador to the UN in New York to the Secretary-General which is said to transmit the information that a 'legislative decree' for joining the Convention has been signed by President Assad.[United Nations Department of Public Information, 'Ban welcomes Syria's letter on accession to treaty banning chemical weapons', press release, 12 September 2013.] The formal instrument of accession is received by the UN treaties office on 14 September, meaning that the entry into force of the Convention for Syria was to be 14 October 2013.[United Nations Secretary-General, Depository Notification C.N.592.2013.TREATIES-XXVI.3, 14 September 2013.]

‘recognizes a challenge’

In the case of the compliance with the regime to control biological weapons, the core of the challenge to be recognised is the potential that biological materials could be used with hostile intent to induce diseases and that action should be taken to reduce the potential threat from such materials.

A typical example of a summary of perceived threats is this example from Malaysia:

Malaysia strongly believes that biological and toxin weapons continue to pose threats to the international community. We are concerned on the potential threat for these biological agents and toxins being used as instruments of terror and warfare.⁵

Policy area [and/or potential outcome] not seen as having sufficient priority.

All governments have a wide range of policy issues that they have to engage with and the level of political attention any one of them receives at any particular time depends on numerous factors. With regard to biological weapons, governments which do not regard themselves as being subject to a direct threat with biological weapons have tended to have given the regime a lower priority. This was highlighted by the European Union in its activities to strengthen the regime:

Biological weapons risks were not seen as an acute problem for global security by most of the countries involved, which consequently leads to low priority in national political agendas compared with domestic political problem areas. Nevertheless, strong commitment to regional and common security was expressed, which may offer the opportunity to mobilize States to accede to the BTWC and to establish and/or improve existing national legislation.⁶

Indeed, as Russia noted, for example, many governments had not taken the steps to even join the BWC which lies at the heart of the overall regime.

A lot remains to be done to achieve complete universality of the Convention. The States Parties should view this as a priority⁷

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5. Datuk Othman Hashim, Head of Delegation of Malaysia, plenary statement, BWC Seventh Review Conference, 1 December 2008.
 6. Portugal [on behalf of the European Union], ‘European Union Initiatives in Support of the BTWC’, Working Paper, BWC/MSP/2007/MX/WP.1, 2 August 2007, para 17.
 7. Valery Loshchinin, Permanent Representative of Russia, plenary statement, BWC Meeting of States Parties, 1 December 2008.

It is therefore clear that a potential obstacle to involvement within the regime to control biological weapons is a lack of political priority. With many multilateral obligations on governments, an issue area such as the control of biological weapons may be seen as a low priority, especially if the threat of use of biological weapons in the short-term is seen as low.

However, some delegations at BWC meetings have been specific that the biological weapons issues should be dealt with as a priority, for example:

Sweden attaches high priority to the reinforcement of the Biological and Toxic Weapons Convention.⁸

This is not just a Western priority. Delegations from other regions have also expressed similar views, for example:

India attaches the highest priority towards the further strengthening of the BWC.⁹

No sense of expectation upon/within entity

Even when a government as a whole, or perhaps even when only those that hold power at the centre, have identified a need to carry out activities in support of the regime, it is not always clear who within the governance structures should actually be carrying out the activities. In the case of the regime to control biological weapons, a clear obstacle would be that parts of governments might not perceive that there is an expectation upon them to act in this issue area.

At the start of the twenty-first century, very few countries had implementation arrangements that included representatives of a broad spread of government departments.¹⁰ During the first decade of the century there was a significant increase in states with a strong inter-departmental implementation, as will be illustrated below.

8. Elisabet Borsiin Bonnier, Permanent Representative of Sweden to the United Nations Office and other International Organisations in Geneva, plenary statement, BWC Meeting of States Parties 10 November 2003.

9. Hamid Ali Rao, Ambassador & Permanent Representative of India to the Conference on Disarmament, plenary statement, BWC Meeting of States Parties, 1 December 2008.

10. See, for example, Angela Woodward, *Time to lay down the law*, VERTIC, October 2003, 48pp.

The need for involvement of a number of ministries in implementation of regime obligations was recognised in the efforts by the European Union to assist governments with implementation matters. For example, reporting on a Technical Assistance Visit to Peru, the EU and Peru noted in a combined paper:

On the last day bilateral visits of the EU expert team, accompanied by the Portuguese Ambassador as representative of the EU Presidency, confirmed the results of the visit and the continued engagement and support on ministerial level. On the part of Peru, the talks were held at the level of Minister (Justice), Vice Minister (Industry), Director-General for Foreign Affairs (Defence) and Chief Cabinet Advisor (Health). It was confirmed that all ministries are engaged with the process and committed to achieving results.¹¹

As an example of the new inter-departmentalism being implemented in this issue area, Thailand informed the other BWC States Parties about the development of its own inter-departmental arrangements:

A BWC Coordinating Committee headed by the Permanent Secretary of the Ministry of Science and Technology was also appointed on 29 March 2006. It is composed of 19 members from 6 relevant ministries and has an initial mandate of 2 years. Among its members are the representatives of agencies which serve as national focal points for the Nuclear and Chemical Weapons Conventions. We hope that this will ensure a more comprehensive approach to the national implementation of all these different but interrelated conventions.¹²

The difficulties of bringing together a diverse group of departments with a variety of perspectives and functions, notwithstanding they all have roles and responsibilities in relation to possible misuse of the life sciences were highlighted by Canada, on behalf of the JACKSNNZ informal group:

Most countries face a dilemma: on the one hand, agriculture and health departments traditionally have a health and safety mandate with an outlook of protecting the population from infectious diseases, protecting national herd [*sic*] and national produce, maintaining safety procedures within biological facilities, and ensuring proper containment. On the other hand, government departments and agencies such as foreign ministries have a history and culture of focussing [*sic*] on security. These traditional views and mandates are at the root of problems we face as states parties to the BTWC.¹³

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11. Portugal [on behalf of the European Union] and Peru, 'Assistance Activities for Implementing BTWC Legislation in Peru', Working Paper, BWC/MSP/2007/WP.6, 10 December 2007, para 7.
 12. Chaiyong Satjipanon, Ambassador and Permanent Representative of Thailand, plenary statement, Sixth BWC Review Conference, 21 November 2006
 13. Canada [for the 'JACKSNNZ' countries], 'Biosafety and Biosecurity', Working Paper,

Perceived as too large a challenge to deal with by any one entity [individual contribution not seen as achieving anything]

This sub-section clearly has significant overlap with the previous one as it may apply to separate elements within a governance structure that may perceive the challenge is too great for them to deal with on an individual basis. However, the focus in this sub-section will be on governance structures as a whole.

The United States, for example, has recognized that the challenge of biological weapons could not be handled in a purely unilateral manner:

President Obama has made it a top goal of his Administration to halt the spread of weapons of mass destruction, because we view the risk of a bioweapons attack as both a serious national security challenge and a foreign policy priority. In an age when people and diseases cross borders with growing ease, bioweapons are a transnational threat, and therefore we just protect against them with transnational action.¹⁴

In addition to national and global activities, there are activities that can be carried out at a regional level to enhance regime effectiveness. This has been explicitly recognized within the BWC inter-sessional processes; for example, one of the 2008 topics for discussion was ‘National, regional and international measures to improve biosafety and biosecurity, including laboratory safety and security of pathogens and toxins’.

If one entity puts in effort to tackle the challenge, other entities might benefit from this effort without having incurred any costs [freeriding]

The potential for freeriding is high. The government of a small or medium sized economy benefits from a reduced global threat from biological weapons that derives from the existence of the regime without themselves necessarily carrying out any regime-related activities.

BWC/MSP/2008/MX/WP.17, 12 August 2008 , para 1. JACKSNNZ is an informal grouping within the BWC (pronounced ‘jacksons’ and sometimes referred to as the Jackson-7) that first appeared in this form at the Sixth Review Conference in 2006 comprising Japan, Australia, Canada, South Korea, Switzerland, Norway and New Zealand.

14. Hillary Rodham Clinton, Secretary of State, United States of America, plenary statement, Seventh BWC Review Conference, 7 December 2011. The ‘just protect’ may be a typo in the original instead of ‘must protect’.

As there are additional costs in implementing verification arrangements, were they ever to be agreed on an international basis, the negotiations on a protocol to strengthen the BWC included proposals for clear benefits for being inside this element of the regime.¹⁵

Conclusions — ‘recognizes a challenge’

Statements of the threat posed by biological weapons reinforce the recognition of the challenge and thus contribute to diminishing this particular potential obstacle.

By identifying the issues in more elaborate detail and thus identifying that diverse arms of governance need to be involved in relevant issue, the regime can be seen to contribute to diminishing the no expectation aspects of this potential obstacle. As well as the intellectual arguments, the need within many countries for representatives of relevant ministries to meet in order that the country is capable of full participation in BWC meetings provides a further contribution to diminishing this potential obstacle.

By bringing governments and other entities together, the regime contributes to diminishing the ‘too large a challenge’ potential obstacle. This is further reinforced by promoting interaction on regional levels as well as national and global levels.

It would seem that there is little the regime can be seen to be contributing to diminishing the free-riding aspects of this obstacle in a direct manner. However, the more that entities become active participants within the regime, the greater the diminution on potential free-riding.

Overall, the regime can be seen to contribute to overcoming the ‘recognizes a challenge’ potential obstacle by raising the profile of relevant issues.

‘identifies a course of action’

The potential obstacles identified under this heading were: ‘Uncertainty whether any action could make a real impact on the challenge’; ‘Uncertainty of process to be undertaken’; ‘Uncertainty of what might be the optimum course of action’; and

15. Such a trade-off was explicit withing the Chemical Weapons Convention. Under the CWC there are restrictions on trade between States Parties and non-States Parties. This not only provides economic encouragement for countries to join the CWC, it also assists in maximising the proportion of the total global trade in certain chemicals that falls within the remit of the OPCW.

‘Uncertainty of what the next step might be’. As there is a number of cross-cutting issues within the potential obstacles these will be dealt with collectively.

There are multiple courses of action that any participant within the regime may take, many of which do not exclude the possibility of any other course. With so many choices, any participant has to go through a process to identify any appropriate course(s) of action for the context being considered.

There are many generic calls for action within the regime. Two examples are used to illustrate the point here:

Japan encourages all States Parties to take necessary national measures to implement the Convention and also calls upon all States Not Party to the BWC to join promptly.¹⁶

and:

The EU considers comprehensive implementation and universalisation of the Convention to be areas of priority.¹⁷

There are many specific suggestions for courses of action that were put forward in BWC Meeting of Experts and elsewhere within the regime. Those compiled by the secretariat during the inter-sessional process meetings are reproduced in Volume II and some of these were elaborated in some detail in Chapter 8.

In a regime as complex as that to control biological weapons, there may easily be doubt about whether any particular action might have a specific impact. The interactive nature of some of the regime activities provides an opportunity to learn lessons from other participants in the regime. This can happen through exchanges in the BWC meetings or working papers submitted to those meetings.

The utility of exchanges was highlighted by proposals during the BWC meetings, for example:

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16. Ambassador Yoshiki Mine, Permanent Representative of Japan to the Conference on Disarmament, plenary statement, BWC Meeting of Experts, 13 June 2005.
 17. Ambassador Kari Kahiluoto, Permanent Representative of Finland to the Conference on Disarmament, on behalf of the European Union, plenary statement, Sixth BWC Review Conference, 8 December 2006.

Interactive sessions are required to share knowledge, practices, procedures, lessons learnt through personal as well as institutional experiences.¹⁸

From the earliest stages of the inter-sessional processes there was an identification that there were issue areas where there would not be a 'one size fits all' solution. For example, South Africa noted in 2003:

We are confronted by the reality that the national measures to implement the prohibitions of the Convention and the national mechanisms to establish and maintain the security and oversight of pathogenic micro-organisms and toxins will not be a case of 'one size (or in this case 'set of measures and mechanisms') fits all'.¹⁹

This recognition has been reiterated many times by other delegations on one or more aspects of implementation issues within the regime to control biological weapons.

The exchange of information arrangements within the regime, primarily through the BWC inter-sessional process, contributes to overcoming this part of this potential obstacle as well for the first step aspects and so is discussed further in the sub-section below.

The interactive nature of some of the regime activities provides an opportunity to learn lessons from other participants in the regime through information exchange both at the formal BWC meetings but also in external regime-related activities such as regional seminars.

Japan noted the following advantages of organizing regional seminars:

- Easy to participate because of geographic proximity
- Ideal opportunity to share each country's experiences and expertise
- Possible to have concrete and frank discussions on the basis of common regional interests²⁰

South Africa noted:

The presentations that were made at the Meeting of Experts in August, and that may be made at this Conference, are vehicles for us to inter alia demonstrate how

18. Pakistan, presentation 22 August 2008, as summarised in *Report of the Meeting of Experts*, BWC/MSP/2008/MX/3, dated 8 September 2008, page 34.

19. South Africa, plenary statement, BWC Meeting of States Parties 10 November 2003.

20. Satoshi TANIGUCHI, Biological and Chemical Weapons Conventions Division, Ministry of Foreign Affairs, Japan, 'Japan's efforts toward regional cooperation on implementation of the BWC', presentation to the BWC Meeting of Experts, 22 August 2007

this work is done within our own countries; to provide the opportunity for us to consider the measures and mechanisms being implemented elsewhere with a view to seeing how our national systems may be enhanced or improved; and to form a basis in terms of which assistance could be provided for the establishment, enhancement or improvement of systems elsewhere.²¹

The concept of the exchange of information has been taken a step further with the proposal by France of ‘peer review’ arrangements to enable further means by which governments can learn from each other’s practical experience.²²

It is a likely working assumption that greater opportunities for exchange of experiences should lead to easier identification of possible courses of action.

Conclusions — ‘identifies a course of action’

The regime can be seen to contribute to diminishing this potential obstacle through the identification of possible courses for action. Moreover, by providing means by which experiences of carrying out courses of action may be shared, the regime allows for greater possibilities to identify appropriate courses of action, thus further contributing to diminishing this potential hindrance.

Owing to the lack of ‘one size fits all’ solutions to some of the regime implementation issues, the regime has some limitations in assisting participants to identify an optimum course of action.

By providing means by which examples of courses of action taken by a number of participants can be exchanged, the regime contributes to the diminishing of the optimum course and first step potential hindrances.

‘benefit of one form or another’

The most obvious benefits of the regime to control biological weapons, assuming the regime is effective, include a reduced threat from biological weapons and an enabling of the peaceful trade in dual-use goods. The bargain of the renunciation by States Parties of

21. South Africa, plenary statement, BWC Meeting of States Parties 10 November 2003.

22. France, ‘Un mécanisme de revue par les pairs pour la CIAB: améliorer la confiance dans la mise en oeuvre nationale et la coopération nationale’ [Peer-review mechanism for the BTWC: enhancing confidence in national implementation and international [sic] cooperation], Working Paper, BWC/CONF.VII/WP.28, 13 December 2011, 5pp. The paper is based on the work of James Revill.

hostile uses of biological materials and technologies in return for freedom to gain the benefits of the peaceful uses of them is embodied in Article X of the Convention. Although most Western states have consistently put emphasis on the security aspects of the bargain, states seeking greater economic development see access to peaceful uses as a key justification for using precious governmental resources in their engagement with the Convention. The human cost of disease is widely recognised, but it is worth noting that there are many parts of the world in which the economic costs of infectious disease have a significant impact, not only through individuals being unable to be economically active when they are unwell, but also through the efforts of others to take care of them.

Indonesia described the peaceful benefits of the regime in the following terms:

Indonesia is of the view that parties are not only obligated to implement all aspects of the Convention, including its legal aspects, but also have the right to enjoy the benefits derived from the provisions contained in the Convention. One of these benefits is the possibility of procuring biological materials, equipment and technology for peaceful purposes from other states parties. Therefore, Indonesia also wishes to stress the significance of international cooperation as one of the important pillars of the Convention.²³

Many participants in BWC meetings have focused on identifying and highlighting benefits of the regime, for example:

Generally speaking, there are two potential benefits from accession to the BWC membership: security and economic. The security benefits come from the removal of all biological weapons from the globe, and this is the primary purpose and benefit of the BWC. The economic benefits emanate from increased cooperation in the peaceful uses of biotechnology.²⁴

There are very general benefits that the regime brings that have been identified from time to time. For example, Australia noted that disease surveillance activities are needed for both naturally occurring as well as deliberately induced diseases to enable trade in the food and agricultural sectors:

Timely and detailed regional surveillance for infectious disease outbreaks or epidemics is essential to Australia's security. This is particularly so for diseases

23. Ambassador Nugroho Wisnumurti, Indonesia, plenary statement, Meeting of States Parties, 10 November 2003.

24. Republic of Korea, 'Universality of the BWC', Working Paper, BWC/CONF.VI/WP.19, 17 November 2006, paragraph 4.

which may have major impact on health and international trade, and also for the ability to detect and recognise the possible deliberate release of an infectious agent. Most crucial is the ability to detect novel or unusual diseases quickly and specifically so that surveillance is a real-time process.²⁵

Benefit not perceived or understood

Benefits of the regime are not always perceived clearly, especially in governance structures of states and other entities which regard themselves as being neither subject to a direct threat with biological weapons nor a source of threat (even inadvertently). Even when there are direct perceptions of biological threats, weaknesses of the regime may make the perceived benefit less valuable:

However, it appears that joining the BWC has not invited a full sense of security due to the shortcomings inherent in the Convention. These include the difficulty of ensuring full implementation and compliance by States Parties, which undermines the effectiveness of the treaty in dealing with biological threats. This may have deterred many prospective Parties from joining the BWC.²⁶

This governmental perspective has been echoed by non-governmental analysis:

The treaty regime of the BTWC is still developing and should continue to do so for a very long time. Its greatest limitation, however, is the absence of meaningful verification and transparency-enhancing measures. This means that the security benefits from the treaty are less than they could be.²⁷

The benefits of regime participation are seen by some as going far beyond classic security interests, for example:

I think in the areas of disease surveillance, biosecurity, national enforcement of legislation and preventing the misuse of research, there is substantial work that will make a measurable difference, we think, in all of those areas. Some of that work will aid us in preventing biology being used as a weapon, but there are also secondary benefits which in some cases may not frankly be secondary. They might be co-equal. When you look at, for example, the work in disease surveillance, there is an obviously public health benefit there. There's an obvious benefit to developing countries from improved capabilities to examine instances of disease outbreaks and to determine whether they are naturally occurring or whether they are suspicious in nature or perhaps have a biological weapons tie.²⁸

25. Australia, 'Regional Networks: The Case for Integration and Coordination', Working Paper, BWC/MSP/2004/MX/WP.27, 20 July 2004, para 1.

26. Republic of Korea, 'Universality of the BWC', Working Paper, BWC/CONF.VI/WP.19, 17 November 2006, paragraph 5.

27. Jean Pascal Zanders, Chemical and Biological Warfare Project Leader, Stockholm International Peace Research Institute, NGO statement, Fifth BWC Review Conference, 21 November 2001.

Many suggestions were made within meetings of the Convention to initiate outreach activities to promote the benefits of the Convention, and by extension, the regime:

using, as appropriate, bilateral contacts with States not parties, and regional and multilateral fora, to promote the political, security and economic benefits of ratification or accession to the Convention.²⁹

The particular suggestion quoted above was made at the Sixth BWC Review Conference and the Final Document from that Conference included :

Their reiteration that the effective contribution of the Convention to international peace and security will be enhanced through universal adherence to the Convention, and their call on signatories to ratify and other states not party to accede to the Convention without delay.³⁰

Skills or capacities may be missing and creating them would be beyond the means available

The need for capacity building within some states, especially those with fewer economic resources, is widely recognized within the regime. This is implicit recognition of lack of capacity as a hindrance to regime implementation and thus effectiveness. The President of the Sixth BWC Review Conference, Ambassador Masood Khan, who was also Chair of the 2007 annual meetings, noted during the Meeting of Experts:

A further important point, which was alluded to in several presentations, is that there is a need to help States Parties build capacity. It is not enough to provide guidance on enacting legislation and regulations: States Parties need practical assistance to build their capacity to enforce and manage such measures.³¹

With much of the focus of the second inter-sessional process on disease surveillance, some officials identified particular benefits from capacity building in this particular area which would enhance the overall regime:

There has also been much valuable direct collaboration on health-security capacity-building. As an example, Australia has been working with partners in

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28. John C Rood, Assistant Secretary of State for International Security and Nonproliferation, United States of America, press conference at the Palais des Nations, Geneva, 20 November 2006 [transcript as circulated by the US mission to Geneva].
 29. Australia, 'An Action Plan for Realising the Universalisation of the Biological and Toxin Weapons Convention', Working Paper, BWC/CONF.VI/WP.15, 17 November 2006, paragraph 5.
 30. Sixth Review Conference, Biological Weapons Convention, 'Final Declaration', BWC/CONF.VI/6, dated December 2006, preambular paragraph ix.
 31. Amb. Masood Khan (Pakistan), Chair, BWC Meeting of Experts, 24 August 2007, closing remarks.

our region to help build capacity in disease surveillance systems. In one such program, Australia is working with partners in our region to build animal health institutions to increase capacity to recognise new diseases emerging in animals which may also infect humans. The health and security benefits of such collaborations are clear.³²

Benefit outweighed by cost

There is an inherent difficulty in making a quantitative assessment of benefits of active participation in a regime like that to control biological weapons. While most governance structures use financial value as the basic measure to assess worthiness of activities, many of the benefits of participation in the regime to control biological weapons are not truly financially quantifiable, such as security and health.³³

The need to overcome this obstacle has been specifically noted in BWC meetings, for example:

it was suggested that it is important to ... Demonstrate that the costs of development, promulgation and adoption of codes of conduct do not outweigh the benefits,³⁴

A number of interventions (most of which have no lasting record) within the meeting addressed this point.

It should be noted that this sub-section is a mirror of the section on costs outweighing benefits below.

Conclusions — ‘benefit of one form or another’

The regime can be seen to contribute to overcoming this potential obstacle of unrecognised or costly benefits through economic as well as health and security benefits for participants.

Regime activities for the promotion of understanding of benefits also assist in overcoming this obstacle.

32. Peter Woolcott, Permanent Representative to the Conference on Disarmament and Ambassador for Disarmament, Australia, plenary statement, Seventh BWC Review Conference, 5 December 2011.

33. Indeed, this was key point in the development of the conjectured generic idealized policy decision, that there are incommensurable aspects of policy.

34. Report of the Meeting of States Parties, BWC/MSP/2005/3, dated 14 December 2005, p 10.

‘cost — whether in resource terms, opportunity costs or political costs’

The potential obstacles identified under this heading were: ‘Costs of a course of action may be perceived as not worth pursuing’; ‘Costs outweigh the benefits’; and ‘True costs misunderstood or perceived incorrectly’.

As with most areas of public expenditure, there is a consideration of costs of activities, and a key set of decisions within the BWC are the costs of running the meetings. However, while there are concepts regarding value for money that are used in relation to a regime like that to control biological weapons, explicit references have not been included within consensus documents from the BWC regarding the regime as a whole, although there has been some attention paid to these issues at a lower level.³⁵

There is greater freedom for researchers and commentators to comment on the record on these issues:

The value of effective, sustained biological disarmament — undertaken in a manner that encourages peaceful cooperation — is priceless. However, achieving this will entail financial and political costs, and the choice of any one route towards strengthening the convention over another may entail opportunity costs. None of these costs can be realistically predicted in advance; but if there is appetite to do something towards strengthening the convention in a time of austerity, then financial costs cannot be ignored.³⁶

There is an inherent difficulty in assessing overall costs of active regime participation, as well as the benefits. Many costs of participating in the regime are relatively diffuse owing to the diffuse nature of the regime. While costs of personnel who are working primarily on regime issues can be identified with some ease, the broad nature of regime activities leads to a situation where there are many people with responsibilities that impinge upon regime activities. Identifying the true cost of such personnel in regime activities would prove difficult. This uncertainty may lead to a perception that costs are greater than they really are.

35. The author has some personal experience of this, having been appointed as one of three experts by the European Commission to make a value for money assessment of the assistance given to the Organization for the Prohibition of Chemical Weapons through EU Joint Actions. The resulting report from this study is not public and so aspects cannot be cited. However, the experience of preparation of the report has informed the work within this thesis.

36. James Revill and Caitriona McLeish, ‘Estimating the costs of compliance options for the BWC’, *Trust & Verify*, no 151, October/December 2015 [published January 2016], pp 1-5 at p 5.

Conclusions — ‘cost — whether in resource terms, opportunity costs or political costs’

The regime can be seen to contribute to overcoming this group of potential obstacles by identifying benefits to reduce relative costs to benefits obtained. The regime also contributes to reducing costs through the learning from the experience of others at organizational levels and through the exchange of experiences between individuals who are brought in contact with each other through the regime. Costs for some regime participants can also be reduced by introducing outside assistance to build capacity (see section above on capacity issues).

‘coincident with the influences that those able to express power might bring to bear’

For the regime to be effective, implementation arrangements must be balanced between those able to express power:

To be effective, then, as well as acceptable, or indeed legitimate, national legislation implementing the international obligations of the BTWC requires the commitment of regulators and research centres to a meaningful discourse, opportunities for civil society to have appropriate access to the conversations, a balanced distribution of power and authority between the different actors, and, finally, trust and accountability between participants.³⁷

Those in power lose power/status from the decision

While the regime to control biological weapons would be unlikely to reduce power or status of those in power, there would be opportunity costs involved for any power structure being involved with the regime. Unlike early periods, NACD activities do not carry the glamour that would attract the attention of those in power.

There is one aspect that does particularly affect governments with presidential systems. In such systems, it is easier to carry out foreign policy that has no direct domestic impact as domestic impact means dealing with domestic ministries and other domestic institutions over which there may be other arms of government also exercising power.

If many ministries or departments are involved, this can become a dilution of power in all forms of constitutional governments. For example a foreign ministry will be used to

37. Filippa Lentzos and Nicholas Sims, London School of Economics, informal plenary statement, Sixth BWC Review Conference, 21 November 2006.

dealing with defence and trade ministries but might expend time and/or political capital in creating links with health or education ministries. Foreign ministries may be opposed to greater involvement of domestic ministries in issues they regard as their ‘turf’.³⁸

The regime contributes to the creation of an expectation of what good governance includes. Germany, on behalf of the EU, made a specific point on this:

Ideally legislation should name empowered authorities, which must be equipped with sufficient capacities and resources. Further, there must be a degree of specialisation ensuring the proper application of the law. This amounts to good governance in the administration of any legislation that serves the handling, including transfers, and control of agents and toxins of concern.³⁹

Those in power don’t understand the purpose of the decision

It should be noted at the outset that the subject matter of this sub-section does not necessarily equate with issues around economic and similar benefits of the regime, but is about outcomes that are in the interests of those able to express power but that may not be well understood.

Many of the positive outcomes of regime activities are not immediately apparent:

The mutual benefits arising through bilateral animal health projects in the region are usually obvious. However Australia’s involvement in multilateral animal health activities, both globally and regionally, generally has less obvious mutual benefits related to systems and standards development.⁴⁰

One of the EU’s collective activities within the regime has been funding workshops to illustrate the benefits (in a broad sense) of joining the Convention that is the centrepiece of the regime to control biological weapons. As noted in the legal document that established funding for a series of workshops in different regions of the world:

The aim of the workshops will be to encourage greater membership and thereby enhanced implementation of the BTWC in these regions and to explain the

38. This has not been directly or overtly referred to in on-the-record interactions but has been implied by the words and actions of particular individuals. This issue would be worth further research that goes beyond the current thesis.

39. Germany [on behalf of the European Union], ‘Assessment of National Implementation of the Biological and Toxin Weapons Convention (BTWC)’, Working Paper, BWC/CONF.VI.WP.3, 20 October 2006, para 21.

40. Australia, ‘Improving Regional Surveillance Efforts: Animal Health - Australia’s Contribution’, Working Paper, BWC/MSP/2004/MX/WP.29, 20 July 2004, para 36.

benefits and consequences of acceding to the BTWC and to understand the needs of the States not Party to the BTWC in order to assist their accession and offer EU technical and drafting assistance to States in need.⁴¹

The nature of language used within diplomacy means it would be unlikely for an official representative of a government or inter-governmental body to suggest that there was a lacuna in other governments in understanding something like the regime to control biological weapons. In essence, this statement from the EU can be read as a direct acknowledgement of this obstacle.

Conclusions — ‘coincident with the influences that those able to express power might bring to bear’

The regime can be seen to contribute to overcoming this potential obstacle by generating awareness of its purpose and function. In addition, by creating a norm of involvement with the regime, those in power in the diverse entities that might be involved in the regime encourages increased participation.

‘coincident with interests of those affected’

For developing countries, the importance of Article X is significant as the peaceful interactions in the biological sciences underpin advances in human, animal and plant health as well as being of economic significance. Developed countries also benefit from greater freedom of trade in peaceful uses of the life sciences.

Participants in the regime have indicated some changes occurring in the economic arena of the life sciences:

... in the biosciences, the distinction between developing and developed countries is simply breaking down. There’s a lot of what we used to call Third World countries that are doing extremely sophisticated science. There’s lots of South-South cooperation. It’s not just relationships being redefined between donors and recipients, but also between partners and collaborators.⁴²

41. European Union, ‘Council Joint Action 2006/184/CFSP of 27 February 2006 in support of the Biological and Toxin Weapons Convention, in the framework of the EU Strategy against the Proliferation of Weapons of Mass Destruction’, an act adopted under Title V of the Treaty on European Union, *Official Journal of the European Union*, 7 March 2006, L65/51-55, Annex, paragraph 2.1.

42. Ambassador Laura Kennedy, United States of America, as quoted in: Daniel Horner and Jonathan B. Tucker, ‘Common Ground on the BWC: An Interview With U.S. Special Representative Laura Kennedy’, *Arms Control Today*, June 2011.

Trade within the regime to control biological weapons relies in part on regime activities being seen as being effective in reducing the potential for misuse of those items being traded. There are also the issues relating to food and agriculture trade highlighted in the benefits section above (see page 252). Potential economic losses could occur for entities if they are not seen as in compliance with the regime.

Costs and benefits do not fall in the same places

While it could be argued that there is a universal benefit within any jurisdiction from a reduced potential threat from biological weapons, costs are borne by some specific areas.

While the regime may assist economically beneficial trade (as noted in the section on benefits) such as in the area of agriculture, the economic benefits do not fall to the same firms that would bear additional costs through having to participate in transfer control arrangements. This is a general difficulty in multifaceted policy realms.

Costs and benefits may be of different types

As with the sub-section above, this is a general difficulty in multifaceted policy realms. The regime to control biological weapons has little specifically to offer in this regard other than the creation of forums in which policy is discussed which allows for more informed choices to be made on policy options.

Conclusions — ‘coincident with interests of those affected’

The regime can be seen to contribute to overcoming this potential obstacle enhancing measures that bring economic and health benefits in addition to the classic security benefits.

‘support from the intellectual and moral arguments’

The potential obstacles identified under this heading were: ‘Not perceived as the correct thing to do’; ‘Intellectual arguments exist suggesting other courses of action’; and ‘Lack of knowledge or skills available’.

Despite many calls for evidence-based policy making within governance structures, the intellectual and moral arguments are often not the main locus of decision making.

Indeed, morality and intellect are seen as needing to be balanced with practical action, for example:

we often get bogged down with moral principles and lofty ideals that are without real value unless and until we put them into practice by way of internationally-binding agreements as well as domestic policies and measures that give substance to those principles and ideals.⁴³

On the question of whether actions are not perceived as the correct thing to do, regime interactions provide illustrations of preferable activities to carry out. Some of these are connected to concepts of what good governance should entail. These expectations may be elaborated through regime activities.

The issues surrounding the potential obstacle of lack of knowledge or skills available has considerable overlap with the sub-section on capacity building, above.

Conclusions — ‘support from the intellectual and moral arguments’

The regime can be seen to contribute to overcoming this group of potential obstacles through interactions that include moral and intellectual arguments and creation of expectations of what good governance in this field should be.

Section conclusions

This first use of the conjectured generic idealized policy decision constitutes an examination of both the regime and of the conjectured decision.

It has resulted in clear indications of the influence of regime activities on potential obstacles to policy development in the arena of controls on biological weapons. However, owing to the basic formulation of this examination, this provides strong evidence of regime influence on behaviour (and in some particular facets, extremely strong evidence), but it would be hard to extend this to claim proof of this influence without further work on the conjectured generic idealized policy decision to enhance the credibility of this tool.

43. Enrique A. Manalo, Ambassador & Permanent Representative of the Philippines to the United Nations and Other International Organizations in Geneva, plenary statement, BWC Meeting of States Parties, 10 November 2003.

Lessons learned at this stage of the development of the conjectured generic idealized policy decision include that there is more work needed to fine tune overlaps between cost/benefit sections and those on capacities/skills which may enable some reduction in duplication of particular elements. Implications of further work on the conjectured generic idealized policy decision are included in the conclusions Chapter of this thesis.

SIPRI seven activities to acquire CBW weapons

Before analysis of the obstacles identified within the conjectured generic idealized policy decision to a policy in favour of acquisition of biological weapons and how these interact with the regime to control biological weapons, there is value in examining some earlier analysis on the process of acquisition of chemical and biological warfare (CBW) capabilities in order to improve the analytical context for the final section of this Chapter.

As part of the work into the six-volume series, SIPRI researchers identified a number of steps that an entity acquiring CBW weapons would be likely to undertake. These were summarized in seven areas of activities: administrative, research, development, testing, production, storage and doctrine.⁴⁴

The identification of these activities follows an approach that is complementary to the identification of the success/failure hierarchy that underpins the *Threat Ambition* dimension (see page 199).

Administrative activities

Activities in the area of administrative and budgetary policy were summarized in these terms:

1. Administrative and budgetary activity in the policy-making arena. Politicians, administrators, scientists and the military have to review alternatives, make decisions whether to start or continue a chemical or biological weapons programme, draw up plans and budgets and supervise their execution. Activity here is a prerequisite of activity down the line.

44. Stockholm International Peace Research Institute, *The Prevention of CBW, The Problem of Chemical and Biological Warfare*, [volume V of the six volume series *The Problem of Chemical and Biological Warfare*], (Stockholm: SIPRI, 1971)287 pp at pp 141-43.

These activities require an expression of desire to acquire the relevant weapons by some element of the policy system that should normally be expressed before any real effort to actually acquire components starts. As noted earlier, only some elements within a governance structure may be involved, or even aware, of decisions to acquire prohibited weapons.

This applies best to democratic systems of governance, although all governments (and non-state actors) would have to take decisions to allocate resources to a biological weapons programme within overall government budgetary processes.

Research activities

Activities relating to research were summarized in the following terms:

2. Research, which entails the discovery and study of toxic or infective substances and mechanisms for their dissemination. The discovery of a possible new BW or CW agent or family of possible agents may be an accidental by-product of academic, public health or industrial research or it may be the fruit of research commissioned or conducted by the military. An inspectorate probably could not, with certainty, say from the apparent nature of the work (without knowledge of its intent) whether it was part of a military programme. It might find it highly suspicious and watch it closely.

It is worth noting that the term ‘research’ is not included in the key terms highlighting the prohibitions within Article I of the BWC⁴⁵ — the first of the two lacunae in the BWC identified by Sims (see page 93).

Development activities

Activities relating to development were summarized in the following terms:

3. Development. When research yields promising new candidate CBW agents, they will be sifted. The more promising ones will then (a) be tested more intensely as regards toxicity and other properties to assess their suitability as CW or BW agents; (b) work will be done on the problems of producing them on the required scale, including the building of a pilot plant or plants; and (c) during this phase, work will be begun on the design or adaptation of dissemination mechanisms for use in weapons (e.g., bombs, spray tanks, etc.). During this phase the activity becomes explicitly military and begins to go beyond the point considered necessary for the design of defensive measures. We shall use the word

45. The key terms are ‘develop, produce, stockpile, or otherwise acquire or retain’.

“development” to describe work which is explicitly and visibly military and the term “development of an offensive capability” to describe development work which goes beyond the point necessary for the design of defensive measures.

Notwithstanding that research is not included as an Article I prohibition, the BWC obliges States Parties not to ‘develop’ weapons, although there is no clear consensus understanding of what constitutes development. This makes the SIPRI description above particularly helpful.

Testing activities

Activities relating to testing were summarized in the following terms:

4. Field testing will be undertaken as development proceeds, leading up to the demonstration of the weapon to the military in an “evaluation” exercise so that they can decide whether to adopt it. This is plainly a military activity and one for the most part needed only for offensive preparations; that holds for all activities that follow.

There have been a number of developments in the CBW arena since the development of these seven stages. While CBW programmes in the 1930s and the 1960s, for example, had large testing programmes, later programmes such as those in Iraq and Syria focused far less on testing activities. A working hypothesis would be that it was easier to carry out a comprehensive testing programme at a time when development of such weapons wasn’t considered such a taboo activity, but this is beyond the scope of this thesis, except to note that the widespread norm against such weapons would raise the political costs of testing activities.

Production activities

Activities relating to production were summarized in the following terms:

5. Production of the agent must be organized, entailing the building of a plant with the required safety measures for the manufacture of the agents as well as providing for a supply of raw materials (a bigger task for CW than BW agents). Production or adaptation of weapons to carry and disseminate the agent must also be organized, as well as the procurement of the inputs needed there.

Scientific and technological developments have meant that the scale of facilities to produce biological agents has been reduced considerably in recent decades, particularly through advances in genetic techniques, fermenter technologies and synthetic biology.

Adaptation or production of munitions to disperse biological agents has also become technologically easier as a result of engineering advances and finer tolerances of machine tools, for example.

Storage activities

Activities relating to research were summarized in the following terms:

6. Once production is started, it is necessary to transport and store the CW or BW agent either in bulk or in filled weapons. For the sake of dispersal, all the stocks are not likely to be at the place of production, though the difficulties of storage may prevent great dispersal. This applies particularly to biological weapons.

With hindsight, this is the area of activities that has the least closest fit to unfolding realities. While some of the historical CBW programmes followed this pattern, the chemical weapons programmes by Iraq in the 1980s did not rely so heavily on storage but on production of materials close to the moment of use.

Doctrinal activities

Activities relating to doctrines and training were summarized in the following terms:

7. It is necessary to develop military doctrine for the use of the weapons, to train troops and conduct exercises, but this will also be done for defensive purposes, and the two—defensive and offensive training—will be hard to distinguish.

As the use of CBW moved from being tactical military weapons to being strategic political weapons the need for training in use became less prominent. However, an entity with ambitions to acquire a significant CBW weapons capacity would still need to test.

Section conclusions

The SIPRI seven areas of activities provide a useful insight into possible perspectives of potential non-compliant states.

Each of these groups of activities involve efforts by entities that wish to be non-compliant with the regime (whether in the regime or not) and thus also policy decisions to initiate and then continue those efforts. There are therefore a number of aspects upon which the regime to control biological weapons may have influence.

Hindrances for decisions against regime compliance

As noted in the introduction to this Chapter, the regime has to be examined against possible decision processes that may lead to policy activities that run counter to the aims of the regime. While the key aspect in the earlier section examining policy processes that were in support of the aims of the regime was whether the regime could reduce the potential obstacles to policy developments, the key aspect in this section is whether the regime could be seen to enhance or magnify the potential obstacles/hindrances that would impede policy developments toward non-compliance with the aims of the regime.

This analysis includes impacts on non-participants in the regime as well as participants. Unless specifically referred to otherwise, regime influences highlighted here may apply to decision-making processes both inside and outside of the regime.

This section will be briefer than that looking at decisions in favour of regime compliance, as most detailed regime activities are, by their very nature, focused on positive behaviour towards the regime within participant entities. Indeed, it is extremely rare for there to be positive statements in favour of biological weapons programmes. The statements the author has on the record in favour of acquisition of biological weapons all predate the negotiation of the 1972 Biological Weapons Convention.

This section should be read in conjunction with the discussion on the identification of the success/failure hierarchy that underpins the *Threat Ambition* dimension (see page 199 onwards).

‘recognizes a challenge’

The obstacles identified under this heading are: ‘Policy area [and/or potential outcome] not seen as having sufficient priority’; ‘No sense of expectation upon/within entity’; ‘Perceived as too large a challenge to deal with by any one entity [individual contribution not seen as achieving anything]’; and ‘If one entity puts in effort to tackle the challenge, other entities might benefit from this effort without having incurred any costs [freeriding]’.

In the case of policies towards non-compliance with the regime to control biological weapons, the core of the challenge to be recognised is the potential for deliberate disease

so that biological materials could be used with hostile intent to induce diseases and that action should be taken to exploit the potential threat from such materials.

Biological weapons are political weapons more than military weapons and this therefore leads to a different set of policy actors from normal military programmes.

The regime can be seen to contribute to reinforcing this group of potential obstacles in a number of ways. The potential for freeriding was much higher when there were biological weapons programmes from which experience could be acquired, such as the utilisation by the United States after the Second World War of information from the Japanese biological warfare programme of the 1930s and 1940s. Fewer biological weapons programmes equates with fewer opportunities to gain experience from others.

More fundamentally, if the norms of the regime are strongly communicated and globally promoted there should be no expectation on any entity to acquire biological weapons.

The drivers for satisfying security and prestige concerns are currently better satisfied through other means as biological weapons are no longer considered a currency of power.

Thus the regime can be seen to reinforce this group of potential obstacles.

‘identifies a course of action’

The obstacles identified under this heading were: ‘Uncertainty whether any action could make a real impact on the challenge’; ‘Uncertainty of process to be undertaken’; ‘Uncertainty of what might be the optimum course of action’; and ‘Uncertainty of what the next step might be’.

There are multiple courses of action that any norm non-compliant entity may take, many of which do not exclude the possibility of any other course. With so many choices, any participant has to go through a process to identify any appropriate course(s) of action for the context being considered.

The reduction in state-run biological weapons programmes over the past half-century or so reduces the possibilities of learning from the experience of others. Regime activities promote awareness of being careful with relevant weapons design information.

The imposition of transfer controls leads to uncertainty about reliability of supplies which complicates potential courses of action. A sub-optimal biological weapons development programme could result in no operational weapons, yet result in similar international opprobrium as a programme that had produced operational weapons. In such a case the sub-optimal effort may be worse than no effort at all.

Therefore the regime can be seen to contribute to reinforcing this group of potential obstacles.

‘benefit of one form or another’

The obstacles identified under this heading were: ‘Benefit not perceived or understood’; ‘Skills or capacities may be missing and creating them would be beyond the means available’; and ‘Benefit outweighed by cost’.

Benefits of a biological weapons programme have historically been seen as focused on security issues. In more recent times there have been fears of how deliberate disease could be used to spread terror. There may also be technological spin offs and an increase in an entity’s collective absorptive capacity. All have to be balanced against costs. Any benefits of a biological weapons programme diminish as resilience of those that might be targetted increases. It is to the advantage of the regime if any benefits that might accrue from a biological weapons programme are not always perceived.

Any political and security benefits of acquiring biological weapons would come with significant political and security costs (see the following section). As with examination of obstacles relating to compliant states, this sub-section has an element of mirroring the sub-section on costs.

The regime can be seen to contribute to reinforcing this group of potential obstacles by reducing perceived benefits of non-compliance.

‘cost — whether in resource terms, opportunity costs or political costs’

The potential obstacles identified under this heading were: ‘Costs of a course of action may be perceived as not worth pursuing’; ‘Costs outweigh the benefits’; and ‘True costs misunderstood or perceived incorrectly’.

The area of costs gets into difficult concepts of value for money; in other words, how much security or other perceived advantage is purchased at a particular price. In terms of regime activities, a potential perpetrator would also have to consider how much insecurity is also purchased in the same transactions. The regime as a whole has influence in this regard. Cost calculations would also have to include opportunity costs such as increased diversion of talented personnel from other purposes.

There are a number of historical lessons of the maintenance (or the suspicion of maintenance) of covert programmes of weapons covered by international regimes. Examples of cases include Iraq, Libya, Syria and South Africa. Each has a number of distinct lessons that may influence a potential perpetrator of a programme for weapons covered by an international regime and implications for the costs involved.

The regime can be seen to contribute to reinforcing this group of potential obstacles by increasing perceived costs of non-compliance.

‘coincident with the influences that those able to express power might bring to bear’

The obstacles identified under this heading were: ‘Those in power lose power/status from the decision’; and ‘Those in power don’t understand the purpose of the decision’.

Weapons programmes, historically, were seen as prestige programmes, especially for any kinds of weapon that had any kind of high political profile. A sense of the prestige, or lack of, that biological weapons brings can be understood following the observation that there is no government in the world with an overt biological weapons programme. While this reduction in states with overt biological weapons programmes correlates with the development of the regime against such weapons it is difficult to prove causation, the regime may be presumed to reinforce this potential obstacle.

‘coincident with interests of those affected’

The obstacles identified under this heading were: ‘Costs and benefits do not fall in the same places’; and ‘Costs and benefits may be of different types’.

In terms of policy processes leading to non-compliance with the regime to control biological weapons, this is the group of potential obstacles that the regime probably has the least influence on.

‘support from the intellectual and moral arguments’

The potential obstacles identified under this heading were: ‘Not perceived as the correct thing to do’; ‘Intellectual arguments exist suggesting other courses of action’; and ‘Lack of knowledge or skills available’.

A clear hindrance to a potential biological weapons programme, if the regime was acting in a practically effective manner, would be a sense that pursuit of prohibited weapons was not the right thing to do. Therefore, the regime should hopefully reinforce this group of obstacles.

As noted within the analysis of policy processes towards compliance with the regime, this group of issues is not often main locus of decision making, but in this case they broadly work against the development of a biological weapons capability.

Conclusions

The conjectured generic idealized policy decision is an analytical tool derived from practical experience of real-world policy making. It is not yet fully formed and should be regarded as a first attempt to create a theoretical abstraction of that experience and the experience of others. However, this Chapter shows the conjectured generic idealized policy decision has potential to highlight particular aspects in a decision area such as the control of biological weapons.

This Chapter, using the conjectured generic idealized policy decision, shows that the regime to control biological weapons can both reinforce the principles, rules and obligations of the regime while at the same time can reinforce obstacles to decisions to

carry out activities prohibited by the regime. However there are some weaknesses in this process which will be discussed below.

A conclusion can be drawn that the identified conjectured generic idealized policy decision obstacles appear to coincide with real-world situations. The conjectured generic idealized policy decision therefore passes a basic test of rationality, such that it has a match with real-world experience of government representatives and others dealing with biological weapons control issues.

The key weakness is that the method used here is a novel method and while some testing was carried out in the development of the conjectured generic idealized policy decision, this is the first full scale test of the new method. It would therefore be productive to attempt to use the novel tool in other issue areas in order to make a fuller assessment of its utility. There would also be some benefit in further work on the definitions of particular aspects of the conjectured generic idealized policy decision in order to reduce the overlaps in the cost and benefit sections and those in the capacities and skills sections.

As to the analysis within this Chapter, the first part examining policy processes towards compliance with the regime has distinct credibility. It is possible to match the provisions within the conjectured generic idealized policy decision with a range of on the record sources. The latter part examining policy processes towards non-compliance with the regime is much weaker. A contribution to this weakness may simply be the lack of public statements in favour of acquisition of biological weapons since the regime to control biological weapons became underpinned by the Biological Weapons Convention. Another contribution may be that there is no extensive literature on why it is that entities develop biological weapons and the influences on their decisions (although this might be a problem deriving from the overall success of the regime — fewer programmes equates to fewer case studies to examine). This has left this latter section having to be illustrated with very general statements about possible regime influences on the identified potential hindrances/obstacles.

Nevertheless, the examinations carried out within this Chapter do enhance understanding and conceptualization of effectiveness.

10. Conclusions

Introduction

This Chapter contains the overall conclusions of the thesis. It starts with some general findings that put the work of the thesis in context. The basic assumptions described in the Chapter 1 are explored. There then follows an elaboration of the activities carried out to fulfil the objectives of this thesis which leads into a revisiting of the Research Questions to explore how well they had been answered. Limitations relating to the research are then explored, followed by some thoughts of what further research could be pursued in future, based on the knowledge generated during the work for this thesis. The Chapter concludes with some observations on the real world problems explored in this thesis.

General findings

Before moving on to specifics, there are some general findings that have emerged from the work carried out for this thesis that are worth highlighting. Some of these are observations rather than results of deliberative research activities however they put other elements of the work contained within this thesis into context.

The first is that it is absolutely clear that there is no common perception within the regime to control biological weapons on either the scope of all issues to be dealt with nor on how they should be dealt with. Analysis of any problem is inherently easier when common perceptions exist.

A second is that there are language issues that are relevant to the research. Most of the work within the inter-sessional process (and other international meetings) is carried out in English. However, the language of diplomacy means that terms can carry loaded meanings beyond what might be understood in everyday use or, indeed, in academic usage. There is also a standardization of language used that can be helpful in some cases but cause confusion in others.

A third is that the shrill tone of much that is written about the possibility of terrorist use of biological weapons has had a dominant influence on much public debate and discourse. While this has not drowned out the more analytical commentators on the subject matter, it has meant that analysts reaching measured conclusions have had some

difficulties having their voice heard. The ‘incestuous inter-quote’ problem that was highlighted in Chapter 3 has made the difficulties of delineating between allegations and confirmed cases much more pronounced.

A fourth is that human factors are important. Individuals within the regime operate in more than one environment — a government official may participate in a regime meeting both as a representative of that government but may at the same time have influence within the policy- and decision-making processes of that government and within regime structures. Therefore, people step across the boundaries that often exist between realms and units of analysis used by various analytical tools. Further human factors arise as major differences can occur in the type and level of engagement of delegation depending on who is on it or who is writing instructions from the capital — there are regular changes owing to routine staff rotations. Officials may have significantly varying influences, or even motivations, relating to policy development depending on individual preferences or where they reside within policy structures.

A final general finding is the observation made in Chapter 7 that there are some commonalities in how policy development structures, such as committees, work whether they are local committees within an academic institution or the UN Security Council. Policy making has a fractal-like characteristic to it; as the level of magnification increases to increase the level of detail in how policy is derived, the nature of the underlying influences remains the same – the interaction of people following influences in the three areas identified in the thesis — power/status, finance/resources and intellect/knowledge.

The basic assumptions reexamined

In Chapter 1, six basic assumptions underpinning the work within this thesis were made explicit. Before examining in detail the results deriving from the specific Research Questions posed in this thesis, it is worth reexamining these basic assumptions to see if they were valid.

The initial assumption underpinning the issues relating to this thesis was summarized as:

the potential use of biological weapons is something to be avoided if possible and the potential for use can be reduced by making acquisition of such weapons more difficult.

While, as noted in Chapter 1, it can clearly be argued that anyone trying to acquire biological weapons does not hold this view, it is clear from the contributions within the regime meetings that this assumption embodies a widely-held perspective.

The second assumption was elaborated in the following terms:

in the first decade of the twenty-first century many governments aimed to strengthen the regime to control biological weapons despite US efforts to downplay the treaty-based elements of the regime.

The scale of activities and contributions to the BWC meetings and, indeed, the continued level of US engagement with the inter-sessional processes, indicates that this assumption was valid. While the US remained committed to the BWC during the period under examination, it also remained staunchly opposed to proposals for additional legally-binding measures that might be appended to the Convention.

The third assumption related to the nature of biological weapons themselves:

biological weapons have distinct characteristics in relation to their potentials for use, their acquisition and their political context; meaning that the policy responses to the threat of biological weapons should have distinct characteristics.

Biological weapons and activities to counter them have clear dissimilarities from many other areas of international policy. Potential threats posed by biological weapons are aggregated by many into a collection of potential threats identified as so-called 'weapons of mass destruction', for which there are a number of policy responses (see Chapter 2). However, biological weapons have distinct characteristics in relation to their potentials for use, their acquisition and their political context. Indeed, if there was a perception that there were sufficient similarities with other types of prohibited weapons (and chemical weapons would be the most obvious candidate for this) there would have been calls to conflate such regimes. The paucity of such calls is a further illustration that biological weapons are a distinct subject area.

Once the conclusion is reached that biological weapons have distinct characteristics in relation to their potentials for use, their acquisition and their political context it follows that the policy responses to the threat of biological weapons should also have distinct characteristics (see Chapter 3). Moreover, as biological weapons are essentially tools for deliberate disease, the counters to them require the involvement of activities not usually involved in international policy organs. It therefore follows that understanding the problems presented by the issue of biological weapons and the possible solutions there may be has to be a truly multidisciplinary effort that spans the natural and social sciences. This thesis therefore has had to go beyond standard political sciences and international relations areas of study.

Furthermore, the limits of the application of Regime Theory to an issue area such as the regime to control biological weapons, as identified in Chapter 6, illustrate the clear dissimilarities of this policy area from many other areas of international policy.

The fourth assumption was elaborated in the following terms:

governments may not act as unified actors in this policy area.

As the list of suggestions made to the Meetings of Experts illustrated, there have been a wide variety of actors involved within the processes that form the regime to control biological weapons. As noted in Chapter 8, the influences on and perspectives of officials from different ministries and agencies vary across governance structures. This reinforces the general finding on human factors, above.

The fifth assumption goes to the core of the work of this thesis:

An assessment of effectiveness of the regime to control biological weapons can be made in one form or another

At the outset of the work for this thesis, the advice offered to the current author was that Regime Theory would provide suitable tools for such an assessment of effectiveness. As work progressed, and the suitability of Regime Theory for this purpose was being challenged, this assumption became the assumption most closely tested.

Chapter 3 concluded that the key challenge that arose within this thesis is the lack of a previously tested method for understanding effectiveness of a regime such as that to control biological weapons, noting that while the identified existing writings on the regime that have been used to understand effectiveness provide lessons and some tools for application in the chosen area, none were suitable in their entirety for the task required here. It was apparent from the variety of problem-oriented approaches identified in Chapter 3 that each of these might be used as background for an evaluation of success, failure and other measures of effectiveness of the regime to control biological weapons, but it became clear that no single measure would encompass all of these approaches. Hence, in the work of this thesis, more than one aspect of effectiveness would have to be explored.

While the existing methods that were identified in Chapter 6 that have been used previously to understand effectiveness within other regimes provide lessons and some tools for application in relation to a regime such as that to control biological weapons, none are suitable in their entirety for the task required here. In addition, the existing literature on understanding success or failure in a regime like that to control biological weapons was found to be weak. Much focused on how 'robust' a regime is, rather than its effectiveness with much of the assessment of effectiveness within Regime Theory relating to whether a regime enhances cooperation between states, rather than whether the regime is effective at achieving its objectives.

Much literature and analysis has been reliant on highly contested techniques such as the use of counterfactual scenarios and limitations of quantitative approaches such as Oslo-Potsdam were identified (see Chapter 7) as they might be applied in the subject matter under discussion in this thesis. Taken with the new frame of reference resulting from the dual-use nature of the biological weapons problem identified in Chapter 2, it was clear that new measures for success/failure would need to be developed.

As is shown in Chapter 8, it was indeed possible to define a limited number of dimensions to help evaluate effectiveness. The consequences of this will be explored in the section on the Research Questions, below.

There was a final assumption relating to the passage of time:

The events of 2001 were a watershed for the efforts to control biological weapons. The rejection by the US of the draft protocol to strengthen the BWC followed by the use of the US postal service as a delivery system for powdered *Bacillus anthracis* forced governments around the world to consider how materials and technologies that could be used to make biological weapons should be controlled.

As was illustrated in Chapter 4, it was clear that 2001 did indeed mark a clear change in the types of statements being made regarding effectiveness. While the protocol negotiations were on-going, the focus of the potential effectiveness of the regime to control biological weapons was on what might result from the negotiations. With the negotiations halted, how should effectiveness of the regime be understood? The regimes to control chemical and nuclear weapons each had global inter-governmental organizations connected with them and the post-2001 efforts of many governments in these fields went primarily into strengthening these existing bodies, their interaction with states and implementation of the relevant treaties within states. As there was no inter-governmental organization for the BWC, a number of issues had to be reconsidered from first principles by some governments. As Chapter 4 illustrated, the events of 2001 were indeed a watershed for the efforts to control biological weapons. It is the inputs into this post-2002 process, and their focus on ‘common understanding and effective action’ that form the basis of this thesis.

Activities involved in preparation of this thesis

A number of activities were carried out in the preparation of this thesis. Each of them is described here to illustrate the work involved and the context they were used in. Each also has novel elements or other originality. Also covered in this section is an overview of the limited ethical issues confronted in carrying out the work of this thesis.

Compilation of the dataset of suggestions — The creation of the dataset of suggestions made at the inter-sessional Meetings of Experts is the first time that this author is aware of all of these being put together in a searchable form and being analysed on an individual basis for characteristics that they may have.

Compilation of the dataset of BWC and other regime-relevant documents — While there are a number of other gatherings together of BWC-relevant documentation in electronic form such as the website of the BWC’s Implementation Support Unit, the

OPBW website run by the University of Bradford and the UN documents server, none is as comprehensive as the compilation by the present author. None is as searchable as the author's dataset. Nonetheless, there are gaps, especially in relation to documentation deriving from the period before desktop publishing was used to generate BWC documents — a period that predates the focus of the work of this thesis.

Bringing forth practical experience to identify limits to existing academic analysis — A PhD thesis is by its very definition an academic work. The role of a practitioner carrying out such a piece of academic research embodies a two-way exchange — the examination of existing academic literature together with the testing of practical experience against that literature. The examination of academic literature and comparison with personal experience was time consuming, but provided valuable lessons, especially where there are gaps between academic writings and real world practice.

Creation of a framework of assessment using dimensions to overcome limitations of conceptualizing effectiveness — The creation of definitions for four dimensions to sit within a new framework of assessment for evaluating effectiveness within the regime to control biological weapons is discussed in detail in the discussion of the first Research Question, below.

Developing the conjectured generic idealized policy decision to overcome limitations of analytical techniques that focus on influences towards policy outcomes — The development of the conjectured generic idealized policy decision, a novel tool for policy analysis, is discussed in detail in the discussion of the second Research Question, below.

All of these were carried out in the context of interaction with practitioners and researchers to bring these strands into a cohesive whole.

Ethical issues

For a thesis dealing with an area considered by many as a moral issues, the work in this thesis has raised very few ethical issues.

Most of the work has been on published writings, in other words open sources available to all if interested. The interactions with practitioners has been mostly at

Ambassadorial level (or their deputies) for a variety of reasons, not least (in the context of this thesis) that at this level they usually have a good sense of the reasons why their government has brought forth a suggestion. It was also useful on an ethical basis to operate mostly at this level as ambassadors, by the very nature of their role, have been trained and approved by their governments as their representatives. While a very junior member of a delegation could inadvertently be put into a position of jeopardy if they expressed something in what was perceived by their authorities as an inappropriate manner, an ambassador should be sufficiently experienced to handle interactions with researchers. On occasion, interactions provided some 'off-the-record' background information. This form of information has been used to inform the work of this thesis, but has not been cited.

Other issues have a different form of sensitivity. Indeed, in understanding the utility of certain technologies for the potential contributions they might make within a programme to develop biological weapons, a by-product of such research can be the accumulation of information that itself becomes proliferation sensitive. Fortunately, it has been possible to draw up this thesis without reference to proliferation-sensitive information or breaching confidentiality of otherwise privileged information.

The Research Questions revisited

To recap, the Research Problem that this thesis seeks to resolve can be defined in the following terms:

How should success or failure, and therefore 'effectiveness', in a regime such as that to control biological weapons be categorised and assessed?

The work examining this Research Problem showed existing tools were not fully capable of generating useful understandings. As noted in the discussion relating to the fifth basic assumption, above, the research within this thesis illustrated the difficulties with a number of aspects of existing analytical techniques.

The First Research Question

The Research Problem was tackled through two Research Questions, the first of which was:

How can the concept of ‘effectiveness’ in relation to the regime to control biological weapons be broken down into separate dimensions in order to create a more rigorous framework of assessment?

The work to answer this Research Question resulted in the development of four proposed dimensions — *Threat Ambition*, *Coherence/Engagement*, *Availability/Opportunity*, and *Resilience* and the development of their definitions is outlined in the first section of Chapter 8. The term *Threat Ambition* is novel and was generated during the preparation of this thesis.

These four proposed dimensions have some overlaps and each have some influence on each other. For example, improved *Resilience* to deliberate release in most jurisdictions leads to reduced effect of any such release; such a reduced effect leads to a reduced advantage of use which should lead to a reduced *Threat Ambition*.

It is possible to argue that three of the dimensions — *Coherence/Engagement*, *Availability/Opportunity* and *Resilience* — are directly related to implementation of the regime within any entity’s jurisdiction while the fourth — *Threat Ambition* — is rooted in the policy outcomes of other entities that may be inside or outside of the regime.

Sub-questions

The first Research Question had two sub-questions, the first of which was:

Can the possible benchmarks or criteria suggested for use within this assessment of regime effectiveness be related to the considerations, lessons, perspectives, recommendations, conclusions and proposals put forward in presentations, statements, working papers and interventions during meetings of the BWC inter-sessional processes?

The main test carried out to answer this sub-question was to tabulate the dimensions against the suggestions made at the BWC inter-sessional Meetings of Experts. This tabulation appears as Volume II of this thesis.

The tabulation, and the analysis in Chapter 8, was primarily used to see if the proposed dimensions would be capable, as a set, to comprehensively cover all of the suggestions that had been recorded. The analysis indicated that there were no aspects of the suggestions made to the Meetings of Experts that fall outside the proposed dimensions,

although in some cases the suggestions prompted clarifications in the descriptions of the dimensions as the research work for this thesis progressed.

A number of suggestions were identified as not being practical measures to enhance the implementation of the Convention and the broader regime it sits at the centre of (in other words, not a suggestion to enhance the effectiveness of the regime in one form or another) but were either rhetorical/political, descriptive, or process/procedural. Examples of entries in the dataset that were labelled in either of these three categories were discussed in Chapter 8 in order to illustrate that these weren't instead suggestions that fell outwith the dimensions.

All dimensions were represented in the tabulation of suggestions showing all have relevance to the regime. No aspects of any of the suggestions, as tabulated in Volume II, was found to fall outside the four dimensions. This constituted the first test of the proposed dimensions.

A limitation of the research approach identified in Chapter 1, that suggestions mainly followed the scope of the topics allocated to each of the meetings in the inter-sessional processes, and so potentially did not cover all issues within the regime proved to be only a partial limitation. While these topics did not cover all aspects of the regime to control biological weapons, a read through of other sources such as general debate statements at the Meetings of States Parties and at the Review Conferences was also carried out in order to see if any aspects could be identified that would fall outwith the proposed dimensions. No such aspect could be found, strengthening the confidence in the comprehensive nature of the dimensions. This could be regarded as the second test of the proposed dimensions.

It follows, therefore, that the results of the work to answer the first sub-question provides high confidence that the proposed dimensions represent a comprehensive coverage of the conceptualization of regime effectiveness amongst participants in the Meetings of Experts, Meetings of States Parties and Review Conferences.

The second sub-question of the first Research Question was:

Can the possible benchmarks or criteria suggested for use within this assessment of regime effectiveness be related to principles, norms and rules (i.e., obligations) within the regime?

In Chapter 8, the four proposed dimensions were tested against two selected sets of earlier writings on principles, norms and rules (collectively referred to as obligations within this thesis) within the regime to control biological weapons. The writings, examined in Chapter 3, were chosen to represent the most developed identification of obligations.

The proposed dimensions matched the obligations in earlier writings with the possible exception of one obligation in the BWC, that of negotiating a chemical weapons convention. While it might be possible to argue that the *Coherence/Engagement* dimension would cover this at a stretch, the point would be somewhat moot as the Chemical Weapons Convention has been negotiated and is now in force. It could also be argued that the regime to control chemical weapons, while it impinges on the regime to control biological weapons, is a separate regime.

First Research Question conclusions

Four dimensions have been successfully identified, defined in detail and tested. In effect, these proposed dimensions have been tested three times: against the tabulated MX suggestions; against other papers and statements within BWC meetings; and against external writings analyzing the regime. The proposed dimensions have been found to encompass all of the material they were tested against. It is therefore reasonable to state that this provides a strong indication that the proposed dimensions are comprehensive in their coverage of regime activities.

The research carried out to answer this Research Question has shown how the concept of ‘effectiveness’ in relation to the regime to control biological weapons can be broken down into separate dimensions. This should lead to the creation of a more rigorous framework of assessment (see below).

The second Research Question

The second Research Question was formulated in the following terms.

Can analysis of policy processes within governmental structures identify whether activities within the regime to control biological weapons impinge upon such policy processes?

Chapter 7 identified four challenges that existing methods for policy analysis do not overcome in many cases (see page 182 onwards) — the implicit assumption that desirable policy is a static target (as opposed to movable objectives); that many policy areas are not subject to overarching decisions which are suitable for analysis as a make or break moment; that policy processes can be viewed as ongoing flows of activity of various sorts, all interacting and interweaving; and that most policy analysis is focused on influences *towards* particular outcomes. The analysis suggested that the first three of these did not necessarily need new tools but potentially could be overcome through researchers seeking a broader conceptualization of the issues they are investigating. The fourth challenge is the most interesting in the context of this thesis. Policy analysis focused on influences *towards* particular outcomes brings with it a severe analytical limitation as correlation does not equate with causation. However, an analysis of hindrances/obstacles to particular outcomes brings with it a means of analysis that allows for a separation of influences and identification in which circumstances certain influences may have been critical to a particular outcome. This is what was the inspiration for the conjectured generic idealised policy decision.

The conjectured generic idealized policy decision, elaborated in Chapter 7, is a second new analysis tool, following the new framework of analysis to analyse effectiveness of regimes. As the major part of this thesis is about the creation of a new framework of analysis for evaluating effectiveness within the regime to control biological weapons, there was some hesitation in using a further new method as a means of triangulation.

Sub-question

The second Research Question had one sub-question:

Can the selected policy analysis methods indicate how obstacles to policy development be overcome using the considerations, lessons, perspectives, recommendations, conclusions and proposals put forward in presentations, statements, working papers and interventions during meetings of the BWC inter-sessional processes?

Attempts to tabulate the elements of the conjectured generic idealized policy decision proved cumbersome and uninformative. The author therefore took the decision to use instead the identified hindrances/obstacles in the conjectured generic idealised policy

decision and attempt to match them against on the record interventions within the BWC regime.

It would have been possible to have changed the sub-question to formulate it in such a way as to accommodate what could be achieved through the conjectured generic idealized policy decision. However, there is something much more interesting about setting a target and being able to show the difficulties of reaching that target rather than resetting the target. This sense was reinforced by the author's experience of reformulating the original research questions before the abandonment of Regime Theory as the dominant framework of the work of this thesis.

Second Research Question conclusions

The conjectured generic idealized policy decision is an analytical tool derived from practical experience of real-world policy making. It is not yet fully formed and should be regarded as a first attempt to create a theoretical abstraction of that experience and the experience of others. However, this thesis shows the conjectured generic idealized policy decision has potential to highlight particular aspects in a decision area such as the control of biological weapons.

The analysis of policy processes within governmental structures can indeed identify that activities within the regime to control biological weapons impinge upon them.

Research Problem conclusions

The Research Problem asked how success or failure, and therefore 'effectiveness', in a regime such as that to control biological weapons should be categorised and assessed.

The proposed set of dimensions can be shown with high confidence to encompass all aspects of the regime to control biological weapons. This provides some useful categorisation, but can the dimensions be used as a practical tool for assessment?

This goes beyond what was asked in the first Research Question which guided the practical work of the thesis, but does fall within the overarching Research Problem.

A basic conclusion on any framework of assessment built on the dimensions is that it is possible to show movement in individual dimensions but not in a directly quantitative manner.

However, the reverse of the four questions creates a tool to help guide policy making. It is possible to use these dimensions as a tool in development of new policy by using the dimensions to evaluate and further develop suggestions before they are made on the international stage through basic questions: ‘will this policy proposal reduce *Threat Ambition* or *Availability/Opportunity*’ or ‘will it enhance *Coherence/Engagement* or *Resilience*’?

A further difficulty in transforming the proposed dimensions instantly into a new practical assessment tool is coming to a conclusion about how much is enough in each of the dimensions. Or to use more traditional academic language, what would be the idealised end point of each dimension?

On one level, the idealised end point for the *Threat Ambition* and the *Availability/Opportunity* dimension would be zero. However, each has some complications. For the first of these, a *Threat Ambition* of zero would always be impossible to confirm with any certainty owing to the nature of political processes in contexts where it is most likely that any ambition to acquire biological weapons would be acted upon in a covert manner. For the *Availability/Opportunity* dimension, a potential of zero availability would be superficially attractive; however, the dual-use nature of relevant materials and technologies means that any control system that might provide an *absolute guarantee* of no misuse of transferred materials, for example, would also be likely to hinder legitimate peaceful uses. It is therefore unclear what an idealised end point for this dimension would be.

The idealised end points for the *Coherence/Engagement* and the *Resilience* dimension are also indeterminate as they both have unclear answers to the basic question of ‘how much is enough?’

Towards the end of the preparation of this thesis, a new simplified way of summarizing the dimensions came to mind. The dimensions could also be described in

the following terms: the *Threat Ambition* dimension equates with acting to reduce motivation to do bad things [the demand side]; the *Availability/Opportunity* dimension equates with acting to reduce opportunities to do bad things [the supply side]; the *Coherence/Engagement* dimension equates with making it work together; and the *Resilience* dimension equates with reducing the impact if it all goes wrong.

Although this simplification loses some of the details of the dimensions, the reformulation may potentially make the dimensions easier to understand and so could facilitate use in other areas.

Limitations relating to the research

Aside from the usual limits of time and space in the preparation of a thesis, a number of areas of limitations of the research carried out were identified. This section starts with some general observations then looks at some specific areas relating to the definitions of the dimensions, theory issues and theory/policy gap issues.

Limitations arose from the original design of the thesis as it started as an examination of how the European Union's Weapons of Mass Destruction Strategy had evolved and how the EU was learning to face new challenges in this sphere. To fulfil this original purpose, a case study of the regime to control biological weapons in the period starting 2001 was selected. This case study would be evaluated against the body of literature known as 'Regime Theory'. However, it became apparent as the work progressed that there were few existing practical tools to evaluate effectiveness in such a regime, all of which had significant limitations or flaws in their application (see Chapter 6). The lack of a means to evaluate effectiveness created significant methodological limitations as to how the activities of the EU, its institutions and its member states could be analysed. As time progressed, the work for the thesis ended up being dominated by the process of creating a framework of assessment to evaluate effectiveness to the extent that it became logical to make this methodology the primary focus of the thesis.

A key limitation of how the thesis turned out is the pre-eminent danger in using two new methods in the triangulation as there may be errors that may not be detected if there were to be related flaws in the two frameworks (and as the two were generated in the same brain, they could both be impacted upon by a common error or an unrecognized implicit

assumption). While it might appear to be better to attempt triangulation of a new framework against an existing established framework, the limitations of the existing frameworks for the area under examination outweigh the benefit of trying new techniques.

Dimension definition issues

One limitation in the research within this thesis arises from the definitions of the dimensions. The dimensions have what might be described as opposite directions of travel which seemed to cause some confusion with some people the author interacted with while developing the dimension definitions.

The situation is that any enhancement of the *Coherence/Engagement* or the *Resilience* dimension relates to an enhancement of the aspects embodied within those dimensions. The reverse happens with the other two dimensions; any enhancement of the *Threat Ambition* or the *Availability/Opportunity* dimension relates to a diminution of the aspects embodied within those dimensions. In other words, an enhancement of the *Threat Ambition* dimension should lead to reductions in desires to carry out activities prohibited within the regime and an enhancement of the *Availability/Opportunity* dimension should lead to reductions in opportunities to carry out activities prohibited within the regime.

Attempts were made during the dimension development phase to find language that would ease this confusion. One example was an attempt to see if the dimensions could be considered to have opposite polarities. Alas, this seemed to simply add to the confusion.

If this limitation were to be overcome through new definitions being developed this might help make these dimensions a more user-friendly tool.

General theory issues

As highlighted in the discussion of the third basic assumption, above, understanding the problems presented by the issue of biological weapons and the possible solutions there may be has to be a truly multidisciplinary effort that spans the natural and social sciences. This thesis therefore has to go beyond standard political sciences and international relations literature. The examples provided within Chapter 5 illustrated that a thesis such as this must be informed from a variety of theoretical inputs.

This need for a broad theoretical base highlights the point that any theoretical construct under consideration should contribute an element of explaining why something happens or why something has significance in order to be of any use.

This need to be informed from a variety of theoretical inputs had some implications for the structure of this thesis, making it somewhat front-end heavy in the resulting thesis. The need to deal with either informative or potentially confounding areas of theory, such as those dealing with innovation, human constructs and the concept of the adjacent possible was compelling, even though there may be little overt reference to these bodies of literature in the chapters of substantive work of the thesis, they have proved very valuable in framing the work herein.

A second area of theory issues is that conceptual analysis is not the same as textual analysis and the latter seems to get much more attention in academic research, not least as it is simpler to take a body of text and analyse it for various terms than it is to create abstractions of the concepts underlying the issues. As noted elsewhere in this thesis, there are language issues relevant to the research as the language of diplomacy means that terms can carry loaded meanings beyond what might be understood in everyday use. This was evident within the research for this thesis when trying to conceptualize effectiveness. The phrase ‘assuring that the purposes of the preamble and the provisions of the Convention ... are being realized’ is an example of the embodiment of the concept of effectiveness by another name. This had potential to be a confounding factor in the research here. While efforts were made to identify such alternative formulations, it would be impossible to give a guarantee that all had been found. The thus undeterminable question of how many more alternative phrases there might be is a limitation on the conceptual analysis in this thesis.

Theory/policy gap issues

The theory/policy gap was analysed in general terms in Chapter 5.

The key theory/policy gap conclusion is one highlighted at the end of Chapter 6 regarding examination of regime success/failure as a measure of effectiveness and identification of it being outside the scope of academic study and in particular Regime Theory. It is worth remembering the perspective that: ‘The most fundamental and most widely discussed of these purposes [of regimes] is the enhancement of the ability of states

to cooperate in the issue area' (as quoted on page 154). As it was noted in the conclusions of Chapter 6:

For a regime such as one relating to trade, this would be a useful measure of success if 99 per cent of regime members were cooperating with enhanced ability or capacity — any other member would essentially be irrelevant. But on the other hand, according to this measure a weapons-control regime in which over 99 per cent of the participants had been cooperating extremely well would also be seen as effective by this 'most fundamental' measure, even if another participant had caused millions of fatalities with the weapons that were supposed to be under control. As this proposition is clearly absurd, new suggestions for evaluating success/failure are required.

It is hoped that the work within this thesis reduces the gap in this specific area. However, it is clear that this does not provide a sufficient solution to close this gap.

The second area of theory/policy gaps issues revolves around intelligibility issues. Academics do not seem to find time to interact with practitioners and practitioners rarely have time to consider academic literature nor adopt academic concepts. This means that common lexicons do not exist — the same concept in academic language can end up expressed very differently in the language of diplomacy. A simple example of the divergence of the use of the term 'consensus' was identified within the thesis.

It would be fundamentally dishonest as a researcher with practical experience to ignore the gap between practice in the real world and the academic literature. This has resulted in a thesis that is less heavy in some ways on existing academic literature, but also heavy on gaps identified through practical experience. It is valuable to consider existing literature but there are times it is more valuable to establish what knowledge from practitioners can be codified into information.

Further research

There are a number of areas of future research that have been highlighted through the research for this thesis.

Further research relating to the dimensions

Some potentials for confusion in the definitions of the dimensions were identified in the limitations of research section above. These would be worthy of further research.

Having established the comprehensiveness of these four dimensions, it may be worth examining whether the same methodology could be used to evaluate measures within other regimes that control things. While the regimes to control chemical weapons, nuclear weapons, land mines and small arms, just to take a few examples, all have some similarities and some differences with the regime to control biological weapons, it would be of interest to examine activities within those regimes against the proposed dimensions. Regimes used to question existing methods for regime analysis were those to eradicate polio or smallpox (see page 155). Clear dissimilarities between these regimes and the regime to control biological weapons mean that the proposed dimensions would be likely to be inappropriate tools for analysis in these cases, not least as the concept of *Threat Ambition* would be fairly meaningless in such a context.

Chapter 9 highlighted a specific area in which further research could be productive, but only if certain new information became available about entities having been at particular stages of the *Threat Ambition* hierarchy at specific times. The five point plus null success/failure hierarchy identified in the discussion on the *Threat Ambition* dimension (see Chapter 8, page 199 onwards) would split entities into six groups — users, integrators, possessors, acquirers, aspirers, and regime compliant. Any analysis would need to take into account that these categories will include entities that are within the formal elements of the regime to control biological weapons and some that are outside. This therefore would create twelve *de facto* categories for analysis. However, such research could only be carried out with new information identified above.

Further research relating to the conjectured generic idealized policy decision

The conjectured generic idealized policy decision has shown to have potential as a practical tool but the roughness around the edges makes it a fruitful area for further research. There is a need to deal with the overlaps within the hindrances/obstacles definitions, as identified in the conclusions to Chapter 9, particularly in the cost and benefit sections and those in the capacities and skills sections. It would also be productive to attempt to use the novel tool in other issue areas in order to make a fuller assessment of its utility.

As noted in Chapter 7, the development of the conjectured generic idealized policy decision arose from the author's practical experience during which three groups of factors relating to decision making had been identified (these were outlined initially in Chapter 5, see page 136 onwards) – power/status, finance/resources and intellect/knowledge. One potential area of further research would be to see how well policy analysis tools match these three groups. As noted earlier, it can be seen from the most cursory of examinations that the power/status group is the focus of most realist analysis, finance/resources the focus of neoliberal political economy approaches and intellect/knowledge the focus of normative thinking or constructivist approaches. However, would a more detailed analysis support such a cursory examination? In such a case, a routine analytical process that looked at each of these groups of factors relating to decision making with regard to any policy decision would then assist in identifying appropriate tools for analysing that decision such that, for example, if the predominant influences on a particular policy, realist analytical tools are most likely to produce useful analysis. As noted earlier, most of the parsimonious theories apply only to decisions in which the most relevant group of these factors predominates.

It was suggested in the sub-section on further research relating to the proposed dimensions that it may be worth examining whether the same methodology could be used to evaluate measures within other regimes. The same logic would apply to further research relating to the conjectured generic idealized policy decision. Moreover, in this case, this tool could be relevant to regimes such as those to eradicate polio or smallpox. Indeed, within the efforts to eradicate polio one of the clearest obstacles has been that in some areas locals who are able to express power (often through violence) have prevented vaccination teams being able to work. This has sometimes been so extreme as to result in fatalities amongst these teams. A clear case of 'those in power lose power/status from the decision' or 'those in power don't understand the purpose of the decision'.

This thesis and the real world

The final conclusions of this thesis relate to research in a real world context.

The focus of the work contained within this text is biological warfare — a particularly unpleasant method for humans to wreak devastation and destruction on themselves and on

the planet. It can be difficult to analyse such a dreadful aspect of humanity without being changed by it. Indeed, many people do not engage with the subject matter because of its distasteful nature and this is of concern as the only way to manage the threat from the hostile uses of the life sciences is to engage with the problem. JBS Haldane expressed similar feelings in his classic work on air raid precautions prior to the Second World War:

I hate having to write this book. Air raids are not only wrong. They are loathsome and disgusting. If you had ever seen a child smashed by a bomb into something like a mixture of dirty rags and cat's meat you would realize this fact as intensely as I do. And I sympathize with the attitude of those who feel that the whole business is so horrible that they will have nothing to do with it.¹

Policy choices made in this area have direct impacts. Biological and chemical weapons have been used in Zhejiang, Sardasht and Halabja, amongst others. During the preparation of this thesis there was the horrific use of sarin in the East Ghouta area of Damascus. It would be the highest form of disrespect to the dead, and those whose suffering still lingers, to treat their passing as simply the basis of a discussion of theory, unless that discussion of theory can be shown to enhance understanding of the chain of circumstances that led to their deaths and so to enhance understanding of which policy options might make future deaths less likely.

Empiricism has fallen from fashion in the academic world. While it obviously has its limitations, there cannot be any doubt that some areas of study, and this includes the regime to control biological weapons, are dealing with real world issues that have short-term and long-term practical consequences. The fashionable view that there are no such things as 'facts', and that all things are open to interpretation has superficial attraction; an attraction that is somewhat diminished when establishing the cause of death of hundreds, if not thousands, of people in an alleged attack with prohibited weapons.

The motivation for the preparation of this thesis has been the understanding that particular policies, activities and events have potential to either bring about death and destruction on a large scale or to enhance public health and promote public safety. With this in mind, deliberate efforts have been made to make this thesis both readable and intelligible to those who may have a chance to influence policy in the future.

1. J B S Haldane, A.R.P., (London: Victor Gollancz Ltd, 1938), 296 pp at p 11.

Bibliography

- Graham T Allison, *Essence of Decision: Explaining the Cuban Missile Crisis* (Boston: Little, Brown, 1971).
- Graham T Allison and Morton H Halperin, 'Bureaucratic Politics: A Paradigm and Some Policy Implications', *World Politics*, vol 24 (Spring 1972), pp 40-79.
- Holger Anders, 'Norm Evolution Dynamics: The Case of Arms Brokering Controls', Paper presented at the annual meeting of the International Studies Association 48th Annual Convention, Hilton Chicago, USA, 28 February 2007, [http://www.allacademic.com/meta/p179860_index.html].
- Emily Bailey, Richard Guthrie, Darryl Howlett and John Simpson, 'Volume I: The Evolution of the Nuclear Non-Proliferation Regime' (Sixth Edition), *PPNN Briefing Book*, Programme for Promoting Nuclear Non-Proliferation, March 2000, 66 pp.
- Laura Barnett, *Canada's Approach to the Treaty-making Process*, Parliamentary Information and Research Service of the Library of Parliament, Canada, PRB 08-45E, 24 November 2008, 11 pp.
- Michael Barnett and Raymond Duvall, 'Power in International Politics', *International Organization*, vol 59, no 1, (Winter 2005), pp 39-75.
- Michael Barnett and Martha Finnemore, *Rules for the World: International Organizations in Global Politics*, (Ithaca, NY: Cornell University Press, 2004), 226 + xi pp.
- Una Becker, 'Light at the End of the Tunnel? The Sixth Review Conference of the Biological Weapons Convention', *PRIF Reports*, 79, (2007), 41 pp.
- Judith Bell, *Doing Your Research Project*, (Milton Keynes: Open University Press, 2005 [fourth edition]), 267 + xv pp.
- Thomas Bernauer, *The chemistry of regime formation*, (Geneva: United Nations Institute for Disarmament Research/Dartmouth Publishing, 1993), 480 pp.
- John D Brewer, *Ethnography*, (Buckingham: Open University Press, 2000)
- Chris Brown, 'The borders of (international) political theory', in: Noël O'Sullivan (ed.), *Political theory in transition*, (London: Routledge, 2000), pp 190-208.
- Barry Buzan, 'From International System to International Society: Structural Realism and Regime Theory Meet the English School', *International Organization*, vol 47, no 3, (Summer 1993), pp. 327-52.
- Barry Buzan, 'The English School: an underexploited resource in IR', *Review of International Studies*, vol 27, no 3, (July 2001), pp. 471-88.
- Hans Bügl, John P Danner, Robert J Molinari, John T Mulligan, Han-Oh Park, Bas Reichert, David A Roth, Ralf Wagner, Bruce Budowle, Robert M Scripp, Jenifer A L Smith, Scott J Steele, George Church & Drew Endy, 'DNA synthesis and biological security', *Nature Biotechnology*, vol 25, no 6, (June 2007), pp 627-29.
- Jane Caplan, 'Contemporary History: Reflections from Britain and Germany', *History Workshop Journal*, vol 6, no 1, Spring 2007, pp 230-38.

- W Seth Carus, 'Defining "Weapons of Mass Destruction"', *Occasional Paper 4*, Center for the Study of Weapons of Mass Destruction, National Defense University [Washington, D.C.], pp 49 + xii.
- Tim Caughley, 'Pacific Islands', in: BioWeapons Prevention Project, *Building a Global Ban: Why States Have Not Joined the BWC*, April 2009, pp 17-19.
- Alan Chalmers, *What is this thing called Science*, [third edition] (Buckingham: Open University Press, 1992), p 12-13.
- Inis L Claude jr, 'Collective Legitimization as a Political Function of the United Nations', *International Organization*, vol 20, no 3 (Summer 1966), pp 367-79.
- Carl von Clausewitz, *On War*, [as translated by Anatol Rapoport] (London: Routledge & Kegan Paul Ltd, 1908), 461 pp [as reprinted in the *Penguin Classics* series, 1982].
- Benjamin V Cohen, 'The Impact of the United Nations on United States Foreign Policy', *International Organization*, vol 5, no 2 (May 1951), pp 274-81.
- Wesley M Cohen and Daniel A Levinthal, 'Absorptive capacity: A new perspective on learning and innovation', *Administrative Science Quarterly*, vol 35, no 1, [Special Issue: Technology, Organizations, and Innovation], (March 1990), pp 128-52.
- Robin Coupland and Dominique Loye, 'International assistance for victims of use of nuclear, radiological, biological and chemical weapons: time for a reality check?', *International Review of the Red Cross*, vol 91, no 874, (June 2009), pp 329-40.
- Robin Cowan and Dominique Foray, 'The Economics of Codification and the Diffusion of Knowledge', *Industrial & Corporate Change*, vol 6, no 3, (September 1997), pp 595-622.
- Malcolm Dando, *The New Biological Weapons: Threat, Proliferation, and Control*, (London: Lynne Reiner, 2001), 181 + ix pp.
- Malcolm R Dando, *Preventing Biological Warfare: The Failure of American Leadership*, (Basingstoke: Palgrave, 2002), 231 + xiv pp.
- Richard Devetek, 'Critical Theory', in: Scott Burchill and Andrew Linklater (eds.), *Theories of International Relations* [3rd edition], Basingstoke: Palgrave Macmillan, 2005, pp 137-60.
- Radoslav S Dimitrov, Detlef F Sprinz, Gerald M DiGiusto and Alexander Kelle, 'International Nonregimes: A Research Agenda', *International Studies Review*, vol 9, (2007), pp. 230-58.
- Adam Dolnik, 'Die and Let Die: Exploring Links between Suicide Terrorism and Terrorist Use of Chemical, Biological, Radiological, and Nuclear Weapons', *Studies in Conflict and Terrorism*, vol 26, no 1, (January-February 2003), pp 17-35.
- Martin David Dubin, 'Transgovernmental Processes in the League of Nations', *International Organization*, vol 37, no 3 (Summer,1983), pp 469-93.
- Harry Eckstein, *Regarding Politics: Essays on Political Theory, Stability, and Change*, (Berkeley: University of California Press, 1992) 405 pp.
- Colin Elman and Miriam Fendius Elman, 'Diplomatic History and International Relations Theory', *International Security*, vol 20, no 1, Summer 1995, pp 5-11.

- Daniel Feakes, Brian Rappert and Caitríona McLeish, 'Introduction: A Web of Prevention?', in: Brian Rappert and Caitríona McLeish (eds.), *A Web of Prevention: Biological Weapons, Life Sciences and the Governance of Research*, (London: Earthscan, 2007), pp 1-13.
- Martha Finnemore and Kathryn Sikkink (1998), 'International Norm Dynamics and Political Change', *International Organization*, vol 52, no 4 (Autumn 1998), pp 887-917.
- Thomas M Franck and Bert B Lockwood jr, 'Preliminary Thoughts Towards an International Convention on Terrorism', *American Journal of International Law*, vol 68, no 1 (January 1974), pp 69-90.
- Nancy W Gallagher, 'Bridging the Gaps on Arms Control', *Contemporary Security Policy* [Special Issue — Nancy W Gallagher (ed.), 'Arms Control. New Approaches to Theory and Policy'], vol 18, no 2, August 1997, pp 7-13.
- Erhard Geissler, *Biological and Toxin Weapons Today*, (Stockholm/Oxford: SIPRI/OUP, 1986), 207 pp.
- Erhard Geissler, 'Strengthening the Biological Weapons Convention by Confidence-Building Measures', *SIPRI Chemical & Biological Warfare Studies* [Scorpion Papers], no 10, Stockholm International Peace Research Institute, (1990), 206 pp.
- Erhard Geissler and John Ellis van Courtland Moon, (eds.), 'Biological and Toxin Weapons: Research, Development and Use from the Middle Ages to 1945', *SIPRI Chemical & Biological Warfare Studies* [Scorpion Papers], no 18, Stockholm International Peace Research Institute, (1999), 276 + 15 pp.
- Erhard Geissler and John P Woodall (eds.), 'Control of Dual-Threat Agents: The Vaccines for Peace Programme', *SIPRI Chemical & Biological Warfare Studies* [Scorpion Papers], no 15, Stockholm International Peace Research Institute, (1994), 265 + xvii pp.
- Alexander L George, 'Case Studies and Theory Development: The Method of Structured, Focused Comparison', in: Paul Gordon Lauren (ed.), *Diplomacy: New Approaches in History, Theory, and Policy*, (New York: The Free Press, 1979).
- Alexander L George and Andrew Bennett, *Case Studies and Theory Development in the Social Sciences*, BCSIA Studies in International Security, Cambridge, MA: MIT Press, 2005), 331 + xv pp.
- Charles L Glaser, 'Realists as Optimists: Cooperation as Self-Help', *International Security*, vol 19, no 3 (Winter, 1994-1995), pp 50-90.
- Jozef Goldblat, *Arms Control*, (London: Sage, 2002) [published in association with the Peace Research Institute Oslo and the Stockholm International Peace Research Institute], 396 + xliii pp.
- Richard Guthrie, 'The Chemical Weapons Convention: a guide', in J.B. Poole and R. Guthrie (eds.) *Verification 1993: Peacekeeping, Arms Control and The Environment*, VERTIC, 1993, pp. 25–32.
- Richard Guthrie, *Preventing Nuclear Proliferation: the NPT and its extension in 1995*, published collectively by the British American Security Information Council, the

- Defence FAX Organisation, the International Security Information Service and the Verification Technology Information Centre, 1993
- Richard Guthrie, 'Significant Multilateral NACD Agreements: the scope and challenge of implementation', in J. Marshall Beier and Steven Mataija, *Cyberspace and Outer Space: Transitional Challenges for Multilateral Verification in the 21st Century*, York Centre for International and Security Studies, 1997, pp. 41–52.
- Richard Guthrie, 'Could a New Security Assurance Enhance WMD Norms?', in Richard Guthrie (ed.), *Verification 1997: the VERTIC Yearbook*, (London/Boulder: VERTIC/Westview Press), 1997, pp 11-22.
- Richard Guthrie, 'Technological Aspects of Verification: declarations, managed access and confidential proprietary information', in Malcolm Dando and Graham Pearson (eds.), *Verification of the Biological and Toxin Weapons Convention*, Kluwer Academic Publishers, 2000, pp 151–60.
- Richard Guthrie, 'Technological Aspects of Verification: investigation of alleged use of biological weapons', in Malcolm Dando and Graham Pearson (eds.), *Verification of the Biological and Toxin Weapons Convention*, Kluwer Academic Publishers, 2000, pp 161–70.
- Richard Guthrie, 'The United Nations Secretary-General's mechanism to investigate alleged use of biological and chemical warfare', A briefing paper prepared by the Stockholm International Peace Research Institute (SIPRI) for the Swedish Ministry of Foreign Affairs, May 2006 [submitted by the Swedish Government to the United Nations study *Verification in All Its Aspects*].
- Richard Guthrie, "'First reading" completed: Article X consultations to continue', *BWPP Review Conference Reports no 8*, 29 November 2006, p 2.
- Richard Guthrie, 'Rising Out of the Doldrums: Report on the BWC Review Conference', *Disarmament Diplomacy*, Spring 2007, pp 16-28.
- Richard Guthrie, 'A New Lease of Life: The 6th Review Conference of the BTWC and Beyond', *BWPP Occasional Paper no 3*, (December 2007).
- Richard Guthrie, 'Tackling ambiguities: lessons for the Review Conference from the Chemical Weapons Convention negotiations', discussion paper, 28th Workshop of the Pugwash Study Group on the Implementation of the CBW Conventions, 'The Second CWC Review Conference and After', Noordwijk, the Netherlands, 5-6 April 2008, 4 pp.
- Richard Guthrie, 'The evolution of EU policy on non-proliferation of WMD', *CFSP Forum*, vol 7, no 4, July 2009, pp 18-24.
- Richard Guthrie, 'The Final Day: closure and reflections', *MX report no 6*, BioWeapons Prevention Project, 31 August 2009, p 2.
- Richard Guthrie, 'The Fifth Day: conclusion of the meeting', *MSP report no 6*, BioWeapons Prevention Project, 14 December 2009, p 2.
- Richard Guthrie, John Hart, Frida Kuhlau and Jean Pascal Zanders, 'Non-Compliance with the Chemical Weapons Convention: Lessons from and for Iraq', SIPRI Policy Paper No. 5, October 2003.

- Richard Guthrie, John Hart, Frida Kuhlau and Jacqueline Simon, 'Chemical and biological warfare developments and arms control', *SIPRI Yearbook 2004*, (Stockholm/Oxford: SIPRI/Oxford University Press, 2004), pp 659–96.
- Richard Guthrie, John Hart and Frida Kuhlau, 'Chemical and biological warfare developments and arms control', *SIPRI Yearbook 2005*, (Stockholm/Oxford: SIPRI/Oxford University Press, 2005), pp 603–28.
- Richard Guthrie, John Hart and Frida Kuhlau, 'Chemical and biological warfare developments and arms control', *SIPRI Yearbook 2006*, (Stockholm/Oxford: SIPRI/Oxford University Press, 2006), pp 707–31.
- Richard Guthrie and John Simpson, 'L'avenir des régimes de contrôle des exportations NBC: Un point de vue britannique', in Camille Grand (ed.) *Les régimes multilatéraux de contrôle des exportations de technologies sensibles*, Institut français des relations internationales (IFRI), December 2000, pp. 25–61.
- Ernst B Haas, *The uniting of Europe: Political, Social, and Economic Forces, 1950-1957* [third edition], (Notre Dame: Notre Dame Press, 2004) [this edition contains the original 1958 text as published by Stanford University Press together with updated prefaces from 1968 and 2003], 552 + xl + *lvi pp.
- Ernst B Haas, 'Is there a Hole in the Whole? Knowledge, Technology, Interdependence, and the Construction of International Regimes', *International Organization*, vol 29, no 3, (Summer 1975), [special edition: *International Responses to Technology*], pp 827-76.
- Ernst Haas, 'Words Can Hurt You: Or Who Said What to Whom About Regimes' in Stephen D Krasner (ed.), *International Regimes*, (Ithaca, NY: Cornell University Press, 1983).
- Peter M Haas, 'Introduction: Epistemic Communities and International Policy Coordination', *International Organization*, vol 46, no 1, [Special edition on 'Knowledge, Power, and International Policy Coordination'], (Winter, 1992), pp 1-35.
- Stephan Haggard and Beth A Simmons, 'Theories of International Regimes', *International Organization*, vol 41, no 3, (Summer 1987), pp 491-517.
- J B S Haldane, A.R.P., (London: Victor Gollancz Ltd, 1938), 296 pp.
- Morton H. Halperin and Priscilla A. Clapp with Arnold Kanter, *Bureaucratic Politics and Foreign Policy*, (Washington DC: Brookings Institution Press, 2006; 2nd edition), 400 pp.
- Henry L. Hamman, 'Remodelling International Relations', in: Vendulka Kubalkova, Nicholas Onuf and Paul Kowert (eds.), *International Relations in a Constructed World*, (Armonk, NY: ME Sharpe, 1998), pp 173-92.
- Martyn Hammersley, *What's Wrong with Ethnography?*, (London: Routledge, 1992), 230 + ix pp.
- Peter M Hammond and Gradon B Carter, *From Biological Warfare to Healthcare, Porton Down, 1940-2000*, (Basingstoke: Palgrave, 2002), 280 pp.

- Andreas Hasenclever, Peter Mayer and Volker Rittberger, 'Interests, Power, Knowledge: the Study of International Regimes', *Mershon International Studies Review*, vol 40, no 2, October 1996, pp 177–228.
- Andreas Hasenclever, Peter Mayer and Volker Rittberger, 'Theories of International Regimes', *Cambridge Studies in International Relations*, (Cambridge: CUP, 1997), 248 + x pp.
- Carsten Helm and Detlef Sprinz, 'Measuring the Effectiveness of International Environmental Regimes', *Journal of Conflict Resolution*, vol 44, no 5, October 2000, pp 630-52.
- Simon Hix, *The Political System of the European Union*, (Basingstoke: Palgrave, 1999), 427 + xx pp.
- Martin Hollis and Steve Smith, *Explaining and Understanding International Relations*, (Oxford: Clarendon Press, 1991), pp 226 + vii. [Note: this book was initially published by Oxford University Press in 1990.]
- Raymond F Hopkins, The International Role of "Domestic" Bureaucracy, *International Organization*, vol 30, no 3 (Summer 1976), pp 405-32.
- Jon Hovi, Detlef F Sprinz and Arild Underdal, 'The Oslo-Potsdam Solution to Measuring Regime Effectiveness: Critique, Response, and the Road Ahead', *Global Environmental Politics*, vol 3, no 3, August 2003, pp 74-96.
- Fred Charles Iklé, 'After Detection — What?', *Foreign Affairs*, January 1961, pp 208–20.
- Beate Jahn, *The Cultural Construction of International Relations: The Invention of the State of Nature*, (Basingstoke: Palgrave, 2000), 182 + xviii.
- Catherine Jefferson, 'The Taboo of Chemical and Biological Weapons: Nature, Norms and International Law', DPhil thesis, University of Sussex, 2009.
- Carsten Strøby Jensen, 'Neo-functionalism', in: Michelle Cini and Nieves Pérez-Solórzano Borragán, *European Union Politics* [third edition], (Oxford: OUP, 2010), pp 71-85 at p 74.
- Steven Johnson, *Where Good Ideas Come From: The Natural History of Innovation*, (London: Allen Lane/Penguin, 2010), 336 pp.
- Ian Johnstone, 'Security Council Deliberations: The Power of the Better Argument', *European Journal of International Law*, vol 14, no 3 (2003), pp 437–80.
- Robert Kagan, 'Power and Weakness', *Policy Review*, no 113, (June 2002), <<http://www.hoover.org/publications/policy-review/article/7107>>
- Stuart Kauffman and Lee Smolin, 'A possible solution to the problem of time in quantum cosmology', *Santa Fe Institute Working Paper no 97-03-020*, 5 March 1997, 15 pp.
- Alexander Kelle, 'Strengthening the effectiveness of the BTW control regime — feasibility and options', *Contemporary Security Policy*, vol 24, no 2, (August 2003), pp 95–132.
- Alexander Kelle, 'Synthetic Biology & Biosecurity Awareness In Europe', *Bradford Science and Technology Report* [University of Bradford], no 9, (November 2007), 23 pp.

- Alexander Kelle, Kathryn Nixdorff and Malcolm Dando, *Controlling Biochemical Weapons: Adapting Multilateral Arms Control for the 21st Century*, (Basingstoke: Palgrave Macmillan, 2006), 208 + vii pp.
- Alexander Kelle, Kathryn Nixdorff and Malcolm Dando, 'A paradigm shift in the CBW proliferation problem: devising effective restraint on the evolving biochemical threat', *DSF-Forschung no 12*, Deutsche Stiftung Friedensforschung, 2008, 68 pp.
- S Kemmis and R McTaggart, *The Action Research Planner*, [Second Edition], (Victoria: Deakin University Press, 1982).
- Robert O Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy*, (Princeton: Princeton University Press, 1984), 290 pp.
- Robert Keohane, *International Institutions and State Power: Essays in International Relations*, (Boulder, CO: Westview Press, 1989).
- Shannon Kile, 'Nuclear arms control and non-proliferation', *SIPRI Yearbook 2005*, (Stockholm/Oxford: SIPRI/Oxford University Press, 2005), pp 551–77.
- Philippe Kirsch and John T Holmes, 'The Rome Conference on an International Criminal Court: The Negotiating Process', *American Journal of International Law*, vol 93, no 2, January 1999, pp 2-12.
- Harold Hongju Koh, 'Why do Nations Obey International Law?', *Yale Law Journal*, vol 106, no 8, (June 1997), pp 2599–2659.
- Koninklijke Nederlandse Academie van Wetenschappen (Royal Netherlands Academy of Arts and Sciences), *A Code of Conduct for Biosecurity: Report by the Biosecurity Working Group*, Amsterdam, August 2007, 43 pp.
- Stephen D Krasner (ed.), *International Regimes*, (Ithaca, NY: Cornell University Press, 1983), 372 + x pp.
- Stephen D Krasner, 'Global Communications and National Power: Life on the Pareto Frontier', *World Politics*, vol 43, April 1991, pp 336-66.
- Allan S. Krass, 'Nuclear verification in the post-Cold War era', in J. B. Poole & R. Guthrie (eds.), *Verification 1993*, VERTIC/Brassey's, 1993, pp. 69–76.
- Vendulka Kubalkova, 'Reconstructing the Discipline', in: Vendulka Kubalkova, Nicholas Onuf and Paul Kowert (eds.), *International Relations in a Constructed World*, (Armonk, NY: ME Sharpe, 1998), pp 193–201.
- Frida Kuhlau, 'Countering Bio-threats: EU Instruments for Managing Biological Materials, Technology and Knowledge', *Policy Paper No. 19*, Stockholm International Peace Research Institute, August 2007, 38 pp.
- Thomas Kuhn, *The Structure of Scientific Revolutions*, (Chicago: University of Chicago Press, 1962) [first edition; second edition published in 1970].
- Thomas Kuhn, *The Essential Tension*, (Chicago: University of Chicago Press, 1977), xxiii + 366 pp.
- Christopher J Lamb and Irving Lachow, 'Reforming Pentagon Strategic Decisionmaking', *Strategic Forum*, no 221, July 2006, Institute for National Strategic Studies, National Defense University, 8 pp.

- Victor Lefebure, *Scientific Disarmament: A Treatment Based on the Facts of Armament*, (London: Victor Gollancz, 1931), 320 pp.
- Jeffrey W. Legro, 'Which Norms Matter? Revisiting the 'Failure' of Internationalism', *International Organization*, vol 51, no 1 (Winter 1997), pp 31–63.
- Milton Leitenberg, *Assessing the Biological Weapons and Bioterrorism Threat*, Strategic Studies Institute, U.S. Army War College, (December 2005), 115 pp at p 45.
- Milton Leitenberg, 'The self-fulfilling prophecy of bioterrorism', *Nonproliferation Review*, vol 16, no 1, (March 2009), pp 95-109.
- Ian O. Lesser, Bruce Hoffman, John Arquilla, David Ronfeldt, Michele Zanini and Brian Michael Jenkins, *Countering the New Terrorism*, (Santa Monica, California: RAND Corporation, 1999) [prepared for the US Air Force], 153 + xxiv pp.
- Jack S Levy, 'Too Important to Leave to the Other: History and Political Science in the Study of International Relations', *International Security*, vol 22, no 1, Summer 1997.
- Marc A. Levy, Oran R. Young and Michael Zürn, 'The Study of International Regimes', *European Journal of International Relations*, 1995, vol 1, no 3, pp. 267–330.
- Jez Littlewood, *The Biological Weapons Convention: A Failed Revolution*, (Aldershot: Ashgate Publishers, 2005), 250 + ix pp.
- Sverre Lodgaard, 'The building of confidence and security at the negotiations in Stockholm and Vienna', *World Armaments and Disarmament: SIPRI Yearbook 1986* (Stockholm International Peace Research Institute/Oxford University Press: Oxford, 1986), pp 423–46.
- Karl Lowe, Graham Pearson and Victor Utgoff, 'Potential Values of a Simple BW Protective Mask', Institute for Defense Analyses Paper P-3077, September 1995.
- Johan Lundin, 'Verification of Dual-use Chemicals under the Chemical Weapons Convention: The Case of Thiodiglycol', *SIPRI Chemical & Biological Warfare Studies* [Scorpion Papers], no 13, Stockholm International Peace Research Institute, (1991), 160 pp.
- Frank W Lutz, 'Ethnography: the holistic approach to understanding schooling', in Martyn Hammersley, *Controversies in Classroom Research*, (Buckingham: Open University Press, 1986), pp 107-19.
- Douglas J MacEachin, 'Routine and Challenge: Two Pillars of Verification', *The CBW Conventions Bulletin*, 39, March 1998, pp 1-3.
- Debora MacKenzie, 'Tilting at Windmills', *New Scientist*, 28 November 2015, pp 30-31.
- Donald MacKenzie and Judy Wajcman (eds.), *The Social Shaping of Technology: How the Refrigerator Got Its Hum*, (Milton Keynes: Open University Press, 1988), 327 pp.
- Lyle Makosky, Eric R Stephen, *Development of a Threat Assessment Framework Applicable to Dual Use Biotechnology*, Defence R&D Canada Contract Report, DRDC-CR-2007-003, April 2007, 58 pp.
- Tom Mangold, *Plague Wars: A True Story of Biological Warfare*, (Basingstoke: Macmillan, 1999), 416 pp (ISBN 0333716140). Also published as: Tom Mangold,

- Plague Wars: The Terrifying Reality of Biological Warfare* (New York: St Martin's Press, 2000) 336 pp (ISBN 0312203535).
- Ian Manners, 'Normative Power Europe: A Contradiction in Terms?', *Journal of Common Market Studies*, vol 40, no 2, pp 235–58.
- Ian Manners, 'The Normative Ethics of the European Union', *International Affairs*, vol 84, no 1 (2008), pp 45–60.
- Lisa L. Martin and Beth A. Simmons, 'Theories and Empirical Studies of International Institutions', *International Organization*, vol 52, no 4, (Autumn,1998) [special edition: *International Organization at Fifty: Exploration and Contestation in the Study of World Politics*], pp 729-57.
- Robert J Mathews, 'Chemical and Biological Weapons Export Controls and the "Web of Prevention": A Practitioner's Perspective, in: Brian Rappert and Caitríona McLeish (eds.), *A Web of Prevention: Biological Weapons, Life Sciences and the Governance of Research*, (London: Earthscan, 2007), pp 163-71.
- John J Mearsheimer, The False Promise of International Institutions, *International Security*, vol 19, no 3 (Winter 1994-1995), pp 5–49.
- Matthew Meselson, 'Averting the hostile exploitation of biotechnology', *The CBW Conventions Bulletin*, no 48, June 2000, pp 16-19. [A slightly edited version of this article also appears as: Matthew Meselson, 'The problem of biological weapons', *Pugwash Occasional Papers*, vol 2, no 3, (September 2001), [collection of papers from the 50th Pugwash Conference, 'Eliminating the Causes of War', Cambridge, UK, August 2000], pp 147–56.]
- Benjamin Miller, 'Explaining Great Power Cooperation in Conflict Management', *World Politics*, vol 45, no 1, (October 1992), pp 1–46.
- Alan Milward, *The European Rescue of the Nation-State* [second edition], (London: Routledge, 2000), [this edition contains the original 1992 text with an additional preface], 466 + xvi pp.
- Andrew Moravcsik, *The Choice for Europe: Social Purpose and State Power from Messina to Maastricht*, (London: Routledge, 1999), 514 + xii pp. [Note: this book was initially published by Cornell University Press in 1998.]
- John Mueller, 'Simplicity and Spook: Terrorism and the Dynamics of Threat Exaggeration', *International Studies Perspectives*, vol 6, no 2, (May 2005), pp 208–34.
- Harald Müller, 'Regime Robustness, Regime Attractivity and Arms Control Regimes in Europe', *Cooperation and Conflict*, vol 30, no 3, 1995, pp 287-97.
- Harald Müller, David Fischer and Wolfgang Kötter, *Nuclear Non-Proliferation and Global Order*, (Stockholm/Oxford: SIPRI/OUP, 1994), 258 pp.
- Ethan A. Nadelmann, 'Global Prohibition Regimes: The Evolution of Norms in International Society', *International Organization*, vol 44, no 4 (Autumn 1990), pp 479-526.
- National Academy of Science, *Globalization, Biosecurity, and the Future of the Life Sciences*, February 2006, 300 pp.

- Robert Neild, 'Cheating in a Disarmed World', *Disarmament and Arms Control: An International Quarterly Journal*, vol I, no 2, Autumn 1963.
- Robert Neild, *What Has Happened to Disarmament?*, David Davies Memorial Institute of International Studies Annual Memorial Lecture, April 1968.
- Joseph S. Nye Jr., 'Scholars on the Sidelines', *Washington Post*, 13 April 2009.
- Joseph S Nye Jr and Robert O Keohane, 'Transnational Relations and World Politics: An Introduction', *International Organization*, vol 25, no 3 (Summer 1971), pp 329-49.
- Joseph S Nye Jr and Robert O Keohane, 'Transnational Relations and World Politics: A Conclusion', *International Organization*, vol 25, no 3 (Summer 1971), pp 721-48.
- John Parachini, 'Putting WMD Terrorism into Perspective', *Washington Quarterly*, vol 26, no 4, (Autumn 2003), pp 37-50.
- Parliamentary Office of Science and Technology, 'Ecosystem Services', *postnote*, 281, March 2007, 4 pp.
- James L Payne, *A History of Force: exploring the worldwide movement against habits of coercion, bloodshed, and mayhem*, (Sandpoint, Indiana: Lytton Publishing, 2004), 296 + vii pp.
- Graham S Pearson, 'The Central Importance of Legally Binding Measures for the Strengthening of the Biological and Toxin Weapons Convention (BTWC)', *WMDC Paper no 28*, Weapons of Mass Destruction Commission, (January 2005) 59 pp.
- Mark A Pollack, 'Theorizing EU Policy-Making', in: Helen Wallace, Mark A Pollack and Alasdair R Young (eds.), *Policy Making in the European Union* [sixth edition], (Oxford: OUP, 2010), pp 15-44.
- Karl R Popper, *Conjectures and Refutations: The growth of scientific knowledge*, (New York: Basic Books, 1962), 412 + xii pp.
- George Poste and Julian Perry Robinson, 'International Control Measures: The Biological Weapons Convention and its Projected Protocol', in: *Measures for Controlling the Threat from Biological Weapons*, Royal Society, (2000), pp 9-14.
- Richard Preston, 'Annals of Warfare: The Bioweaponers', *New Yorker*, 9 March 1998, pp 52-65 at p 65.
- Robert D Putnam, 'Diplomacy and Domestic Politics: The Logic of Two-Level Games', *International Organization*, vol 42, no 3, (Summer, 1988), pp 427-60.
- Brian Rappert (ed.), *Technology and Security: Governing Threats in the New Millennium*, (Basingstoke: Palgrave, 2007), 223 + xii pp.
- Brian Rappert and Chandré Gould (eds.), *Biosecurity: Origins, Transformations and Practices*, (Basingstoke: Palgrave, 2009), 250 + x pp.
- Brian Rappert and Cairíona McLeish (eds.), *A Web of Prevention: Biological Weapons, Life Sciences and the Governance of Research*, (London: Earthscan, 2007), 218 + xi pp.
- Gregory A Raymond, 'Problems and Prospects in the Study of International Norms', *Mershon International Studies Review*, vol 41, no 2, (November 1997), pp 205-45.

- James Revill, *The Biological and Toxin Weapons Convention 2001-2006: An Assessment of the Intersessional Process*, PhD thesis, University of Bradford, 2010.
- James Revill and Malcolm Dando, 'The Rise of Biosecurity in International Arms Control', in: Brian Rappert and Chandré Gould (eds.), *Biosecurity: Origins, Transformations and Practices*, (Basingstoke: Palgrave, 2009), pp 41-59.
- James Revill and Caitriona McLeish, 'Estimating the costs of compliance options for the BWC', *Trust & Verify*, no 151, October/December 2015 [published January 2016], pp 1-5.
- Dick Richardson, *The Evolution of British Disarmament Policy in the 1920s*, (London: Pinter, 1989), 265 + vi pp.
- R.M. Ritter (ed.), *Oxford Style Manual*, (Oxford: Oxford University Press, 2003), 1033 pp.
- Guy B Roberts, 'Arms Control without Arms Control: The Failure of the Biological Weapons Convention Protocol and a New Paradigm for Fighting the Threat of Biological Weapons', *INSS Occasional Paper*, 49, Institute for National Security Studies [United States Air Force], (March 2003), 111 + xii pp.
- Julian Perry Robinson, 'Chemical Warfare Arms Control: A framework for Considering Policy Alternatives', *SIPRI Chemical & Biological Warfare Studies* [Scorpion Papers] no 2, Stockholm International Peace Research Institute, (1985), 116 pp.
- J Martin Rochester, 'The Rise and Fall of International Organization as a Field of Study', *International Organization*, vol 40, no 4, (Autumn 1986), pp 777-813.
- Royal Society, *New approaches to biological risk assessment*, RS policy document 08/09, July 2009, 17 pp.
- John Gerard Ruggie, 'International Responses to Technology: Concepts and Trends', *International Organization*, vol 29, no 3, [special edition on: *International Responses to Technology* (Summer 1975), pp 557-83.
- David Ruppe, 'Experts question merit of recent smallpox exercise', *Global Security Newswire*, 9 March 2005.
- Bertrand Russell, *History of Western Philosophy*, (London: George Allen & Unwin, 1946), p 2.
- Paul A Sabatier, *Theories of the Policy Process*, (Boulder: Westview, 2007), 344 + vi pp.
- Kim Salomon, 'What's the Use of International History?', *Journal of Peace Research*, vol 30, no 4, November 1993, p 376.
- Amy Sands, 'The impact of governmental context on negotiation and implementation', *Contemporary Security Policy* [Special Issue — Nancy W Gallagher (ed.), 'Arms Control. New Approaches to Theory and Policy'], vol 18, no 2, August 1997, pp 116-37.
- Thomas C Schelling and Morton H Halperin, *Strategy and Arms Control*, (New York: Twentieth Century Fund, 1961), 148 pp.

- Frank Schimmelfennig, 'Arms Control Regimes and the Dissolution of the Soviet Union: Realism, Institutionalism and Regime Robustness', *Cooperation and Conflict*, vol 29, no 2, 1994, pp 115-48.
- Edella Schlager, 'A comparison of frameworks theories and models of policy processes, in: 'Paul A Sabatier (ed.), *Theories of the Policy Process*, (Boulder: Westview, 2007), pp 293-319.
- Nicholas A Sims, *The Diplomacy of Biological Disarmament: Vicissitudes of a Treaty in Force, 1975-85*, (London: Macmillan; New York: St Martin's Press, 1988), 356 + xv pp.
- Nicholas A Sims, The BTWC in Historical Perspective: From Review and Strengthening Processes to an Integrated Treaty Regime, *Disarmament Forum*, no 4, December 2000, pp 19-26.
- Nicholas A Sims, 'The Evolution of Biological Disarmament', *SIPRI Chemical & Biological Warfare Studies* [Scorpion Papers] no 19, Stockholm International Peace Research Institute, (2002), 200 + xi pp.
- Nicholas A Sims, 'The Future of Biological Disarmament: New Hope after the Sixth Review Conference of the Biological Weapons Convention', *Nonproliferation Review*, vol 14, no 2, July 2007, pp351-72.
- Nicholas A Sims, *The Future of Biological Disarmament: Strengthening the treaty ban on weapons*, (Abingdon/New York: Routledge, 2009), 216 + xvii pp.
- Nicholas A Sims, 'Midpoint Between Review Conferences: Next Steps to Strengthen the BWC', *Disarmament Diplomacy*, 91, (Summer 2009), <<http://www.acronym.org.uk/dd/dd91/91bwc.htm>>.
- Claire Turenne Sjolander and Wayne S Cox, *Beyond Positivism: Critical Reflections on International Relations*, Boulder and London: Lynne Rienner, 1994), 203 pp.
- Detlef F Sprinz and Carsten Helm, 'The Effect of Global Environmental Regimes: A Measurement Concept', *International Political Science Review*, vol 20, no 4, October 1999, pp 359-69.
- Ronald Stamper, Kecheng Liu, Mark Hafkamp and Yasser Ades, 'Understanding the Roles of Signs and Norms in Organisations - A semiotic approach to information systems design', *Journal of Behaviour & Information Technology*, vol 19 no 1 (2000), pp 15-27.
- Arthur A Stein, 'Coordination and Collaboration: regimes in an anarchic world', in Stephen D Krasner (ed.), *International Regimes*, (Ithaca, NY: Cornell University Press, 1983).
- Richard H Steinberg and Jonathan M Zasloff, 'Power and International Law', *American Journal of International Law*, vol 100, no 1, (January 2006), pp 64-87.
- Jessica Stern, 'Dreaded Risks and the Control of Biological Weapons', *International Security*, vol 27, no 3, (Winter 2002/03), pp 89-123
- Stockholm International Peace Research Institute, *The Problem of Chemical and Biological Warfare*, [six volume series], (Stockholm: SIPRI, 1971). The six volumes are: I *The Rise of CB Weapons* [1971]; II *CB Weapons Today* [1973]; III *CBW and the*

Law of War [1973]; IV *CB Disarmament Negotiations, 1920-1970* [1971]; V *The Prevention of CBW* [1971]; and VI *Technical Aspects of Early Warning and Verification* [1973].

Susan Strange, 'Cave! Hic Dragones: A Critique of Regime Analysis' which appears in: *International Organization*, vol 36, no 2, (Spring 1982), pp 479-96 and Stephen D Krasner (ed.), *International Regimes*, (Ithaca, NY: Cornell University Press, 1983), pp 337-54.

T J Sullivan and W L Perry, 'Identifying Indicators of Chemical, Biological, Radiological, and Nuclear (CBRN) Weapons Development Activity in Sub-National Terrorist Groups', *Journal of the Operational Research Society*, vol 55, no 4, [Special Issue: 'OR in Defence'], (April 2004), pp 361-74.

John M Swales, *Research genres: Explorations and applications*, Cambridge: Cambridge University Press, 2004), pp 314 + xii.

R L Trask, *Mind the Gaffe: The Penguin Guide to Common Errors in English*, (London: Penguin, 2001), 302 + ix pp.

Jonathan B. Tucker, A Farewell to Germs: The U.S. Renunciation of Biological and Toxin Warfare 1969-70, *International Security*, vol 27, no 1 (Summer 2002), pp 107-48.

Jonathan B. Tucker (ed.), *Toxic Terror: Assessing Terrorist Use of Chemical and Biological Weapons*, (Cambridge, MA: MIT Press, 2000), 320 pp.

Jonathan B Tucker and Raymond A Zilinskas, 'The Promise and Perils of Synthetic Biology', *The New Atlantis*, (Spring 2006), pp 25-45.

Arild Underdal, 'The Concept of Regime "Effectiveness"', *Cooperation and Conflict*, vol 27, no 3, 1992, pp 227-40.

VERTIC, 'A new strategy: strengthening the biological weapons regime through modular mechanisms', *VERTIC Research Reports*, no 6, (October 2006), 88 pp.

Ronald A Walker, *Manual for UN Delegates*, United Nations Institute for Training and Research, 2011, 194 + xii pp.

William Walker, 'Weapons of Mass Destruction and International Order', *Adelphi Paper 370*, International Institute for Strategic Studies, (2004), 90 pp.

Kenneth N Waltz, *Theory of International Politics*, (New York: Random House, 1979).

Kenneth N Waltz, Letter to the Editor, *International Organization*, vol 36, no 3, (Summer 1982), pp 679-81.

Ken Ward, 'The BWC Protocol: Mandate for Failure', *Nonproliferation Review*, vol 11, no 2, (Summer 2004), pp 183-99.

Alexander E Wendt, 'The Agent-Structure Problem in International Relations Theory', *International Organization*, vol 41, no 3, (Summer 1987), pp 335-70.

Mark Wheelis and Malcolm Dando, 'On the brink: biodefence, biotechnology and the future of weapons control', *The CBW Conventions Bulletin*, no 58, December 2002, pp 3-19.

Mark Wheelis, Lajos Rózsa and Malcolm Dando (eds.), *Deadly Cultures: Biological Weapons Since 1945*, (Cambridge MA: Harvard University Press, 2006) 479 pp.

- Francis Wheen, *How Mumbo-Jumbo Conquered the World: A Short History of Modern Delusions*, (London: Harper Perennial, 2004), 338 pp.
- Jim Whitman, 'Global Governance and Twenty-first Century Technology', in: Brian Rappert (ed.), *Technology and Security: Governing Threats in the New Millennium*, (Basingstoke: Palgrave, 2007), pp 89-110.
- Jerome B. Wiesner, 'Inspection for disarmament', in Louis Henkin (ed.), *Arms Control, Issues for the Public*, Columbia University/Prentice Hall, 1961, pp. 112–40.
- Jerome B. Wiesner, 'Comprehensive arms-limitation systems' in Donald G. Brennan (ed.), *Arms Control, Disarmament, and National Security*, George Braziller, 1961, pp. 198–233.
- Mason Willrich, *Non-Proliferation Treaty: Framework for Arms Control*, The Michie Company, 1969.
- Angela Woodward, *Time to lay down the law*, VERTIC, October 2003, 48pp.
- World Health Organization, *Public health response to biological and chemical weapons - WHO guidance*, [2nd edition], 2004, 340 + xix pp.
- World Health Organization, *Laboratory Biosafety Manual* [third edition], document no WHO/CDS/CSR/LYO/2004.11, November 2004, 178 + viii pp.
- World Health Organization, *Biorisk management: Laboratory biosecurity guidance*, document no WHO/CDS/EPR/2006.6, September 2006, 33 pp.
- Sir Michael Wright GCMG, *Disarm and Verify: An Explanation of the Central Difficulties and of National Positions*, Chatto & Windus, 1964.
- Gary Yerkey, 'Experts study threat of chemical weapons in terrorists' hands', *Christian Science Monitor*, 29 August 1986, p 9.
- Oran R Young, *The Effectiveness of International Environmental Regimes: Causal Connections and Behavioural Mechanisms*, (Cambridge, MA: MIT Press, 1999), 326 + xiv pp.

Note on referencing systems

Oxford style has been chosen for referencing as there are significant limitations to the Harvard system of referencing for a thesis such as this. For some chapters, there is a heavy reliance on papers by governments presented to intergovernmental meetings. Under the Harvard system for referencing, the author of the paper given would be the conference, so for the 2009 Meeting of Experts under the Biological Weapons Convention the reference to a Working Paper would be of the form (BWC, 2009v) as there were 28 Working Papers submitted. As the analysis within this thesis derives from the positions of the States Parties to that Convention (and it is States Parties, either individually or in groups, which submitted the Working Papers) it is of considerable assistance to the reader to utilise Oxford style instead. Moreover, there are instances where statements are made at a meeting that are driven by the views of the Ambassador who may have different emphases from those of the predecessor or successor in that post. For a thesis of this nature, it is therefore useful to be able to provide that data where available.

A second issue with Harvard referencing is the aim of reducing information to a bare minimum with no additional data added. This can cause further misleading situations. Take the book by Andrew Moravcsik, *The Choice for Europe: Social Purpose and State Power from Messina to Maastricht*, that was published in the UK by Routledge in 1999. This book was initially published by Cornell University Press in the USA in 1998 and it would appear that the pagination was different for that edition. Under Harvard referencing it would be considered inappropriate to add '[Note: this book was initially published by Cornell University Press in 1998.]' into the bibliographic reference.¹

Selection of a referencing system raises issues of exclusivity, most notably on the basis of gender. There had been a presumption that the academic world was so small that only a surname and initial(s) would be needed to identify individuals. As the *Oxford Manual of Style*, now subsumed into the *Oxford Style Manual*, notes:

A couple of generations ago, British academic authors were known by their initials, and female authors were so rare relatively that the convention of spelling

1. A similar situation occurs with Tom Mangold's work, *Plague Wars: A True Story of Biological Warfare*, published by Macmillan in the UK in September 1999 at 416 pages (ISBN 0333716140) also published as *Plague Wars: The Terrifying Reality of Biological Warfare* published by St Martin's Press in the USA in February 2000 at 336 pages (ISBN 0312203535).

out their names was considered not only gallant but useful, so as to avoid the faux pas of unwittingly referring to a female author as *he*.²

In pursuing the removal of gender distinctions, some referencing systems chose to cite everyone in the previously male style. Others decided that the retention of whole names for both sexes was beneficial:

citing forenames by initials only is not a service to the reader.³

Indeed, it could be argued that removal of useful data — the forenames — goes against academic principles.

In the electronic era, the use of full names is of considerable benefit. It is much more difficult to carry out a search in digital texts for ‘Smith, J’ and find what you are looking for than it is to search for ‘John Smith’.

For all of these reasons, Oxford referencing is used within this thesis.

2. R.M. Ritter (ed.), *Oxford Style Manual*, (Oxford: Oxford University Press, 2003), 1033 pp at p 506.

3. *Ibid.*

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