BIOLOGICAL WEAPONS: NORM BUILDING AND ITS LIMITATIONS

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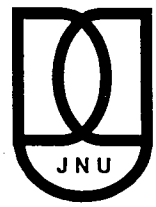
MONALISA JOSHI



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It is certified that the dissertation entitled ***Biological Weapons: Norm Building and its Limitations*** submitted by ***Monalisa Joshi*** is in partial fulfillment for the award of the degree of ***Master of Philosophy*** of this University. This dissertation has not been previously submitted for any degree for this or any other university.

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To the memory of my
Grandmother and Uncle

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CHAPTER 1
NORM BUILDING: PROBLEMS AND PROSPECTS

Disease infects and lives in us. The word itself brings to one's mind, pictures of misery, pain, helplessness and even death. Human beings are committed to search for procedures and methods of immunity from diseases. Right from the very beginning, this pursuit as an endless strife has helped evolve and shape a moral repugnance against the deliberate use of disease causing biological agents. It has comforted our lives and has also brought an understanding of life as it has evolved. The keen desire for a better life also brings with it challenges and perils of the potential misuse of newfound knowledge and understanding.

The series of anthrax spore attacks (post September 11) in the US (United States), have refocused our attention and encouraged us to pay central attention to what once looked like peripheral concerns. Especially, in the US, this unconventional threat has generated questions about public health preparedness that has reached beyond military planning. Most countries realize that civilians are at a greater risk from threats that can no longer be ignored as distant military threats. The two threats, national biological weapons

programme and terrorist use of biological weapons has since come to be debated to no end.

The measures to restrain the proliferation of biological weapons have evolved the effective functioning of moral repugnance. Revulsion against biological weapons, however, remains a value-laden argument. Efforts to give a practical shape to it have helped shape the expected, required and observable behaviour of states, which gradually becomes distinct as norm. There is a whole range of debate regarding the causes and importance of regime and to that extent norm in international relations. This debate can be located in the three different schools of thought of international relations.[1] These are neo-liberalism, realism and cognitivism.

Whereas neo-liberals stress (self-) interest, realists emphasize power and relative power position as a motive for co-operation and success of an international regime. Cognitivists delineate the importance of actors' (state) causal and social knowledge in creating an International regime.[2] This dissipated focus on specific variables

[1] The different schools have been demarcated on the basis of their specific variable. For realists, power based theories of regime, neoliberals Interest based and cognitivists, knowledge based theories of regime. For details refer Hasenclever, Mayer and Rittberger (1997).

[2] Hasenclever, Peter Mayer and Volker Rittberger, *Theories of International Regimes* (Cambridge: Cambridge University Press, 1997), p. 211.

renders each strand of thought insufficient to explain non-proliferation regimes and their functions like building norms. All the dimensions of a regime can perhaps be well understood by some sort of division of labour or synthesis amongst the various schools.[3]

This synthesis is evident in Gary Goertz's analysis of the contexts of international norms.[4] According to him, the relative importance of both norm (about 40%) and self interest (about 60%) accounts for the success of a regime. This finding has important implications for a major problem explained by Security Dilemma in the area of international studies.[5] Scholars who are critical of international security regimes argue that specific calculations are more important for a state. Therefore the pursuit of long-term interest (as regime) becomes difficult.[6] This question of conflict of self-interests can be settled by introducing norms. Although the rules of co-operation will be

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[3] Baldwin, David A, "Neoliberalism, Neorealism and World Politics" in Baldwin ed. *Neorealism and Neoliberalism, The Contemporary Debate*, (New York: Columbia University Press, 1993) pp. 3-25.

[4] Gary Goertz, *Contexts of International Politics* (Cambridge: Cambridge University Press, 1994) p. 243.

[5] Security Dilemma – a situation in international relations in which a state's action taken to assure its own security (such as deploying more military forces) tend to threaten the security of other states. The responses of other states (such as deploying more of their own military forces) in turn threaten the first state. (Robert Jervis, *World Politics*, 30(2), 1978, pp.167-214.

[6] Robert Jervis, "Security regimes" in Krasner (ed.), *International Regimes* (Ithaca: Cornell University Press, 1983), p.33.

chosen for purely instrumental reasons, it will also have a "moral" component in the form of tit-for-tat strategy.[7] This moral component in a security regime lies in reciprocity, which facilitates co-operation.

Thus an international security regime, involving norms fundamentally requires the agreement of states, understanding of the causal factors and benefit from its progression. This approach can help resolve issues that a single state finds difficult but whose solution is paramount and essential for the international community at large. At present, states are ill prepared to face new threats because the notion of moral repugnance against biological weapons has not been internalized.

At the heart of this paradox lies the very nature and the incentives biological weapons provide. When compared to other weapons with the potential of mass destruction, biological weapons remain relatively cheap to manufacture.[8] Dual-use technologies are involved in the manufacture of biological weapons. These weapons can be easily deployed and concealed (mostly in liquid or powder form)

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[7] Axelrod R, *The Evolution of Cooperation* (New York: Basic Books, 1984) in Gary Goertz, no. 4, p. 232.

[8] Weapons of Mass Destruction (WMD) include chemical, biological, radiological, nuclear (CBRN) weapons. They are distinguished from conventional weapons by their enormous

and are sufficient even in small quantities. Unlike nuclear weapons they do not destroy through blast and heat.[9] The symptoms of use of biological weapons appear much later, giving an edge to the agency (state or non-state) to sufficiently hide their identity.

The use or even the threat of use of biological weapons triggers a panic reaction amongst the general public. The state machinery has to gear up its public health management system, hospitals and clinics to prevent and control the ill effects of these weapons. In the process, economy of a state, which is one of the most important stabilizers in international relations, could be strained. At present, researchers supported by the US government assessments believe that roughly twelve countries have active biological warfare programmes, including parties to the BTWC (Biological and Toxin Weapons Convention) such as Iraq, Iran, Libya, China, Russia, and North Korea.[10]

The purpose of this research is to examine and delineate various mechanisms evolved by the states, post World War II, to

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potential lethality, given their small size and modest costs, by the relative lack of discrimination in whom they kill.

[9] Buzan and Herring, The *Arms Dynamic in World Politics*. (Boulder, Colorado: Lynne Rienner Publishers, 1998),p. 62.

[10] Jonathan B. Tucker, "In the Shadow of Anthrax: Strengthening the Biological Disarmament Regime", *The Nonproliferation Review*, vol. 46, no. 2 (spring) 2002, p. 112.

discipline their behaviour so as to prevent the proliferation and use of biological weapons. It find answers to the question of what are the various limitations in the operation of these norms, that guide such a code of conduct for state actors.

Chapter 1 provides the theoretical background of this study. It is divided in two sections. The first section brings out a general understanding of and about norms. Various norms that have evolved against WMD are outlined in the second section. Chapter 2 brings out an understanding of biological weapons, in the light of current scientific developments and their potential for military use. The contribution of various international treaties and agreements towards building of norms, against biological weapons, is traced in chapter 3. The unique features of these weapons pose a formidable challenge to norm building. Chapter 4 is an overview of several agencies, which take advantage of the features of biological weapons and conversely effect the operation of norms. A summary of the research and its implications are provided in the concluding chapter.

What are Norms?

"Norm" is a word derived from the Latin for a carpenter's set square, which tells the carpenter what a right angle is expected and required to be.[11] Their application in this sense makes norm not only the resultant but also a crucial determinant of any social aggregate. States in an international order also constitute a society by virtue of their mutual interactions, trade and diplomatic relations. However, a lot of difference is evident between national and international morality (concerned with right and wrong). While national morality is contingent on the culture, history and traditions of war, international morality is a more universal set of rules applicable to the interaction of states.[12]

The process of transition from a nascent state to maturity of norms consists of three different stages.[13] The stages are firstly, norm emergence where new norms have been identified. Secondly, norm cascades where identified norms gather greater classification and support from a growing number of states. Lastly, internalization of norm wherein political behavior becomes a matter of routine and the

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[11] Coral Bell, Normative Shift, *The National Interest,* vol.13, no.6 (*winter*) 2002/03. p. 44.

[12] Joshua S. Goldstein, *International Relations* (New York: Longman, 2003) p. 120.

[13] Finnermore and Sikkink, *International Organisation*, 1998 in William D.Coleman and Melissa Gabler, " Agricultural Biotech and Regime Formation : A Constructvist Assessment of the Prospectus" , *International Studies Quatrerly*,46(4), 2002, December, pp. 481-506.

meaning of norms enjoy a taken-for-granted quality, independent of any treaty status.

In international politics, a norm can be thought of as an idea. This idea can be proscriptive or permissive. It is the culmination of combined efforts to resolve a problem, which cannot be addressed independently by one state. This effort is manifested at two levels- official and unofficial. At the official level there exists a treaty mechanism. Here, the essential feature for the emergence of any norm is the consensus of states, which is formalized in the text of an international treaty. Unofficially, the commitment of states and public awareness is important in the final stage of norm building and thus bringing about consistency of any regime.[14]

Most of the international moral rules are strictly codified, some are mentioned in print and few are implicit. Nevertheless, this diffusion in establishing norms does help states develop a general understanding of what is right or wrong. It guides the behaviour as expected in a particular situation. Norms are important because they

[14] Hasenclever, Peter Mayer and Volker Rittberger, no.2, p.61.

help in the decision making process and aid in shaping state's preferences in debates on policy rights and issue areas.[15]

Norms select, direct and sustain the behavior to evolve consensus and help the states to converge expectations on issues of global concern. The success of this process lies in the potential of the understanding and the knowledge of norms to reach socially optional solutions against the temptations of rational individualistic defections.[16] These solutions are the blue prints of an international regime.

According to Krasner, regimes can be defined as sets of implicit or explicit principles, norms rules and decision making procedures around which actor's expectations converge in a given area of international relations.[17] Principles are beliefs of fact, causation and rectitude. Norms are standards of behavior defined in terms of right and obligations. Rules are specific prescriptions or proscription for action. Decision making procedures are prevailing practices for making and implementing collective choice. There are a number of international regimes in areas concerning economy, security and trade.

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[15] Friedrich V. Kratochwill, *Rules, Norms and discussions on the conditions of Practical and Legal reasoning in International Relations and Domestic Affairs*. (Cambridge: Cambridge University Press, 1989) pp. 1-12.

[16] Ibid., p. 48.

Various security regimes have addressed the issue of proliferation of WMD and the threat of their intentional or unintentional use by a state or a non-state group. Factors like national security calculations, domestic incentives and technological development are some of the motives for states to acquire WMD.[18] Sponsorship by a state and features of WMD (especially the insidious chemical and biological weapons) can be the two reasons for non-state actors to acquire WMD and subsequently use them.

Norms against WMD

The various components of non-proliferation norms comprise of restraining their use through treaty compliance mechanisms, diplomatic consensus building and denial of technology. These efforts had received a boost following the World War II. The advent of nuclear weapons produced varied resonance. On moral grounds, almost all the sections of society were horrified and prayed that any reoccurrence of

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[17] Stephen D. Krasner, Structural Causes and regime consequences: regimes as International variables, *International Organization*, vol. 36, no. 2, (spring 1982), pp. 1-21.

[18] Flemming Riecke, "NATO's Non-Proliferation and Deterrence Policies Mixed signals and the Norm of WMD Non-use" in Eric Herring ed., *Preventing the use of Weapons of Mass Destruction* (London: Frank Cass, 2000) p. 30.

a tragedy of this kind would be avoided. Politically, during the period the world was facing a bipolar situation. In this context, bombing on Hiroshima and Nagasaki further deepened the ideological divisions. It represented the huge divide between the technological and military capabilities of the two blocs, the Soviet Union and US. Soviet Union was desperate to acquire this new technology to stay in competition. Whereas the US wanted the bomb as a legitimate weapon to help win war and shape post war international relations by influencing Soviet behavior.[19] Resultantly, arms control effort after 1945 became propaganda laden.[20]

After 1950's more modest and realistic efforts were evident. The reason for this was the change in arms control theory. This change has been attributed to three factors.[21] First, more consideration on alternative measures to enhance confidence in co-operative security arrangements. Second, emergence of military leaders and theorists who favored a revisionist outlook and lastly the launch of Soviet Union

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[19] Blacker and Duffy, eds., *International Arms Control Issues and Agreements* (California: Stanford University Press, 1984), p. 95.

[20] Bruce Russet, *The prisoners of Insecurity, Nuclear Deterrence, The Arms Race and Arms Control* (San Francisco: W. H. Freeman and Company, 1983), p. 170.

[21] Larsen and Rattaray, eds., *Arms Control Towards the 21st Century* (Boulder, Colorado: Lynne Rienner Publishers, 1990), pp. 1-56.

Sputnic revolutionized US thinking. It was realized that US nuclear weapon's deterrence could be vulnerable to technology threats in the future.

The first direct result of these efforts was the Antarctic Treaty of 1959. It was the first major treaty that banned the use of WMD on an entire geographical area (Antarctica). It provided for the freedom of scientific research for peaceful purposes in the interest of mankind. This treaty was exemplary in providing a roadmap for future co-operation by virtue of political innovation i.e. the synergy of complementary Soviet Union and US interests.[22] This treaty has no provision for a fragile US-Soviet Union military presence and thus avoided a great risk. It paved the way to look for measures for peaceful existence and was preceded by several major and minor agreements to ban WMD.

Treaties like Limited Test Ban Treaty (1963) and Outer Space Treaty (1967) were influenced by diverse factors in the course of their inception. The Limited Test Ban Treaty outlawed nuclear weapons in the atmosphere under water or in outer space (it allowed for

[22] Deborah Shapely, "Antarctica: Why Success?" in George, Farley and Dallin, eds., *US-Soviet Security Co-operation, Achievements, Failures, Lessons* (Oxford: Oxford University Press, 1983), pp. 307-335.

underground testing). The determining factors in framing this treaty were,(a) the radical shift in arms control negotiating strategies of 1950 and (b) the apprehension generated after the Cuban Missile Crisis of 1962. The heads of states of both the US and the Soviet Union got personally involved in making headway in the pre-treaty bargaining phase. Eventually the tricky question of inspection was dropped in favour of surveillance by national means.[23] The most important contribution of the Limited Test Ban Treaty lies in restraining the spread of radioactive material in the environment.

Gradually, this ban also articulated the need to attend to the growing public fears of nuclear bombs being placed in permanent earth orbit by either of the superpowers. Further negotiations led to the conclusion of the Outer Space Treaty of 1967. This treaty prohibits placing any weapon of mass destruction into the earth orbit or on the moon or other celestial bodies.

The Limited Test Ban Treaty and the Outer Space Treaty are regarded as the precursors to the fuller détente' of 1970s. The nuclear Non proliferation Treaty (NPT) that prevents the transfer of nuclear weapons and nuclear weapon production technologies to non-nuclear

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[23] Richard Smoke, *National Security and the Nuclear Dilemma: An Introduction to the American Experience in the Cold War* (New York: McGraw Hill, 1983), p. 136.

weapon states, was the hallmark of this era. The NPT allows for the development, research, production and use of nuclear technology for peaceful purposes. This treaty has provisions for international inspections, export control and the sharing of benefits of peaceful research. The NPT was facilitated by two major trends of 1960s, the Sino-Soviet split and the development of European détente'.[24] The superpowers were now free from the demands of alliance maintenance. With the signing of NPT, Soviet Union and US demonstrated a major effort at convergence of their common interest. NPT being the high point on the road of co-operation and co-existence initiated by the Antarctic Treaty, attention was now drawn to control weapons of other categories.

Chemical and biological weapons received renewed focus in the heightened arms control atmosphere of the 1960s and 1970s. In 1968 a nerve gas leak killed six thousand sheep in Utah, US. The aftermath public reaction compelled the Nixon administration to take concrete steps toward chemical and biological weapons control. President Nixon

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[24] Joseph S. Nye, Jr., "US-Soviet Co-operation in a Non-Proliferation Regime" in George Farley and Dallin, eds., *US-Soviet Security Co-operation, Achievements, Failures, Lessons* (Oxford: Oxford University Press, 1983), p. 343.

declared publicly to abide by the terms of the formerly denounced Geneva Protocol.[25]

In addition, earnest negotiations were started in the United Nation (UN) to settle various problems of chemical and biological weapon control. During this process, it was realized that the imperative of large scale testing for biological weapons would render their inspection useless. Therefore, the US and its allies gave up the contending issue of inspection. Eventually, a Biological and Toxin Weapons Convention (BTWC), prohibiting the production and storage of biological toxins and calling for the destruction of biological weapons stocks was signed in 1972. The separation of biological and chemical weapons at this stage proved less fruitful for restraining the proliferation of chemical weapons.

It was only after a protracted twenty-one years, that a convention of unlimited duration requiring all stockpiles of chemical weapons to be destroyed was signed in 1980. While the negotiation for a chemical weapons ban were going on in the UN, there were heightened US concerns over two third world chemical weapons programme. There were reports that a petroleum company had sold chemical (thiodyglycol

[25] Richard Smoke, no. 23, p. 140.

and thionyl chloride) used in the manufacture of mustard gas to Iraq.[26] The US president George Bush (senior) was determined to outlaw this category of weapons. Eventually, the US declared a unilateral renunciation of chemical weapons. This concession facilitated the finalisation of Chemical Weapons Convention (CWC), the first major post cold war agreement.

After 1990s the mechanisms to deliver WMD have become more sophisticated and the focus of attention for being a multiplier of various destructive WMD technologies. Today aerial bombs, cannon artillery, missiles and spray tanks can deliver chemical and biological weapons. Missiles have reduced the time and space factors in war fighting and have brought destruction near to the press of a button.

As a result of this transformation in delivery systems, an attempt to control proliferation of the missile technology was realized through Missile Technology Control Regime (MTCR) in 1987. This treaty restricts exports of ballistic missile and production facilities. The MTCR shares common features with the Australia Group and Nuclear Suppliers Group. However, both these groups, as also the MTCR lack the power of a treaty and its commitments are formalized by trading

[26] Brain Solomon, "The Chemical Weapons Convention: Editor's International", in Solomon, ed., *Chemical and Biological Warfare* (New York: The Wilson Company, 1999), p. 51.

diplomatic notes.[27] MTCR was primarily made by middle level officers in 1980s much before the future of missile proliferation could be realized.

Various confidence and security building measures carried the spirit of mutual trust manifested in MTCR forward. Two important agreements in this regard are the Stockholm Accord (1980) and Confidence and Security Building Measurement Agreement of 1990, that improves measures for exchanging detailed information on weapons, forces and military exercises. These have since enhanced the stature of regimes, treaties and strengthened norm building.

An overview of various agreements and multilateral treaties reveals that composite measures to ban weapons of mass destruction still leave lot of gaps to be filled in. Although moral repugnance associated with the use of WMD is old, the time taken by states to give a practical shape to this knowledge is protracted. Eventually, the norms thus developed played an important role but they were not the major reason for the conclusion of further agreements. Factors like security calculations, involvement of political personalities, immediate

[27] Aaron Karp, "The Maturation of Ballistic Missile Proliferation" in William C. Potter and Harlan W. Jenips, eds., *The International Missile Bazaar, The New Suppliers Network* (Boulder: Westview Press, 1994), p. 13.

international circumstances were more crucial. Interestingly, BTWC and CWC ban/limit an entire category of weapons. No such treaty pertaining to nuclear weapons exists so far.

The agreements involving nuclear weapons have focused fundamentally on the norms to ban deployments in new environments and restrict specified new developments.

A nuclear moratorium since its first use points that abstinence from the use of nuclear weapons in the conduct of war is well understood by the states. The proliferation of nuclear weapons in states can be linked to the metaphor of nuclear weapons being the "currency to power". Conversely, biological and chemical weapons have been branded as "an alternative to nuclear weapons", because of their relatively lesser costs and equally destructive effects.

To conclude, therefore, norms against WMD have evolved as a result of the moral repugnance generated after the destruction at Hiroshima and Nagasaki in 1945, brought about by the use of nuclear bombs. Although the number of states possessing biological weapons is increasing, these weapons have never been used for mass destruction. For any value constraint to be built against their use, it is essential that the moral component pivot on the dread is associated

with the use of WMD. The link between the dread of a biological weapon use and normative measure to prevent this disaster should therefore, be clearly understood and established.

CHAPTER 2
THREAT ASSESSMENT

Various categories of weapons have never determined the cause, course or commitment of each side in a war. Weapons influence the conduct of a war but that too, not singularly, since the intent or the minds of operators using the weapons is crucial. Thus, it is believed that "there has never been an aggressive weapon, only aggressive owners and operators of weapons".[1]

For the possessors, the weapons with the potential of mass destruction work at three levels-political, strategic and psychological. Politically, the mere possession of WMD is regarded as a currency to power. Strategically, WMD go a long way in deterring the enemy. They influence the choices that the other party will make by influencing his expectations of how the first party will behave.[2] Psychologically, the possessor has unlimited access to massive destruction just by the mere press of a button.

In security calculations if all the three aspects, political, strategic and psychology of the decision-maker are not balanced, the resultant use of WMD could mean holocaust. However, the

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[1] Colin S. Gray, *Weapons don't make War: Policy, Strategy and Military Technology* (Kansas: University Press of Kansas, 1993), p. 45.

[2] Thomas C. Schelling, *The Strategy of Conflict* (Cambridge: Harvard University Press, 1981), p. 13.

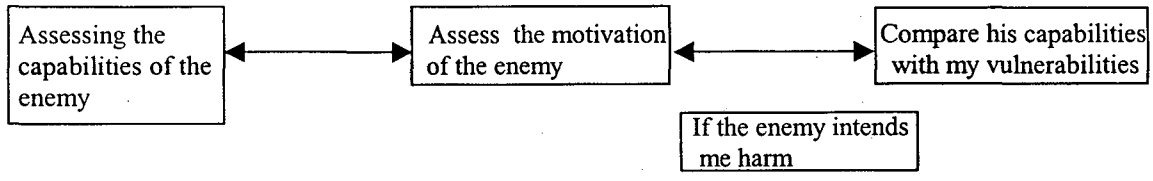
change in nature of warfare over the last sixty years delimits the use of WMD. Much of the contemporary warfare has in fact taken the form of local conflicts. It is fought with conventional weaponry, limited to the rifles, knives, grenades and weapons that a soldier can carry on their person more often than not civil wars in which no great alliances of nations are involved.[3] Narrowing down in the scope of war has led some to talk of the military obsolesce of WMD. In many aspects this trend provides gravity to their political and strategic role.

In addition, the advances and techniques in sciences do not guarantee the affectivity of biological weapons. Superior weapons can only be effective in battle as tactics and numbers permit.[4] The actual threat of a biological weapon use can be determined on the basis of a model. The classic threat assessment model is a flow chart, comprising three different stages. (Refer to Figure 1) In the extreme left is the imperative to assess the capabilities of the enemy. In international relations, other states and non-state actors are two major threats to national security. Out of the four categories of WMD, biological weapons stand singularly. They are cheap to manufacture, easy to store and deploy. Even an economically weak state can acquire them and thus influence international politics.

[3] James Turner Johnson, *Morality and Contemporary Warfare* (New Haven and London: Yale University Press,1999), p. 3.

[4] Colin s. Gray, no,1., p.77.

Figure 1 The Classic threat – assessment model



Source: Sebestyen Gorka," Biological toxins- a bioweapon threat in the 21st century", www.janes.com, 25 August 2002.

The lack of "signature" or attribution of use makes biological weapon a fitting choice for covert attacks by a state or state sponsored terrorist groups.

This chapter assesses the threat of biological weapon in present times. The first section provides a broad understanding of biological weapons. The second section contents the highly debated issue of the military potency of biological weapons.

Understanding Biological Weapons

While most of the weapons kill with an explosion, biological weapons are silent killers. When used against inhuman targets these weapons can eliminate agricultural or animal products, crops or contaminate the enemy's food and water supply. An animate target of biological weapons will show symptoms of disease. However, all outbreaks of disease cannot be linked to the use of biological weapons because disease is a natural phenomenon. The possibility of use of biological weapons is established by "the release of living organisms (as well as the means of delivery) intended for use in warfare to cause death or disease, and which for its effect depends on the ability to multiply in the person, animal or plant". [5]

[5] Jozef Goldblat, *Arms Control* (London: PRIO,1994),pp.xxii,xviii.

Biological agents include microorganisms like virus, bacteria, fungi and ricketssia. Quite often toxin weapons are also categorized under biological weapons. This is a flawed identification because toxins are not living organisms but substances that are used to cause death or injury in an attack.[6] Toxins (botulism and ricin) can be used secretively.

Biological agents and toxin substances infect an animate (human and animal) target through contaminated water, food, air or any wound or passage in the body. Though the mode of infection for each biological agent differs, in general, the pathogens (agent causing disease) will release toxins, deficit immunity and disturb the normal functioning of the body. Worst, the victim's susceptibility to other diseases will increase. Once inside the body of the host the pathogens will spread further, reinfect, mutate or lie dormant.

The history of use of biological warfare producing the above effects can be traced to the early pre-Christian era. In 400 B.C. Scythian archers dipped arrowheads in the blood of decomposing bodies and used these arrows as missile directed towards the enemy.[7] There were allegations of German and Japanese use of plague as a biological weapon in World War II.

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[6] Kathleen C. Bailey, *Doomsday Weapons in the Hands of Many,* (Illinois: University of Illinois Press, 1991), p. 91.

[7] Ed Regis, "Evaluating the threat", www.sciam.com, 21January 2002.

In the 70s and 80s, with the advancement of scientific process and techniques, there has been a rapid development of biosciences. The present day biotechnology however dates back to the ancient and traditional fermentation process (like brewing of beer, manufacturing of bread, cheese, wine and vinegar). The remarkable turnabout in biotechnology has been the use of microbial animal or plant cells or enzymes to synthesize, breakdown or transform materials.[8] According to the 1992 convention on Biological Diversity, biotechnology is defined as "any technological application that uses biological systems, living organisms or derivatives thereof, to make or modify products or processes for specific use". Technology is neither good nor bad, but its moral value depends on how it is used.[9]

In 1970, Joshua Lederberg was among the first scientist to express concern over the misuse of advances in molecular biology.[10] In 1973, Cohen and Boyer demonstrated that scientists could deliberately alter the genetic information of bacteria using the

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[8] John E. Smith, *Biotechnology* (Cambridge: Cambridge University Press, 1996), p.2.

[9] Richard Price, *The Chemical Weapons Taboo* (Ithaca and London: Cornell University Press,1997) p.170.

[10] Robert P. Kadlec and Alan P. Zelicoff. "Implications of the Biotechnological Revolution for Weapons Development and Arms Control" in Zilinskas, ed., *Biological Warfare – Modern Offense and Defense* (Boulder, Colorado: Lynne Rienner Publishers, 2000), p. 11.

recombinant DNA (r-DNA) technology.[11] Just three decades after it was demonstrated that genetic engineering was possible, it was claimed in the British journal, *New Scientist* in 1999 that an entirely new artificial organism could be created by biologists.[12] Researchers can now design targeted experiments in which specific genes are cloned, sequenced, and inserted into new organisms.[13] In this way, the properties of two genes in question can be determined with precision by observing the effects on the host cells to which they are transferred.[14] Unlike the classical methods, quantities of specific DNA molecules, proteins and other products can be produced through the use of r-DNA, to impart altered characteristics to host organisms.[15] All the characteristics desirable in the biological weapon agent – virulence, stability, disguised antigen structure and production efficiency may be subject to enhancement through genetic engineering.[16]

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[11] r-DNA- the hybrid DNA resulting from joining the pieces of DNA from different sources.

[12] Malcolm R. Dando, *The New Biological Weapon, Threat Proliferation and Control* (Boulder, Colorado: Lynne Runner Publishers, 2001), p. 53.

[13] Genes- Hereditary material or the chromosome of an organism.

[14] Kadlec and Zelicoff, no. 10, p. 13.

[15] Mark Wheelis, Biotechnology and Biochemical weapons, *The Non proliferation Review*, vol.46,no.2 (spring)2002, p. 48.

[16] Kadlec and Zelicoff, no. 10, p. 16.

Biological weapon designers who apply the techniques of genetic engineering may attempt to create agents that possess all of the identified attributes and manifest each trait with maximized potency. In addition, there are fears expressed about the Human Genome Project (HGP). The HGP to be completed in 2005 will provide the entire human genome sequence.[17] HGP is important because it provides for an objectively manipulable biological science and can open up malign misuse of biology for the development of new weaponry. Information from such genetic research could be used for the design of weapons targeted against specific ethnic or racial groups.[18] Furthermore, the merging of chemistry and biology in the "genomics/proteomics revolution" significantly expands the threat potential.[19]

These new trends and developments have expanded the scope of biological weapons to include not only traditionally known pathogens but also genetically manipulated agents and bioregulators.[20] Bioregulators are naturally occurring constitute of a

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[17] Human Genome Project- A project which aims to establish links between genotype (genetic factors responsible for creating the phenotype) and phenotype (visible or otherwise measurable properties) of humans.

[18] Malcolm R. Dando, no. 12, p.128.

[19] Malcolm R. Dando, "Biotechnology and the Potential for Abuse", Summary Report, Biotechnology , Weapons and Humanity, An Informal Meeting of Government and Independent experts, Montreux, Switzerland, 23-24 September 2002, www.icrc.org/web/eng/siteeno,nst,30 May 2003.

[20] Malcolm R. Dando, no. 12, p.33.

victim's body and could be used to damage health by introducing unnatural quantities of it in the body. Modern day biological warfare agents include virus like dangue, small pox, hepatitis A, hepatitis B, rickettsia like epidemic coxillea burneti, bacteria like anthrax, cholera, plague and fungi like histoplasma, coccidioidomyiosis.(See Table 1)

The natural life cycle of these agents is different from their laboratory production. The facilities for the laboratory production of biological agents are the same as those used in legitimate vaccine or pharmaceutical plants.[21] Both include equipment and materials for microbial fermentation, cell culture or egg incubation and processes like harvest, purification and freeze-drying. The dual-use equipment is similar to that used in making beer, and can be acquired commercially without raising suspicion. The relevant design elements of a production facility for biological weapons will

[21] David Isenberg, " Quick Reference Guide to Biological technology Equipment" CBW DiscussionForum<cbw_sipri@sipri.se, 25 October 2002.

Table 1 Key Biological Weapons

Disease	Infectivity	Transmissibility	Incubation Period	Mortality	Therapy
Viral					
Chikungunya fever	high?	none	2–6 days	very low (–1%)	none
Dengue fever	high	none	5–2 days	very low (–1%)	none
Eastern equine encephalitis	high	none	5–10 days	high (+60%)	developmental
Tick borne encephalitis	high	none	1–2 weeks	up to 30%	developmental
Venezuelan equine encephalitis	high	none	2–5 days	low (–1%)	developmental
Hepatitis A	-	-	15–40 days	-	-
Hepatitis B	-	-	40–150 days	-	-
Influenza	high	none	1–3 days	usually low	available
Yellow fever	high	none	3–6 days	up to 40%	available
Smallpox (Variola)	high	high	7–16 days	up to 30%	available
Rickettsial					
Coxiella Burneti (Q fever)	high	negligible	10–21 day	low (–1%)	antibiotic
Mooseri	-	-	6–14 days	-	-
Prowazeki	-	-	6–15 days	-	-
Psittacosis	high	mod-high	4–15 days	mod-high	antibiotic
Rickettsi (Rocky Mountain spotted fever)	high	none	3–10 days	up to 80%	antibiotic
Tsutsugamushi	-	-	-	-	-
Epidemic typhus	high	none	6–15 days	up to 70%	antibiotic/vaccine
Bacterial					
Anthrax (pulmonary)	mod-high	negligible	1–5 days	usually fatal	antibiotic/vaccine
Brucellosis	high	none	1–3 days	–25%	antibiotic
Cholera	low	high	1–5 days	up to 80%	antibiotic/vaccine
Glanders	high	none	2–1 days	usually fatal	poor antibiotic
Meloidosis	high	none	1–5 days	usually fatal	moderate antibiotic
Plague (pneumonic)	high	high	2–5 days	usually fatal	antibiotic/vaccine
Tularemia	high	negligible	1–10 days	low to 60%	antibiotic/vaccine
Typhoid fever	mod-high	mod-high	7–21 days	up to 10%	antibiotic/vaccine
Dysentery	high	high	1–4 days	low to high	antibiotic/vaccine
Fungal					
Coccidioidomycosis	high	none	1–3 days	low	none
Coccidiodes Immitis	high	none	10–21 days	low	none
Histoplasma Capsulatum	-	-	15–18 days	-	-
Norcardia Asteroides	-	-	-	-	-
Toxins[a]					
Botulinum toxin	high	none	12–72 hours	high neromusclar paralysis	vaccine
Mycotoxin	high	none	hours or days	low to high	?
Staphylococcus	moderate	none	24–48 hours	incapacitating	?

[a]Many sources classify as chemical weapons because toxins are chemical poisons.

Sources: Adapted by Anthony H. Cordesman from Report of the Secretary General, Department of Political and Security Affairs, *Chemical and Bacteriological (Biological) Weapons and the Effects of Their Possible Use* (New York: United Nations, 1969), 26, 29, 37–52, 116–117; *Jane's NBC Protection Equipment*, 1991–1992; James Smith, "Biological Warfare Developments," *Jane's Intelligence Review* (November 1991), 483–487; and USACHPPM, *The Medical NBC Battlebook*, USACHPPM Technical Guide 244, 4-22–4-26.

Source:Anthony H. Cordesman, *Terrorism, Asymmetric Warfare, and WMD, Defending the US Homeland* (Westport, Connecticut: Praeger, 2002), pp.136-137.

will include containment, purification and sterilization equipment; ventilation and filtration systems; and storage methods. [22]

Containment measures protect the environment from the infectious nature of biological agents. To enhance the effectiveness of agents, a high level of purity is maintained through sterile air, steam or inert gas supply. Ventilation equipment like High Efficiency Particulate Air (HEPA) filters are used at two stages- primary barriers (separating product from operators) and secondary barriers (separating the product from contamination). Bacterial cultures are stabilized for storage or packaging by concentration and drying. Lyophilization (direct freeze-drying), ultra or deep freezing is the preferred method for long term storage of bacterial cultures.

The procedure used for the actual replication of an organism is a function of the organism itself but the techniques of replication include fermentation, cell culture, viral replication. Fermentation is carried out in vessels called bioreactors where cells are cultured under computer controls. The product of the fermentation process is powdered and milled to obtain particles with a diameter less than ten microns. These particles can be easily absorbed by human lung. The powder or alternatively, mud like liquid (slurry) thus obtained

[22] Ibid.

can effectively create aerosol clouds. Aerosol dissemination is the most efficient method for spreading biological agents.

The laboratory production of the best studied biological weapon, anthrax causing biological agent (*Bacillus anthracis*) involves four steps. These steps are germination, vegetation, sporulation, separation and weaponization.[23] In unfavorable conditions the bacterial cell dehydrates and the cell wall hardens to protect the genetic material from decay. This protective mechanism generates spores. Spores can remain dormant and dangerous for years.[24] Sporulation is a key for the bacteria's survival in nature and also important for its use as a weapon. The fourth step, separation of spores from debris, demands time, special equipment and intensive labour. After this key step the obtained wet paste or a solid brick of spores is weaponized. Weaponization involves the turning of spores into superfine powder in large and expensive centrifuge and drying apparatus.

Although many biological agents can be used to make weapons, only a limited number can cause widespread illness and

[23] Edlake, "The Anthrax Cases", www.anthraxinvestigation.com , 11 March 2003.

[24] Kathleen C. Bailey, no.3, p.28.

death. These include anthrax, small pox, plague and hemorrhagic fever causing agents.[25]

In US, the Centre for Disease Control and Prevention Department (CDC) has classified biological weapon agents in three categories A, B, C on the basis of threat to national security, high mortality, potential for major public health impact and the requirement of special action for public health preparedness. The high-priority category A includes small pox, anthrax, plague, botulism, tularaemia and hemorrhagic fever pathogens.[26]

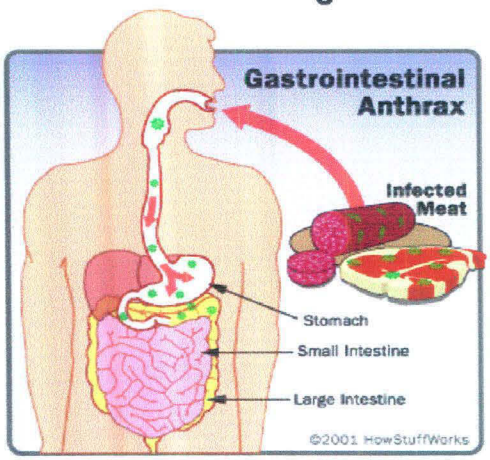
Anthrax: It is caused by *Bacillus anthracis*. This bacterium causes inhalation, cutaneous or intestinal anthrax in the victim. Inhalational anthrax is highly contagious. After the exposure to the spores, a number of toxins are released in the victim body, leading to internal bleeding in the space between lungs. Death occurs within 24 to 72 hours after symptoms appear. The vaccine to prevent this disease exists but is not widely available. (Refer to Figure 2)

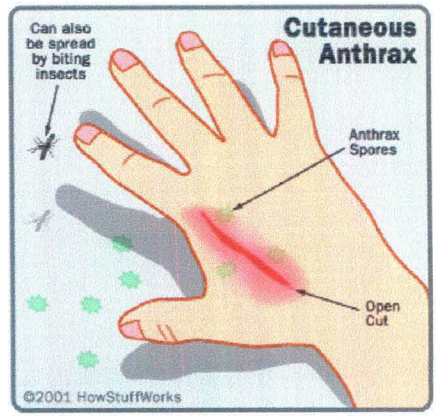
Small pox: The pathogen for small pox is a virus termed variola major. This pathogen travels from lungs to lymph nodes to numerous internal organs and skin. Symptoms include muscular pain, fever, vomiting and spasms. Death occurs in thirty percent of

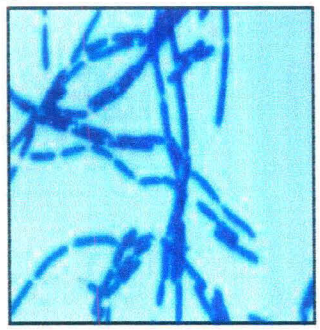
[25] Thomas V. Inglesby, "The Germs of War", *Strategic Digest*, May 2001, p. 605.

[26] Anthony H. Cordesman, *Terrorism, Asymmetric warfare and WMD, Defending the US Homeland* (Westport, Connecticut: Praeger, 2002), p. 135.

Figure 2 Infection of Anthrax

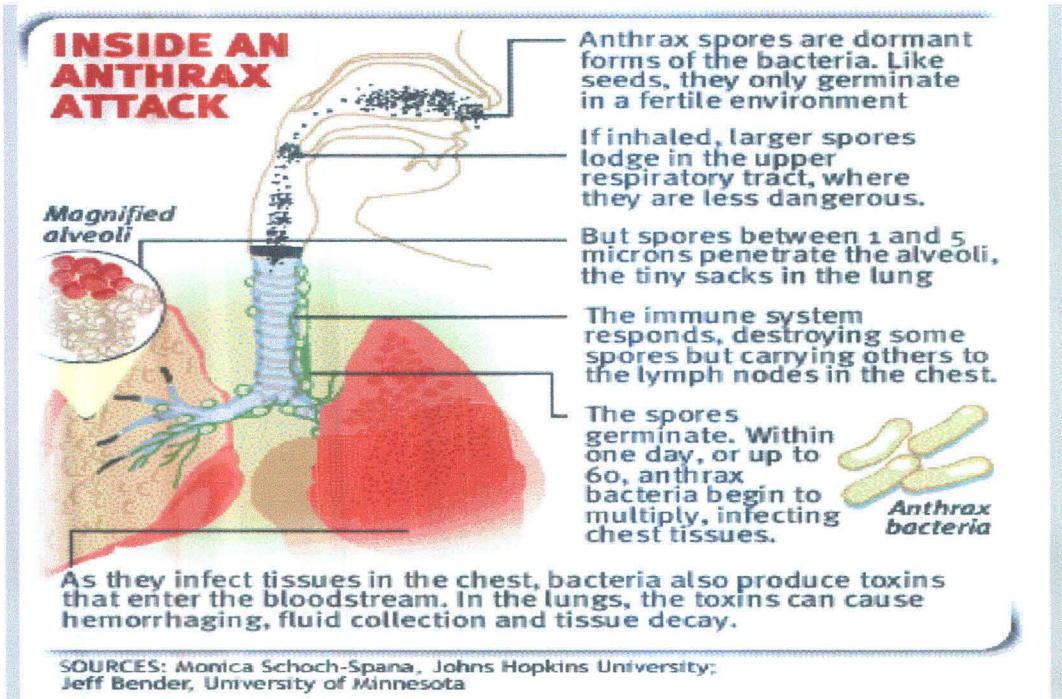






The anthrax bacteria, *bacillus anthracis*, as seen under a microscope. (Image: University of California -Davis)

Inhalation Anthrax



unvaccinated people. In theory, small pox was eradicated in 1977. At present only Russia posses and US two highly controlled samples of the pathogen. The vaccinations to prevent small pox, once universally available, have now stopped.

Plague: The bacterium *Yerisinia pestis* is the pathogen of plague. After inhalation, the victim's air pockets in the lungs are severely infected and marked by bloody sputum and rapid deterioration. Death will occur because of blood infection. The control of disease is possible only in the early stages by administering antibiotics like streptomycin.

Haemorrhagic Fever: various viruses like filo and arenaviruses will attack small blood vessels, increase permeability and cause uncontrollable internal bleeding. Gradually, massive hemorrhage in mucous membranes, skin and internal organs leads to death. Some of these viruses have mortality of ninety percent. Preventive therapies are available only for a few of the pathogens.

Military Potential of Biological Weapons

The dual use technologies will facilitate any covert biological weapons programme. However, the acquisition of biological agents by the states, is a complex and time-consuming process. According to scholars this process comprises of seven stages-

1. Policy review and decision to initiate an offensive program
2. Budgetary estimates and resource allocation
3. Research and development
4. Agent production
5. Design, test and build munitions
6. Acquire delivery systems
7. Acquire operational capability, develop battle plans, train troops to use biological weapons, integrate weapons, logistic and plans into military forces.[27]

While the first three stages are theoretical, practical procedures start from the fourth stage. The production, storage and stockpiling of offensive biological agents for a state are not difficult. The caveats lie in using these agents. Fermentors, centrifuges, purification and other laboratory equipment are used not only by the biomedical community but have other academic and commercial applications as well, such as wineries, milk plants, pharmaceutical houses and agricultural products.[28] The production of biological agents can be easily concealed under the rubric of pharmaceutical industry or public health management systems.

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[27] R. A. Zilinskas, Verification of the Biological Weapons Conention in E. Gressler, ed., *Biological and Toxin Weapons Today* (Oxford: Oxford University Press) for SIPRI and Traffic of Technology Assessment, Technologies Underlying Weapons of Mass Destruction. OTA-BP-ISC-IIS. December, United State Congress, Washington D.C. in Malcom R.Dando, no. 7, p. 140.

[28] David Isenberg, no.21.

Environmental decay after release, lack of predictability of effects and time taken for the symptoms to appear are some of the factors that limit the use of biological agents against military forces.[29] The effect of this weapon is contingent on the susceptibility and immunity of animate targets, which differs radically. There is a major risk that the wrong area of the enemy gets contaminated. Persistent agents may contaminate the ground, which the user wants to cross or occupy and force the use of protective measures or decontamination. The use of protective gear, equipment, drugs and medicines will reduce the harmful effects of biological weapons. When compared to chemical agents, the use of biological agents is more likely to cross the threshold, where nuclear retaliation seems justified.[30]

Biological weapons cannot effectively be used as a deterrent. Deterrence is credible, only if it can be clearly demonstrated. Biological weapon deterrence requires delivery system and communication to the enemy. Both these measures are gross violation of international norms and lead to reputational costs for the state. Given these limitations, the question of adopting the use of biological weapon by a state could be taken up only as a weapon of

[29] Susan Martin, "The Role of Biological Weapons in International Politics: The Real Military Revolution" *The Journal of Strategic Studies*, vol.25, no.1, March 2002, pp.63-98.

[30] Anthony H. Cordesman, no.26, p.99.

last resort. The other ways involving state use could be economic warfare against enemies, crops or livestock or attacks on cities, bases or by sponsoring terrorist activities.[31]

There has been no decisive use of biological weapon in a battlefront. This is because though organisms are excellent killing machines, they make poor military weapons.[32] The allegations of German sabotage operations in World War I are not based on conclusive evidence. [33] In the early 1930s and until the end of World War II, Japan conducted research of biological agents and dissemination devices. Japan also conducted human experiments and tested biological weapons during military operations in China and against Soviet Union troops.[34] No threat, evidence or actual use of biological weapons by a state has been established thereafter.

Non-state actors like extremists, terrorist groups or groups sponsored by a state, face fewer challenges in using biological weapons. However, terrorist working outside a state run laboratory infrastructure would have to overcome extraordinary technical and operational challenges to effectively and successfully weaponize a

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[31] Edward M. Spiers, *Weapons of Mass Destruction, Prospects for Proliferation* (London: St.Martin Press, 2000), p.24.

[32] Ed Regis,no.7.

[33] Jean Pascal Zanders et.al.,Biotechnology and the future of Biological and Toxin Weapons Convention, *Sipri Fact Sheet,* November 2001,p.1.

biological agent sufficient to cause mass casualties. There are difficulties in acquiring, producing, handling or storing agents. There can be four primary acquisition routes that terrorists could pursue in acquiring biological agents.[35] They are, purchasing an agent from one of the world's 1500 germ banks, by theft, from natural sources, and from a rogue state, a disgruntled government scientist or a state sponsor.

In an event that a terrorist group becomes successful in acquiring the agent, obtaining a highly lethal strain is not an easy task. Weaponization of the strain, turning it into microscopic powder, is the second hurdle as it involves technical expertise and threat of accidental exposure to the agent. Further, aerosolizing, testing, disseminating and maintaining the virulence of the agent involves greater technical challenges.

Terrorist actions are not bound by traditional and universal moral standards. Their goal is to disrupt and destabilize a society by generating fear. Precisely because they are silent, stealthily, invisible and slow acting, germs are capable of inducing levels of anxiety approaching hysteria. However, the history of bioterrorism so far has not been a success story. A religious cult led by Bhagwan Shree Rajneesh carried out the first of its kind in Oregon, US. The

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[34] Ibid.

cult members hoping to disrupt an upcoming county election, contaminated local salad bars with salmonella, causing 751 cases of diarrhea.[36]

In direct contrast to the frequent public presentations, the technical challenges to produce an effective biological weapon are not simple and straightforward. In fact, the incentives and caveats which biological weapons provide to the state actors are the same for non-state actors. That is the reason the most catastrophic scenarios of biological terrorism threats, involving mass casualties, though possible, are not likely to occur. The major issue here is to correctly estimate the threat of bioterrorism, looking beyond sensationalistic media.

The rapid spread of biotechnology and related sciences is pivoted on its own dynamics. Their global reach cannot be stopped only delayed. However, any such steps will have to balance scientific temper and arms control measures. Attempts to achieve such a critical balance are evident in various international initiatives.

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[35] Anthony H.Cordesman, no.26, p.164.

[36] Laurie garret, "The Nightmare of Bioterrorism", *Foreign Affairs*, January/February 2001,p.81.

CHAPTER 3
NORM BUILDING

Historically, biological weapons have been held by a taboo against their use. This taboo is now at a risk because of the growing prominence of non-state actors (especially terrorists) in international system as also due to breakthrough in science and its spin off in the field of weaponry. Persistent difficulties regarding the use and acquisition of biological weapons might be overcome in the future, given the present potency of scientific developments. Also, the first use of biological weapons will be very shocking, the second lesser and so on.[1] One use by a state could prompt non-state actors to acquire and subsequently use biological weapons. Therefore it is imperative to direct present actions and strategies and actions to evolve mechanisms to safeguard the future.

The conditioning of action is a direct translation of our thoughts. There is a cyclical link between thoughts and actions. Our thoughts guide actions and these actions, in turn, influence and mould thoughts. The thought of aversion to the use of germs in warfare is evident in various human civilizations. The Manu Law of India, in 500 B.C. the Saracens, drawn from the Koran, a millenium

[1] Randall Forsberg, Driscoll, et.al, *Non proliferation Primer, Preventing the spread of Nuclear, Chemical and Biological Weapons* (Massachussetts: The MIT Press, 1995), p.21.

later and the widespread approbation of the use of arsenic smoke in the siege of Belgrade in 1456 are instructive.[2] The mode in which this normative point is carried forward has changed in accordance with time.

This chapter takes a look at the various routes which states have identified and followed to build norms against biological weapons. These routes have mainly branched into certain rights and obligations for the states.

The sovereignty of a state preserves its prerogative, to reap the benefits of technology and scientific development, though prohibitions are the main concern. Rights and obligations of a state try to grapple the potential of scientific and technological developments, thereby exercising a determining influence on its future. Technology is a social construct that embodies both moral and political values.[3] A general agreement on issues like provisions for the exchange of new ideas, national controls and the punishment of violators will ensure the safety of rights and obligations of the states.

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[2] Julian P. Robinson, "Germs, warfare and the human impulse to keep them apart", Biotechnology, Weapons and Humanity, Summary Report, An Informal Meeting of Government and Independent experts, Montreux, Switzerland, 23-24 September 2002, www.icrc.org/web/eng/siteeno,nst,30,May 2003.

[3] Richard Price, *The Chemical Weapons Taboo* (Ithaca and London: Cornell University Press, 1997), p.170.

A control regime is a fabric of international legal requirements reflecting and/or establishing accepted norms of natural behavior and mechanism to implement or operationalize these requirements.[4] Ideally, there are four major elements of an international control regime.[5] These include an international treaty, an international agreement, a verification mechanism and sanctions. With regards to biological weapons, an international treaty commits each party to give up their possession, threat of use, actual use or acquisition. Secondly, an agreement (or more rarely, a semi-formalized consensus) mandates national controls on trade in items crucial for developing or manufacturing biological weapons. Verification is a mechanism or procedure to ensure that parties to the treaty/agreement act in conformity with its obligations and the violations can be detected. A means of international pressure, sanctions are meant to force the violators to conform to treaty obligations. This framework forms the basis of classifying and arranging the various components of biological arms control measures. (Refer to Table 2) It also shows what rights and obligations are associated with each of these components, gradually leading to the building of norms against biological weapons.

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[4] J. Christian Kessler, *Verifying Nonproliferation Treaties, Obligation, Process and Sovereignty* (Washington DC: National Defense University Press, 1995), p. 9.

Table 2 Various *Components of Biological Weapons Control Regime*

International Treaty
1.Geneva Protocol 1925
2.Biological and Toxin Weapons Convention 1972
International Agreement
1.Australia Group 1985
2.Missile technology Control Regime 1987
3.Mendoza Accord 1991
Verification
1.Biological and Toxin Weapons Convention 1972
Sanctions to Seek Compliance
1.Action taken against Iraq

International Treaty

International treaties represent the most prevalent channel of norm building in international society. The immediate political situation influences the spirit or main focus of a treaty. The thrust of a treaty will also contribute to the character of the entire control regime. A delineation of the political circumstances behind the conclusion of

[5] Ibid.

Geneva Protocol and the Biological and Toxin Weapons Convention will provide useful insights about how political leadership and decision-making procedures were important factors towards norm building.

i) Geneva Protocol 1925

Geneva Protocol was an effort to put into practice the moral repugnance against biological and chemical weapons, thereby establishing a link between the two. This normative point was carried further, by provisioning for a ban on two categories of weapon. This was a major agreement banning the entire category of chemical and biological weapons. In the World War I there were widespread allegations of use of biological weapons. German secret agents targeted livestock with the agents of anthrax and glanders in Romania and the US from 1915-16, in Argentina from roughly 1916-18 and in Spain and Norway (dates and details are obscure).[6] After the world war ended, the League of Nations was established in 1919 for peaceful settlement of disputes and arbitration.[7] The Geneva Protocol can be regarded as the first manifestation of the objectives of League of Nations.

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[6] "History of biowarfare" www.pbs.org/wgbh/nova/bioterrors, 11 September 2001.

[7] Blacker and Duffy, *International Arms Control Issues and Agreements* (Stanford, California: Stanford University Press, 1984), p. 21.

At times Geneva Protocol is also referred to as "no first use" protocol. The state parties could retaliate if biological or chemical weapons were used against them. This protocol prohibits the use of germs or chemical weapons. The state parties were "bound as between themselves according to the terms".[8] The protocol contains no verification or compliance mechanism and does not restrict research and development of biological weapons. Japan and United States refuse to ratify the agreement in 1925. It took fifty years before the US senate voted to verify it. Many states signed the Protocol from 1960s onwards along with decolonisation. At present 132 states are parties to the protocol. On its 75th anniversary, June 2000, its importance was highlighted by US President Bill Clinton as "a major step forward protecting the world from dangers of weapons of mass destruction".[9] Geneva Protocol in much sense is a precursor to BTWC.

This Protocol laid down no specifications for settling disputes or operations of its terms. It was based on the spirit of mutual trust of parties, which could be broken if deemed necessary. Several scholars' doubt whether Geneva Protocol really dissuade state

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[8] Protocol for the Proliferation of the use in war of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare ["Geneva Protocol"] signed in Geneva, Switzerland, June 17, 1925.

[9] http://www.acronym.org.uk/47anniv.htm

parties from using biological weapons in World War II. The belief is that belligerents refrained from using chemical and biological weapons, largely because they feared retaliation and perception of limited likely military gains from use.[10]

ii) Biological and Toxin Weapons Convention 1972

Post World War II, the allegations of the use of chemical weapons sparked off voices to urgently address the issue of possible health hazards through the release of chemical and biological agents. The centers of these intense reactions were two incidents. The first was the news of the US use of defoliants and tear gas in the war against Vietnam. The second was the killing of six thousand sheep in Utah because of the accidental release of nerve gas from a US army ground. There were both international and domestic reactions to the use of chemical weapons.[11]

The Conference of the Committee on Disarmament (CCD), an international group of experts was commissioned by the UN General Assembly to study chemical weapons and biological weapons. In US, President Nixon declared to abide by the terms of Geneva Protocol and unilaterally renounced biological weapons. At that time

[10] Philip J. Farley, "Arms Control and US Soviet Security Co-operation" in George, Farley and Dallin eds., *US—Soviet Security Co-operation: Achievement, Failures and Lessons* (Oxford :Oxford University Press, 1988), pp. 620-621.

[11] Blacker and Duffy, no. 7, p. 142.

lack of field testing and unproven military potency of biological weapons as compared to chemical weapons, gave thrust to biological weapons control. The persistence of Soviet Union to link chemical weapons and biological weapons was eventually given up and its allies and US dropped the issue of verification. Moscow and Washington viewed the convention as a means to maintain momentum on arms control to find yet one more area in which the USA and USSR shared a common interest in restraint.[12]

On April 10 1972, a convention of unlimited duration, on the prohibition and stockpiling of Bacteriological (Biological) and toxin weapons and on their destruction (the Biological and Toxin Weapons Convention) was signed. It contains fifteen articles. Article I prohibits development, production, stockpiling, or retention of microbial, biological agents or toxins "of types and in quantities" without justification for peaceful purposes and means of delivery, used in armed conflict. Under the terms of Article II the state parties are obligated to destroy all such weapons in a period of nine months after the entry into force of the treaty. Article III restricts the transfer, assistance, encouragement or inducement to "any recipient whatsoever" for the manufacture of acquisition of agents, toxins,

[12] Nicholas A. Sims, *The Diplomacy of Biological Disarmament; Vicissitude of a Treaty in Force, 1975-85* (New York: St. Martin's Press, 1988) ,in Kessler, no. 4, p. 53.

weapons and the means for using such agents. Article X has provisions for the exchange of equipment, materials and information about the use of biological agents and toxins for peaceful purposes. It ensures the promotion of economic or technological development of state parties by "international exchange of biological agents, toxins and equipment" for the purpose of peaceful uses.

The issue of verification is not dealt with in detail by the convention. In order to resolve mutual problems and disputes Article V has provisions for consultation between the states. Article VI provides obligations for compliance by the state parties. There is no provision for on-site inspection keeping in mind the clandestine nature of biological weapons. This convention endorses the role of UN as an international organisation unlike any other agreement since the procedures for investigation are to be carried out by the UN Security Council. In a field where technology inventing itself a new, review conferences can help update and strengthen the convention according to the imperatives and requirements.

The Biological and Toxin Weapons Convention will be added by the draft Convention on Criminalisation of Biological and Chemical Weapons. This convention is prepared by a working group

from the Harvard Sussex Program and is in draft form.[13] It provides judicial proceedings for a state to punish criminal actions of producing, using stockpiling biological weapons and chemical weapons. This convention highlights the role of individuals in strengthening the norms against biological weapons and chemical weapons. The need for such a convention primarily rose because of the recent world events, particularly the anthrax attacks in US mainland.

International Agreement

One of the main reasons for the proliferation of biological weapons is the transferability of biotechnology techniques and processes across the states. In order to restrain the control of sensitive information, equipment and agents, several steps have been taken at the international level. These include the Mendoza Accord, Australia Group and Missile Technology Control Regime.

i) The Mendoza Accord 1991

The Mendoza Accord is a joint Declaration of Argentina, Chile and Brazil in 1991. It commits the parties not to develop retain, transfer or use biological and chemical weapons. They preserve the right to

[13] The Draft Convention on the Prevention and Punishment of the crime of Developing, Producing, Acquiring, Stockpiling, Retaining, Transferring or Using Biological or Chemical Weapons.

use all peaceful application of biology for economic technological development and well being of the citizens. This is a regional agreement. The parties have also been committed to establish on a "national basis" appropriate "inspection mechanism" necessary for the implementation of the accord. Other states of the region Bolivia, Ecuador, Paraguay and Uruguay have also since signed this agreement.

ii) The Australia Group 1985

In an attempt to stop the spread of chemical weapons to Third World countries, in 1984, Australia proposed to the Organization for Economic Co-operations and Development (OECD) to establish control on the exports of ingredients used to manufacture chemical weapons.[14] The Australia Group, an informal association was established in 1985. Group members administer a common list of items, subject to national export controls, co-ordinate approaches to export licensing procedures, consult and exchange information on matters relating to export request which could potentially end in the proliferation of chemical and biological weapons. In addition they brief non-group members on the activities and purposes of the

[14] Backer Spring, "The Chemical Weapon Convention: A Bad Deal for America" in Brian Solomon, ed., *Chemical and Biological Warfare* (New York: The Wilson Company, 1999), p. 50.

group.[15] The transfer of biological warfare agents, equipment for production and organisms are resented. It does not have the power of a treaty. Presently, there are thirty-four parties to the group including the European Commission, UK and US.

iii) Missile Technology and Control Regime 1987

Just like the Australia Group, trading diplomatic notes carries the commitments of this informal regime. The regime lays down "a strong presumption to deny", exports of cruise missiles and rockets, with a delivery capacity of 500 Kg. warhead 300 Kms. . Delivery attractions of cruise missiles for a biological weapons attack have increased with the increased accuracy offered by guidance technology, such as global positioning system (GPS). Missile components like engines and guidance sets are also denied except under mutual governmental assurance.

Verification

Verification is the backbone for the success of any international treaty. Destruction or control of proliferation of any weapon is not possible unless its existence is verified. Biological weapons use the same technology that is used for producing medicine, drugs, and

[15] Steve Tulliu and Thomas Schmalverger, *Coming to Terms with Security: A lexicon for Arms Control and Disarmament and Confidence Building* (Geneva: UNIDIR, 2001), p. 66.

fertilizers. Moreover, biosciences are re-inventing and progressing each day. Under these circumstances a verification mechanism agreed upon in past would be ill equipped to handle emerging challenges. The Review Conferences after every five years, provisioned in the BTWC, can ensure verification measures and strengthening the convention itself in the wake of these new threats.

First Review Conference

It was held in 1980. According to Nicholas Sims, the inclination to strengthen the BTWC in this Review Conference was "virtually taboo".[16] This Review Conference made progress by classifying terms and specifying a consultative procedure.[17] The Declaration of the Conference notes the confidence-building value of voluntary declaration by parties concerning past biological weapons and steps to eliminate such programs.[18] A party dissatisfied with the outcome of bilateral efforts to resolve a compliance concern (Article VI) "could bring it before the collectivity of states parties, represented by their experts in a veto-free setting".[19] The differences between Britain, Sweden and Soviet Union regarding consultation for allegations of

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[16] Nicholas A. Sims, "The Second Review Conference on the Biological Weapons Convention", in Susan Wright, ed., *Preventing a Biological Arms Race* (Cambridge: The MIT Press, 1990), p. 268.

[17] J. Christian Kessler, no. 4, p.56.

[18] Ibid.

[19] Nicholas A. Sims, no. 12, p. 269.

violations were resolved in the end. The British ambassador Mr. Summerhayes concluded that the consultative committee at expert level could be convened "by depositaries".[20] This meant that the veto of permanent member of Security Council could now not prevent any investigation of a formal complaint.

Second Review Conference

US accusations of Soviet violation preceded this Conference of 1986. US alleged that the outbreak of anthrax at Sverdlovsk was the result of an explosion at an illegal bioweapons facility. In addition it was claimed that the Soviet Union was using biological agents in Laos, Kampuchea and Afghanistan.[21] Once again verification was the contending issue. In absence of thorough examinations the US allegation could not be proven. The lack of institutional mechanisms for resolving accusation by a state party was the main issue in the Final Declaration of the Second Review Conference. The declaration "stresses the need for all states to deal seriously with compliance issue and emphasize that the failure to do so undermines the Convention and the arms control process in general".[22]

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[20] Nicholas A. Sims, no. 16, p. 168-190.

[21] J. Christian Kessler, no. 4, p.59.

[22] Final Declaration of the Second Review Conference, BWC/CONF. 11/13

The co-operation of states with the consultative meeting to consider problems, resolve matters was considered important. The scope of "consultative meeting" was expanded to suggest ways and means with the assistance of technical experts for resolving problems and initiate international procedure within the UN framework. "In order to prevent the occurrence of ambiguities, doubts and suspicions", while investigating non-compliance complaints, four broad measures were identified. These were firstly, exchange of data on research centers, laboratories and secondly information on outbreaks of infectious diseases and occurrences caused by toxins. Thirdly, to encourage publication of biological research in journals for the benefit of international community. Lastly, actively promote contacts among scientists engaged in biological research.

The mode of data exchange was to be finalized by an ad hoc meeting of "scientific and technical experts" from the parties. Herein for the first time the issue of non-compliance allegations was referred to a non-political organization. It was expressed in the conference that Security Council, "may, if it deems it necessary, request the advice of the World Health Organization in carrying out any investigation of complaints lodged with the council". The Second Review Conference achieved success by establishing a procedure

for investigation and evaluating accusations of non-compliance in a less political and confrontational forum than Security Council and by composing various modalities on the state parties.[23]

Third Review Conference

It was held in September 1991. The measures in the Final Declaration of the Third Review Conference were based on the earlier two conferences. Compliance related elements of the regime were also extended in this Conference. Apart from the earlier four, five new measures to be implemented "on the basis of mutual co-operation of states parties" were introduced.[24] The new measures included active promotion of contacts, declaration of legislation, regulation and other measures, declaration of past activities in offensive and/or defensive biological research and development programs, declaration of vaccine production facilities, annual declaration of nothing or nothing new.[25]

The final declaration expressed the view "to establish an Ad Hoc Group (AHG) of Governmental Experts open to all states parties to identify and examine potential verification measures form a scientific and technical standpoint".[26] This group of experts would

[23] J. Christian Kessler, no. 4, p.61

[24] Final Declaration of the Third Review Conference, BWC/CONF. 23, Article I

[25] Ibid.

[26] Ibid.

evaluate the technical capabilities of possible verification measures.[27] This group could identify measures that could determine whether a state party is developing, producing, stockpiling, acquiring toxins or biological agents "of types and in quantities" or "weapons equipment or means of delivery designed to use such agents or toxins".[28] The requirement to respond to an alleged non-compliance to the Convention was made more detailed and time bound. The conclusion of the Third review Conference transformed the format of BTWC. If all these steps were fully implemented, the BTWC would have become a disarmament treaty with significant teeth.[29]

The AHG of Governmental Experts to identify and examine potential verification measures from a scientific and technical point became known as "VEREX". This group identified several offsite and onsite measures. They included information monitoring methods, data exchange measures, remote sensing technologies and inspection related activities, exchange visits, inspection techniques and continuous monitoring technologies. Considering the doubts of several countries, especially the US regarding the

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[27] Ibid.

[28] Ibid.

[29] J. Christian Kessler, no. 4, p. 66.

available technical measures to provide verifications VEREX stressed to provide another alternative, confidence building measures. The exchange of biotechnology industrial trade secrets or commercial proprietary information (CPI) also received particular attention.

In 1994 a special Conference was convened to examine the VEREX Final Reports. This Conference converted the scientific and technical findings of VEREX into the basis for diplomatic efforts.[30] The special conference stated a gradual approach towards verification. The Conference concluded with the proposal for establishing an AHG "to consider appropriate measures and draft proposals" to become part of "a legally binding instrument".[31] The AHG was established in 1995 and started work to conclude a verification protocol. The complexity of a verification regime can be understood by the fact that the AHG failed to complete its task for the Fourth Review Conference held in 1996. This conference encouraged the group to review its method of work and move to a negotiating format in order to fulfill its mandate against all expectation.[32] However, no deadline was specified for the group to

[30] Nicholas A. Sims, *The Evolution of Biological Disarmament* (Oxford: Oxford University Press, 2001), p. 103.

[31] Special Conference document BWC/SPCONF/1, 1 Oct. 1994 in Nicholas A. Sims, no. 29, p. 110.

[32] Nicholas A. Sims, no. 30, pp. 12-116.

complete the negotiations. The Review Conference expressed the view that the AHG would be able to complete its work at the earliest date.

The AHG deliberations and efforts to prepare a verification protocol for the Fifth Review Conference (November 2001) received a serious blow, when the US rejected the draft protocol text and terminated the mandate of the AHG. Resultantly, the Fifth Review Conference opened with a certain amount of trepidation.[33] In his remarks to the Review Conference meeting John R. Bolton, Under Secretary for Arms Control and international security, US, categorized the agreed protocol as flawed and "better than nothing". It was reasoned that "countries that joined the BTWC and then ignore their commitments and certain non-state actors would never have been hampered by one protocol".[34] US came up with its own proposals for strengthening the convention. These were primarily focused on voluntary, national efforts.[35] The final meeting of the Fifth Review Conference was suspended to avoid a total failure of

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[33] Jean Pascal Zanders, "Successful Conclusion of Fifth Review Conference in sight", *www.CBWDiscussionForum*<cbw-sipri@sipri.se, 25 December 2002.

[34] John R. Bolton, "Biological Weapons Convention". *www.state.govt/us/rm/janjuly/6235.htm* , 1 June 2003.

[35] Elisa D. Harris, "Chemical and Biological Weapons, Prospects after September 11" www.brook.edu/press/review/summer/harris.htm , 7 May 2003.

the Review Conference.[36] A plenary session of the state Parties to the Fifth Review Conference was reconvened in November 2002. An agreement on the president's proposal for annual meetings, "both of experts and of state parties" in the run up to the Sixth Review Conference to be held in 2006 was concluded.[37] The topics for consideration for the annual meeting in 2003 are-

(i) The adoption of necessary measures to implement the prohibitions set forth in the convention, including the enactment of penal legislation.

(ii) National mechanism to establish and maintain the security and oversight of pathogenic microorganism and toxins.[38]

The US rejection has completely stalled the protocol process. The reasons for US action lies in the justifications it provided. The administration argued that such a protocol was too weak and too strong, too weak to catch the cheaters, too strong to avoid putting at risk US biological defence or trade secrets.[39] The distinction between offensive and defensive research is possible only if the biotechnology industrial sector, independent scientists, researchers

[36] John R. Bolton, no.34.

[37] Draft Decision of the Fifth Review Conference of the Parties to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) Weapons and on their Destruction, BWC/CONF. V/CRP. 3

[38] Ibid.

at the universities co-operate in sharing information. This demarcation will also help in identifying cheaters.

Sanctions to seek Compliance

Sanctions involve economic or military action to coerce a state to conform to agreement. There are several arguments whether sanctions can really carry a normative point forward. Marginalising a state from international politics will disrupt its social life, effect the economy and generate public resentment. Domestic changes like these could force a state to comply with the terms of international treaty.

As a result of the US "rogue doctrine" the autocratic regime of Iraq, possessing WMD, was considered as a threat to national security and world peace. Iraq was the target of economic sanctions under the framework of UN and subject to military action, led by UK and US, to force compliance. Iraq has signed the BTWC in 1991. After the Gulf war, the US government passed the Act of 1991, the Chemical and Biological Weapons control and elimination. This law prohibits procuring any goods or services from the sanctioned entities and their import to the US. Since 1994, a number of foreign entities in several countries have been sanctioned. Under the Iran-

[39] Elisa D. Harris, no.35.

Iraq Act of 1992, the US government shall not procure, or enter into any contract of goods, services or technology from the sanctioned persons or entities, or issue any license for export for two years. In accordance with the resolution 687 dated 3 April 1991, of Security Council, Iraq was required to disclose and eliminate its WMD arsenal, including biological weapons program and missiles with a range of more than 150 Km.[40]

The United Nations Special Commission (UNSCOM) was set up to implement the provision of the resolution. This resolution also called for "on site inspection" and the development of a mechanism for monitoring sales or supplies by other countries to Iraq of dual use items that might have applications in weapons programs prohibited to Iraq.[41] Iraq denied having biological weapons program and officially ended UNSCOM weapons on site inspection in 1998.

UNMOVIC

The United Nations Monitoring, Verification and Inspection Commission (UNMOVIC) was to replace UNSCOM to continue the latter's work and to operate a system of ongoing monitoring and verification to check Iraq's compliance with its obligations.[42] The Executive Chairman of UNMOVIC Dr. Hans Blix pointed that unlike

[40] United Nations Special Commission, *www.un.org/Depts*.

[41] Ibid.

earlier times Iraq had started co-operating in their operation. However, UK and US maintained that Iraq was in possession of deadly WMD, a threat to security and world peace. This perception was the main reason for the US aggression on Iraq in March 2003.

Nevertheless, sanctions against Iraq achieved one major feat, after the end of war no concrete evidence of the alleged Iraqi WMD program could be found.

The existence of all the four components of a control regime indicates that norms to ban and prevent proliferation of biological weapons have evolved from their nascent stage. The heart of the problems in the further evolution of these norms is the verification process. Unlike CWC, BTWC has no organisational setup to cater to verification and related problems. The various Review Conferences of BTWC have taken into account scientific and technological developments. These Conferences have also set the stage for compliance and verification mechanisms. The complexity of these two issues is because of the technological difficulties and the number and the interests of the parties involved.

To conclude, therefore, any successful conclusion of an agreement pertaining to the verification and compliance of biological weapons will involve the convergence of the satisfaction of interests

[42] UNMOVIC: Basic facts, *www.un.org/Depts*, 13 March 2002.

of various biotechnology research and associated labs, willingness of scientific community and researchers to share information and most importantly the commitment of states. Unless these issues are resolved norms against the production of biological weapons cannot be effective. Perhaps, only the norms against the use of biological weapon can be well articulated.

CHAPTER 4
PROGRESSION OF NORMS

The changing face of scientific developments and weak enforcement mechanisms challenges the progression of norms against biological weapons. Powers create norms.[1] The powerful and the rich have historically set standards of many aspects of our everyday life. Once created norms have "inertia". Their creators may have withered away but the norms continue to exist.

One major problem with the maturity of norms is related to their operational aspects since the international domain is unregulated and anarchical. In addition, value considerations providing the foundations for the generalized attitude are rather weakly articulated in politics.[2] Also, countries violate norms on one pretext or other. This happens when countries feel that norms are an impediment to the political, economic or strategic aspirations of the power concerned, even if this is contrary to the accepted patterns of international behavior. Conformity to norms and the arrangements of the enforcement agency are crucial factors in the progression of a norm. Rewards are incentives for the progress of norms. This reward can take different forms, be it, avoidance of

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[1] Gary Goertz, *Contexts of International Politics* (Cambridge: Cambridge University Press, 1994), p. 247.

punishment or approval of associates. The benefits of mutual approval of states and sharing of information by the biotechnology industry could incite states to follow norms against biological weapons.

This chapter brings out how the norms against biological weapons have fared in international relations? What are the major weaknesses in operationalizing these norms? The first section of this chapter is an overview of the drawbacks inherent with the enforcement treaty mechanisms. The second section takes account of actors like states, people and biotechnology firms and assesses their role in building norms against biological weapons.

Politics of Enforcing Norms

The fundamental conditions for policing any behavior require precise directions and setting of standards that remain vulnerable, given the loopholes in both BTWC and the Geneva Protocol. The scope of the Protocol and BTWC is broad, text ambiguous with lot of omissions and exclusions. There is no clear demarcation between prohibited and permitted activities. The issue of verification and compliance is another troubleshooter.

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[2] Hasenclever, Mayer and Rittberger, *Theories of International Regimes* (Cambridge: Cambridge University Press, 1997), p.61.

The basic prohibition of biological weapons is enshrined in Article I of the BTWC. State parties have repeatedly drawn attention to the weakness of this Article in various Review Conferences. It has been stated that the scope of its terms "microbial or other biological agents or toxins or whatever their origin or method of production" is ambiguous. The Fourth Review Conference tried to specify "technological developments" in the fields of "microbiology, biotechnology, molecular biology, genetic engineering and any applications resulting from genome studies". However, it missed inclusions like bio regulators, use of pests or riot control agents, which can be exploited for malign use.[3] A lack of prohibitory provisions in BTWC regarding these agents can aid states in acquiring and using them.

There is no distinction between permitted and prohibited activities or an objective criterion for deciding the quantities of agents. In addition, the incorporation of term "hostile purpose or in armed conflict" in Article I to restrict non-peaceful use of biological weapons is expansive. Hostile purpose is broader than armed conflict, which, in turn, is broader than war.[4]

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[3] Graham S. Pearson, "Opportunities for the Fifth Review Conference ", *Disarmament Forum*, four, 2000, p. 28.

[4] Mark Wheelis, "Biotechnology and Biochemical Weapons", *The Non proliferation Review*, vol.46,no.2 (spring)2002, p. 52.

The Oxford English Dictionary definition of verification is "the action of demonstrating or proving to be true or legitimate by means of evidence or testimony". Verification as a process serves multiple functions. It provides evidence, thereby reassuring the status of a state. Verification performs the role of deterrent. It will put restrains on states, which intend to violate. A fourth concept of verification is a process ideally a co-operative one.[5]

The BTWC lacks verification and compliance mechanisms. Many issues regarding verification, including the very word verification should or can be applied to BTWC continues to divide the countries.[6] The fact that biological weapons can be clandestinely manufactured in small quantity guides the US stand on non-verifiability of BTWC. It stems from the belief that the convention understands this concept for other arms control agreement and no verification regime can be devised to make it so.[7] Important issues related to verification such as, on site inspections, the specification of type of visit, duration, work and selection of inspectors' have not been agreed upon.

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[5] For details, refer to Daniel Feakes, " Evaluating the CWC Verification System", *Disarmament Forum*, four,2002,pp.11-22.

[6] Ibid.,p. 11.

[7] Marie Isabelle Chevrier and Amy E. Smithson, "Preventing the Spread of Arms: Chemical and Biological weapons" in Larren and Rattray, eds., *Arms Control Toward the 21st Century* (Boulder, Colorado: Lynne Rienner Publishers, 1996), p. 224.

The close associations of legitimate pharmaceutical activities and public health measures with a possible biological weapon program is a difficult issue to resolve. Any, verification and compliance measure which sets out to establish prohibited and permitted activities will invariably effect security information and commercial proprietary information (CPI).[8] The verification protocol published after every negotiating session contains a statement for selection of agents and the list of agents being considered.[9] Countries are divided on the issue whether to include a comprehensive list according to current developments or a simple list of agents to simplify compliance matters. Some headway was achieved in resolving verification and compliance related problems at the conclusion of the Third Review Conference in 1991. Following its report a new AHG was established to recommend a legally binding proposal for strengthening the ~~of~~ verification procedures of BTWC. US rejected the draft protocol thus achieved after six years in 2001.

The need to co-operate in the "development and application of scientific discoveries" is the main focus of Article X of the convention. It is the source of a major divide between developed

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[8] Ibid.,p.220.

[9] Malcolm R.Dando, *The New Biological Weapon: Threat Proliferation and Control* (Boulder,Colorado: Lynne Rienner Publishers, 2001), p. 14.

and developing countries party to the treaty.[10] The developed countries are inclined to provide voluntary technical help than mandatory assistance to developing countries. Unlike the latter, developed countries give more importance to address the problem of verification than the activation of Article X. Some provisions of this article regarding trade in equipment, pathogens and toxins are in direct conflict with those of the Australia Group. Whereas, Article X provides for "the right to participate in the fullest exchange of equipment, materials..."

Australia Group restricts trade in certain equipment, pathogens and toxins. Countries that are at a receiving end because of inactivation of Article X pointed out that their pharmaceutical activity and domestic public health is being adversely effected. On the other hand countries endorsing export controls rely on Article III of BTWC which restricts transfers to any recipient. Thus, both Article X and Article III has provisions, which are used to justify stand and safeguard interests of the states. Measures to ameliorate this conflicting arrangement could include the improvement of bio-safety standards worldwide and system of facility inspections.

[10] Marie Isabelle Chevrier and Amy E. Smithson, no.7 , p. 215.

External factors that Hinder Norms

There is a wide gulf between a state's action and its meaning at the international and national level. When certain international norms are set, they are the result of the combined action of many states. Yet at the same time international norms must be present at the domestic level since individual states must finally implement them.[11]

At present there are 146 state parties to the BTWC. The high participation rate supports the proposition that a norm against biological weapons exists but does not prove its existence.[12] There is no objective basis to successfully prove the presence of a biological weapons program or otherwise in a state. Lack of definitive standards of proliferation or lack of corresponding assessment criteria means that there exists no consensus regarding when proliferation has occurred, or poses a risk to international security. Even the detection (if possible) of biological weapons cannot conclusively reveal the capability of a state to use them or their military potential. Moreover, most countries will not admit to having an active, dormant or a past offensive biological weapon program.

[11] Gary Goertz, no.1,p. 244.

[12] Nicholas A. Sims, *The Evolution of Biological Disarmament* (Oxford: Oxford University Press, 2001) for SIPRI, p.164.

The US remains to be the main source of information on proliferation developments. The US Department of Defense estimates in 2001 show that at least nine countries are potential threats because of their biological weapons program. These countries are China, India, Iran, Libya, North Korea, Pakistan, Russia and Syria.[13] It is believed that Syria and Pakistan have the resources and capabilities to support limited biological warfare research and development. A similar estimate in 1997 had listed seven such countries. However, compared to an earlier assessment four countries were conspicuously absent, namely Egypt, Israel, Taiwan and South Korea.[14] The uncertainties in all such lists are due to the difficulties in assessing biological weapons capability of a country.

A historical record suggests that a strong response to non-compliance has not been forthcoming. Even after repeated US claims of Soviet Union non-compliance of BTWC in 1980s, countries were unwilling to take action because the evidence was not deemed sufficient. The Sunshine project, an independent organization committed to bring issues of WMD proliferation in public domain,

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[13]Anthony H. Cordesman, *Terrorism, Asymmetric Warfare and WMD: Defending the US Homeland* (Westport, Connecticut : Praeger, 2002), pp.132-134.

[14]Office of Technology Assessment, Proliferation of Weapons of Mass Destruction: Assessing the Risks, OTA-ISC-559, Washington D.C. Government Preventing Office, August 1993, pp. –66 in Jean Pascal Zanders, "The Proliferation of Biological Weapons: A threat Assessment", *Disarmament Forum*, four,2000 p.9.

reveals in a report on 8 May 2003, that US has violated the terms of BTWC. The US army has developed and patented a new grenade that it says can be used to wage bio warfare. This disturbing revelation has though stirred no international reactions.

After the fall of Soviet Union, US started to focus its attention to the threat of proliferation of WMD in the Third World countries. For successfully controlling this new threat, military strategists demonized some of the Third World Countries as "rogues" or "outlaws". Thus, the rogue doctrine, which specifies the characterization of hostile (or seemingly hostile) Third World states with large military forces and nascent WMD capabilities, bent on sabotaging the prevailing world order.[15] In the 90s the official Pentagon list of rogues consisted of North Korea, Iran, Iraq, Libya and Syria. In 2002, US listed three countries, North Korea, Iraq and Iran in the axis of evil. UK and US were certain that Iraq was in possession of lethal weaponry that could threaten US security and imperil world peace. The BTWC protocol would have neither hindered nor stopped the biological weapons programme of Iraq.[16]

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[15] Michael Klare, *Rogue States and Nuclear Outlaws* (New Delhi: Universal Book Traders, 1995), p. 26.

[16] William Blum, "Anthrax for Export" in Brian Solomon, ed., *Chemical and Biological warfare* (New York: The Wilson Company, 1999), p.18.

However, it is now largely established that the US supplied Iraq with much of the raw material for creating a chemical and biological warfare program.[17] During the Iran-Iraq war (1980-1988), Iraq received the lion's share of American support because Iran was considered a greater threat to US interests. Representative Samuel Gojdension, Democrat of Connecticut, Chairman of House subcommittee investigating "United States Exports of sensitive Technology to Iraq", stated in 1991,

> From 1985 to 1990, the United States Government approved 771 licenses for the export to Iraq of $ 1.5 billion worth of biological agents and high-tech equipment with military application (only thirty-nine applications were rejected).[18]

Iraq did not use biological weapons against US forces in Gulf war of 1991 and 2002. Critics of the US policy argue that in dealing with Iraq, US was more concerned in maintaining its interest in the Middle East and in ensuring business for American Corporation and seemed less concerned about WMD proliferation threats. Several states view the articulated US stand against biological weapons as empty rhetoric.

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[17] John R. Bolton, "Remarks to the 5th Biological Weapons Convention Revcon Meeting", http://www.state.govt/us/rm/janjuly/6231.htm , 24 March 2003.

[18] William Blum, no. 16, p.22.

Major concerns of US in relation to biological weapons have revolved around the "horrifying prospects" of their terrorist use.[19] In US public discussion between the global proliferation and domestic terrorism are inclined towards the latter. Many, governments with exceptions of France and Israel do not give the same emphasis to the threat of bio-terrorism as US does.[20] Sensationalistic media and the ease to capture attention of key audiences on the subject have generated hype about bio-terrorism.

Although popular accounts are filled with scenarios of bio-terrorists, the technical expertise required to culture, transport and disseminate a virulent agent in sufficient quantities to cause disease is formidable.[21] According to US sources, no terrorist group has been associated with a serious effort to acquire any of the WMD.[22] There is agreement by most parties to the controversy that the probability of biological or chemical attack is extremely low, though not zero.[23] Given the historical record, current technical and political realities serious doubts have been raised whether the issue of

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[19] President George Bush "Address to General Assembly" http://www.state.gov/t/us/rm ,1 May 2003.

[20] Michael Moodie, "Fighting the Proliferation of Biological Weapons: Beyond the BWC Protocol", *Disarmament Forum*, four, 2002, p.38.

[21] Ed Regis, "Evaluating the Threat",*www.sciam.com*, December 2001, p.22.

[22] Anthony H. Cordesman, no.13, p.72.

bioterrorism should be the focus of current levels of investment and attention.

Factors like security concerns, economic and trade interests have influenced the reluctance of biotechnology industry to co-operate. Biotechnology firms and associated research labs are key components of any biological weapon program. It is in these laboratories that virulent strain, biological agents can be stored, produced, multiplied or altered to increase their lethality. Moreover, the ongoing researches will produce advances in medicine and basic science that can be carried for commercial or defense purposes and put to hostile use. Biotechnologies are supporting a socially beneficial, rapidly growing, investment rich, wealth creating and economically competitive industry.[24] When subjected to WMD controls, the negative impacts on this industry will be, loss of CPI, difficulties in collection of information for national authorities, to prepare facilities to receive inspectors, of accepting possible disruptions to production-scheduled necessitated by inspection. Out of these, loss of CPI or trade secrets is a very high cost to bear. Trade secrets provide cutting edge technology to these industries

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[23] Rosen P.,"Coping with bioterrorism" [editorial], BMJ, 2000 in H.Jack Geiger, "Bioterrorism Preparedness", *American Journal of Medical Health*, Vol. 91, no.5, May 2001,p.708.

[24] J.P. Perry Robinson, " Protecting Biotechnology from Biological weapons", www.jrc.es/pages/iptsreport/vol26, 2 June 2003.

and are achieved after a protracted investment of time, money and labour. A genetically modified organism used in the US for commercial production of insulin has been valued at more than a million dollars.[25] The editorial published in *Nature*, effectively sums up this issue that there are "no simple answers" to the dilemma about protecting information that could be used for malevolent purposes.[26]

It is imperative that any protocol devising WMD controls on the industry should notice that minimum harm is brought to it. The norms with regard to non-proliferation of biological weapons, therefore, should be set to increase transparency of activities involving key dual technologies. In the negotiation of the CWC, the related chemical industry played an important role. However, no such involvement of the biotechnology industry with BTWC is evident. This co-operation is essential for establishing effective controls on the proliferation of biological weapons and for the biotechnology industry itself. Otherwise, it might tarnish the image of the industry, lead to stringent export controls. Scientists could be reluctant to work and share knowledge with the industry.

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[25] Ibid .

[26] "The end of Innocence?" *Nature*, 15 November 2001, p. 236.

The promotion of advances in biosciences has brought to the fore the old debate about openness in scientific research. Scientists believe that the exchange of free ideas is essential to the development of any discipline. However, a number of publications with regard to the genome databases have alarming possibilities for any agency interested in the production of biological weapons. Another route for strengthening norms against biological weapons can be a robust public information campaign. A successful public effort will have to address two key issues.[27] How much information the government is willing to provide publicly? Secondly, how to ensure that this information is not endangering national security and scientific research interests. Governments make very ~~less~~ little information available about biological weapons proliferation, which is not effective to mobilize public responses.

The key issue is to strike a balance between business interests of these firms and the methods for restraining the proliferation of biological weapons. Some policymakers suggest that regulations controlling access to pathogens and related information should be tightened.[28] Recommendations like regulation of biological data and publication of manuscripts associated with "risky"

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[27] Michael Moodie, no.20, p.40.

[28] Jessica Stern, "Dreaded Risks and the Control of Biological Weapons", *International Security,* vol. 27, no. 3, (winter) 2002/03, p.112.

projects have not received favorable opinion by scientists. It has been felt that the public no longer shares the value of openness in scientific research. It will be in the benefit of scientists and researchers not to be seen as helping terrorists or compromising national security interests.

Civil society actors can also play an active role in informing the public. An official statement of ICRC (International Committee of the Red Cross), dated 25 September 2002, urged the military, scientific and medical professionals and those in the biotechnology and pharmaceutical industries to prevent the potential hostile uses of biotechnology.[29]

Various drawbacks are hampering the present status of norms against biological weapons as well as effecting any such result in the future. States have a major role to play resolving mutual differences on issues of concern, being transparent about their weapon's program and restraining proliferation of biological weapons through national means. Each party, the public, national security community and the research community should be made to understand the objectives and constraints of the others.[30] Although a difficult task to achieve, this common understanding will go a long

[29] "Bioweapons: ICRC urges stronger Controls", www.icrc.org/web/eng, 23 March, 2003.

[30] Gerald Epstein, "Controlling Biological Warfare Threats", in Jessica Stern, no.28, p.118.

way in creating the basis for building norms as with regards to non-proliferation of biological weapons as also mechanisms to make "norms" effective and efficient.

CHAPTER 5
CONCLUSION

Successive inventions and discoveries have changed the pace and nature of human life. Among others, the world has come to be described as a growing village with interdependency and connectivity amongst people, completely transforming the profile of international relations. The abolition of former distances means that we all now share common joys, but also misery and peril. The release, either deliberate or accidental, of biological agents is a threat that has recently come to occupy the centre-stage of strategic debates world over. This threat has put the lives of present and future generations in great danger. Heightened global concern, fostered by a greater interconnectedness, has created an awareness to combat the proliferation of biological weapons. It is in this context that this study approaches this problem in the framework of international norms.

The political history behind the conclusion of various treaties and agreements to ban WMD is traced in chapter 1. The idea of no-use of WMD, which germinated after World War II, was consequential for these major agreements. In Chapter 2 and 4 of this study what has particularly come into focus is the finding that the military potential of

biological weapons, whether for a state or terrorist group is not yet credible as a viable weapon of war.

The presence of normative ideas in our civilizations and the lapse of decades since the evolution of formal agreements, has led to an understanding of the four norms against biological weapons. Features of biological weapons like, production (proliferation), use and transfer are related to these four norms. They are: f*irstly*, biological agents should be produced, retained or developed only for peaceful measures or for preventing diseases; s*econdly*, countries should destroy within a fixed duration, the agents, toxins and means of delivery they possess; t*hirdly*, the use of biological agents as weapons in conflicts should be completely restricted; and l*astly*, the transfer of items and technology related to biological warfare to any recipient, by a state should be prohibited. The general acceptance of the first and third norms proves that states have accepted their responsibility to prevent hostile use of biological agents. Problems with the second and last norms are due to the features inherent to biological weapons and lack of convergence of interests of the industry and state in controlling their spread. The reasons for proliferation of biological weapons are one, the lack of attribution or "signature" of use and secondly the

effects after use. If a biological agent has been used, it cannot be established for certain whether it is a deliberate release or a natural outbreak of disease.

Nuclear weapons are associated with national pride and status in international politics. However, biological weapons equip a state with a secret sense of achievement. Biological weapons do not kill the same number of people or cause physical destruction in the same manner as nuclear weapons would, though their use will have long-lasting ill effects on the economy of the target state. Moreover, contrary to chemical weapons, the use of biological weapons is dreaded and feared for its capacity to disrupt public life. These weapons can destroy vital human and economic resources while keeping the infrastructure intact. It is perceived that biological weapons are well suited to our times where "economic strength" remains the strongest element of power. The technique of various stages for weaponizing biological agents is deeply intertwined with their legitimate production. Therefore, it can never be credibly verified whether ongoing research in biotechnology and associated firms will not be used for malignant purposes. An even greater dilemma is the potential of advances in techniques and process of biosciences.

This is also the worst fear of major powers, especially the US. Some countries accuse the US of their wrongdoings. These countries are comparatively weaker than the US and any face-to-face combat they may initiate with this superpower is doomed to failure. Consequently, a worst case analysis points towards a covert attack by such states or a sponsored terrorist group. This threat has compelled the singular power in the world to look inwards and pursue defense preparedness measures. At this juncture lies the sacrifice of international norms. The survival of norms depends on historicity and the role of the powerful in society. It is important that the powerful countries seek measures to strengthen co-operation.

At present, because of the lack of operational experience, there are ambiguities as to whether biological weapons can effectively kill in large numbers to remain politically relevant. How much is the lethal dose, how many and who will be killed remains critical. In addition, scientific research has since lost the culture of sharing knowledge, especially when it comes to sensitive frontiers of research. As a result, biotechnology, pharmaceutical and associated laboratories and firms are reluctant to share information regarding their status and developments. The fruits of any research are a result of a huge

investment of time, toil and money. These firms would be deprived of the benefits of any breakthrough, if it were shared, and this would also be a direct infringement of their trade secrets, methods and procedures.

Any information made public (through Internet, books and magazines) can prove advantageous to a terrorist's acquisition of biological agents, though there are, as yet, no conclusive studies on this aspect. It seems that further research is essential to find out ways and means for co-operation between states and the biotechnology firms. Fundamentally, both the industry and the public interest should benefit from norms, even if it were to place commercial proprietary information in some jeopardy in the short run.

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