



WHY PREVENTING HOSTILE USE OF THE LIFE SCIENCES IS RELEVANT TO AFRICA

The ICRC Appeal on Biotechnology, Weapons and Humanity

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Biological and chemical weapons are increasingly in the news. A series of events in the United States, beginning with the 11 September 2001 attacks and including mailed letters deliberately infected with anthrax later that year, have led to heightened fears of increasing resort to such agents for terror. Concurrently, the 2003 Iraq war, which failed to find weapons of mass destruction (WMD), has led to a great deal of cynicism about such threats, especially in the developing world. This article sets out the concerns of the International Committee of the Red Cross (ICRC) about the risks of new advances in the life sciences being turned to hostile use and explains what it is doing to try to encourage objective risk assessment and reduction in that context. We argue that, setting aside the rhetoric of the 'war on terror', there are sound reasons for actors in the life sciences in Africa to treat concerns about poisoning and the deliberate spread of disease seriously. It is in their interests to take practical action in line with their existing ethical and legal obligations in order to assess and reduce these threats.

State of play

For many centuries poisoning and the deliberate spread of disease have been the subject of public abhorrence. Diverse cultures, religions and military traditions proscribe these actions. International rules such as the 1925 Geneva Protocol, the 1972 Bacteriological and Toxin Weapons Convention (BTWC) and the 1993 Chemical Weapons Convention (CWC) formalise those prohibitions.

Despite the existence of these norms, the perceived risk of a major biological weapons attack is increasing. While they caused relatively

few casualties, anthrax mail attacks in the US in late 2001 were extremely disruptive and costly to the US economy.¹ The culprit or culprits remain unidentified.² There is growing concern in the Western scientific community that the 21st century is likely to see infectious disease, in particular, used as a weapon against civilian populations if society is not more vigilant. Scientific academies such as the Royal Society in the UK and the National Academies of Science in the US have begun to advise their governments on responding to the potential for hostile use of their advances, especially 'bioterrorism'.³ These

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issues have been taken up by other scientists, including Professor Malcolm Dando, a neurobiologist and arms control expert. Dando noted that the motives behind hostile use may be more complex than first meet the eye:

Beyond malice or unbridled curiosity, the 'militarization of biology' may also be a siren song for many scientists, physicians and their employers simply in need of a livelihood. Because prohibited actions derive from intent, the line between legitimate defensive activities and banned offensive weapons development may not be easily visible.⁴

Despite the failure to find evidence of biological weapons in Iraq, it remains likely that clandestine government biological warfare programmes are continuing in several countries, in violation of international law.

Although the BTWC bans the use of biological weapons, there is a general lack of confidence that measures taken against failure to comply will be sufficient to deter or catch defaulters.

This aspect has long been recognised as a weakness in the treaty: by the mid-1990s international efforts were under way to remedy the situation by devising a verification regime. Those efforts were curtailed in July 2001 by US rejection of the draft protocol and any continued negotiations. Without the prospect of US participation, the protocol negotiations collapsed and much less ambitious deliberative 'expert' discussions followed instead.⁵

At the same time, new developments in the life sciences, while exciting in a wide range of peaceful contexts, continue to increase the risk of using biotechnological advances as weapons. These developments – in fields such as biology, chemistry, genomics, bioinformatics and many other disciplines – are leading to increased understanding of, and ability to manipulate, basic life processes such as metabolism, breathing, reproduction and cognition.⁶ Information from governments, UN agencies, scientific and medical circles, and industry provides a disturbingly long list of existing and emerging capabilities for the misuse of scientific advances. If the history of science and the past development of weapons are any guide, the stark future humanity faces is that these new advances will make the development

of biological weapons more attractive to those with hostile intent. It will also make such hostile use potentially far more effective, while more difficult to detect. This means that beyond 'classical' bio-warfare agents such as anthrax, plague and smallpox, advances in legitimate science are broadening the possibilities for the creation and use of new hostile agents, with more varied characteristics and effects.⁷ The leopard is increasingly able to change its spots.

The ICRC appeal

Although it is best known for its work in assisting and protecting the victims of armed conflict, the International Committee of the Red Cross (ICRC) has a mandate to endeavour to prevent suffering by promoting and strengthening humanitarian law and universal humanitarian principles. Prompted by the above concerns, the ICRC issued a public appeal in September 2002 entitled 'Biotechnology, weapons and humanity'.⁸

Launching a public appeal is rare for the ICRC and underlines the importance it attaches to maintaining the fundamental norms against poisoning and deliberate spreading of disease. However, it was not entirely unprecedented. The ICRC launched a related public appeal in 1918 in which it described warfare by poison as 'a barbaric invention which science is bringing to perfection' and protested 'with all the force at [its] command against such warfare, which can only be called criminal'.⁹ The 1918 appeal is still valid. Responding in part to that appeal, states adopted the 1925 Geneva Protocol reaffirming the general ban on the use of poisonous and asphyxiating gases in warfare and extended it to cover bacteriological (that is, biological) weapons.

The 2002 ICRC appeal on biotechnology, weapons and humanity is aimed at governments, industry, academic researchers, health professionals and scientific circles, as well as civil society in general. It is intended to promote the implementation of practical measures to prevent the use of the life sciences for hostile purposes, both by individual actors and in improving synergy between them.

The ‘web of prevention’

The ICRC describes this approach as the ‘web of prevention’. This concept stemmed from the ICRC’s realisation, in response to a large number of consultations with individual and institutional actors in the professional life sciences, that there is a very low general level of awareness in that community about the taboos against biological and chemical weapons. This is cause for concern, because scientists, physicians, policymakers and related business people – the primary agents of these advances – have particular responsibilities to uphold taboos against poisoning and the deliberate use of disease.

The ‘web of prevention’ concept is intended to help relate these legal and ethical norms to individuals and institutions in the life sciences by properly informing them of the *risks, rules* and *responsibilities* associated with preventing hostile use of their advances. This knowledge should help to motivate them to objectively assess and reduce risk in this sphere and to take action accordingly.

Such engagement requires three main phases of action from actors in the life sciences:

- acknowledging that minimising risks from the hostile use of advances in the life sciences is of concern to them and part of their responsibility;
- identifying and implementing the necessary actions within their own spheres of influence that will contribute to risk reduction and complement actions being taken in other spheres; and
- ensuring that their actions are known among others and complement the actions of others.

Examples of practical measures in the life sciences that can contribute to a ‘web of prevention’ include:

- scrutinising all research with potentially dangerous consequences and submitting it to rigorous and independent peer review;
- adopting professional and industrial codes of conduct aimed at preventing the abuse of biological agents;
- ensuring effective regulation of research programmes, facilities and biological agents that could lend themselves to misuse, and supervising individuals with access to sensitive technologies;

- supporting enhanced national and international programmes to prevent and respond to the spread of infectious disease; and
- ensuring that awareness of the risks, rules and responsibilities associated with preventing poisoning and the deliberate spreading of disease are part of laboratory or other training for all personnel.

This is only an indicative list. Depending on the context, many other practical measures may be applicable. Such individual preventive actions may not result in major changes by themselves, but they can be very effective in combination and do not have to be complex or expensive. The benchmark is that they should be effective in the context in which they are applied.

It is important to note that the ICRC is not trying to tell actors in the life sciences *how* they should translate their responsibilities into practical action, but to remind them that there are ethical and legal obligations and these should be implemented thoughtfully.

One analogy that is pertinent to understanding the ‘web of prevention’ model in the life sciences is that of fire prevention. The use of fire is relevant to many aspects of our everyday lives, whether we are conscious of it or not. At the same time, fire can be highly dangerous if used improperly, for example for arson. No one proposes that fire should be banned. However, there is virtually universal awareness of the potential risks and the need for practical measures to minimise improper use of fire and its consequences.

Fire trucks and firefighters arriving to extinguish a fire are dramatic and highly visible elements of society’s efforts to minimise its risk and harmful effects. But most of the time a combination of mundane and largely unnoticed complementary measures such as smoke detectors, safe building construction codes, properly marked fire exits, safety evacuation drills, extinguishers, and sprinkler systems reduce fire risk effectively. As well as reducing the risk of an outbreak, such practical measures may minimise the effects of a dangerous fire. Most fire-prevention measures are not dramatic and rarely interfere with legitimate daily business. They are there, nevertheless. So it should be with the life sciences, which –

like the use of fire – carry impacts for society through their benefits and risks.

What the ICRC is doing

Since the launch of its appeal the ICRC has been involved in a range of activities with actors in the life sciences around the world. In line with its ‘web of prevention’ approach the committee is approaching not only governmental officials but also representatives from biotech and pharmaceutical companies, government laboratories, and other agencies, academia, scientific and medical associations.

On 7 May 2004 the ICRC convened a one-day roundtable in London in partnership with the British Red Cross. This meeting, entitled ‘On preventing hostile use of the life sciences’, engaged representatives of the British-based life science community from all of the above groups. The aim of the meeting was to gather together a wide range of these actors in order to engage on the issues raised in the ICRC appeal and, in particular, to secure greater cooperation and coordination in achieving its aims.

Further roundtables are planned for the coming months at national and regional levels worldwide in order to continue to engage representatives from the professional life science community on these issues. Similarly to the first roundtable, the discussion themes will focus on

- how to promote and disseminate awareness of international legal norms pertinent to preventing the hostile use of the life sciences at the individual and institutional level;
- means of educating scientists about risks, rules and responsibilities and the creation of a culture of responsibility and enhancing complementary and coordinated action;
- practical measures that individuals and institutions could implement in their own environments to reduce the risk of misuse of their materials and technologies.

The ICRC has also contributed, by invitation, to other gatherings of actors in the life sciences around the world on themes related to reducing the risk of hostile use of their advances. A meeting organised by the BioWeapons Prevention Project in Johannesburg, South Africa, in July 2004 was one such opportunity. That meeting

focused on African dimensions of preventing poisoning and the deliberate spreading of disease.¹⁰ These and other conferences have offered the ICRC the opportunity of engaging with various professional life science communities, including actors from industry, on the concerns raised in its appeal.

To help raise awareness in the scientific and industrial communities, the ICRC developed promotional material, including posters intended to catch the attention of scientists working in laboratories.¹¹ The ICRC will also shortly publish principles of practice for life science professionals on the common international humanitarian norms formalised in different bodies of law about poisoning and the deliberate spread of disease.¹² These principles are not intended to impose yet more regulation on legitimate science, but should provide a suggested checklist to include in discussions on, for example, research, research proposals, funding, publication, contracts of employment for scientists, health and safety procedures, professional practice, peer-review processes, and educational programmes. They should also contribute to discussions in the framework of the 2005 Meeting of Experts of the BTWC, which will address and promote common understanding and effective action on the content, promulgation, and adoption of codes of conduct for scientists.

In addition to its outreach to the professional life science community, the ICRC has invited states to consider the drafting and adoption of a ministerial-level declaration to reaffirm the relevance and continued importance of the norms against poisoning and the deliberate spread of disease – something that the international community failed to include, for the first time in December 2002, in a BTWC review conference final document. High-level commitment reflected in a ministerial declaration would draw greater attention to these issues at senior political level and would send a clear signal to scientists and industry that their governments consider that the prevention of hostile use of their materials, expertise and equipment is imperative. Not all states agree with the initiative at this stage, but it is enjoying strong support from a wide range of countries. As a demonstration of their commitment to

norms against poisoning and the deliberate spread of disease, African countries should in the interim consider taking the lead, for instance through a high-level declaration by the African Union (AU).

Africa's interest

Seen from an African perspective, it might be tempting to dismiss engagement on issues associated with preventing poisoning and the deliberate spread of disease as being of marginal relevance. Combating and eradicating endemic diseases enjoy the highest priority in most African countries, especially south of the Sahara. Naturally occurring epidemics of diseases such as malaria, tuberculosis and HIV/AIDS (to name but a few) place chronic strain on a public health infrastructure that is usually under-resourced and consequently overstretched – if it exists at all. The prospect of monitoring biotech activities must remain far removed when many parts of the continent lack basic services such as electricity, water and modern communications, and human development indices lag far behind many parts of the rest of the world.¹³ In a struggle for limited resources it is hard to justify contemplating the introduction of practical measures to prevent hostile use of the life sciences.

But why should African actors in the life sciences pay much heed to these issues when they do not necessarily perceive themselves as being in the frontline as terrorist targets? There are several reasons that they should acknowledge and act on their responsibilities to reduce the risks of poisoning and the deliberate spreading of disease, consistent with the aims of the ICRC appeal.

1. A deliberate outbreak of disease could have catastrophic consequences for the populations, economies and environments of African countries

It is a cruel irony that countries with the least developed public health infrastructure and least resources to meet infectious disease threats tend to be among the most vulnerable to these threats, whether occurring naturally or caused deliberately. By any objective measurement Africa as a region falls in such a category.

According to *The Economist*, 41 of the 50 countries with the lowest overall life expectancies in the world in 2003 were in Africa. Twelve of the 26 countries with the lowest health spend per capita as a percentage of gross domestic product were African. This figure may even be worse than it sounds, because there are apparently no measurable figures for some of the least-developed African countries.¹⁴

Recent natural outbreaks of infectious disease give some indication of the economic and political disruption that the deliberate hostile use of infectious disease could cause, in addition to existing miseries. The economic costs of the 2003 outbreak of SARS¹⁵ to tourism, business travel, and many other economic sectors of countries as diverse as China, Thailand and Canada were obvious. One estimate put the cost of the SARS outbreak to Asian economies as high as US\$10.6 billion.¹⁶

A biological attack would not necessarily have to target human beings to cause great disruption or humanitarian impact. On average, Africans are highly dependent on producing animal and plant commodities for their economic survival and even bare subsistence. In 2003 seven of the ten countries most economically dependent on agriculture were in Africa, and 26 of the top 48.¹⁷ The non-intentional outbreak of foot and mouth disease in the UK in 2000 demonstrated the massive economic impact that such an epidemic can have – even in a wealthy country that is not heavily dependent on agriculture, and with no human casualties.¹⁸

These examples show that diseases that originate locally are nevertheless potentially global – and therefore, African – problems in scope and effect, whether intentional or not. For example, in August 2004 the South African Ministry of Agriculture reported an outbreak of the avian flu virus H5N1 (which had originated the previous year in Asia) among commercially farmed ostriches in the Eastern Cape. More than 8 000 ostriches were slaughtered to contain the disease, which can be lethal to humans and could eventually adapt in order to jump from human to human.¹⁹ In less-prepared developing societies, consequences for humans could be much more severe in the case of a biological attack intended to cause maximum damage and disruption.

But *why* would African populations or economies be targets for attacks with biological agents? It is worth bearing in mind that African countries could be considered attractive targets for attack precisely because they are perceived (or these countries perceive themselves) as non-strategic or unimportant. For example, those with hostile intent might carry out such attacks as a demonstration of their power to other countries perceived as 'strategic' or as a means of creating a regional or global pandemic, hoping to overwhelm the disease response resources of developed countries. The chances of being caught could be much lower in African countries than in those with greater public health and law enforcement capabilities, or there may be a lower perception of threat, accompanied by a lower level of vigilance. Those with hostile intent may simply wish to attack foreign populations in African countries without regard for 'collateral damage' to the local people or their environment, as happened in the truck bomb attacks on American embassies in Kenya and Tanzania on 7 August 1998, which killed 225 people and injured more than 4 000.

Sadly, the use of poisoning and the deliberate spread of infectious disease as a method of warfare is not a new concept in Africa. Historical examples abound, for example infecting the tips of arrows and contaminating wells. Modern examples include the use of chemical weapons by Mussolini's armies in the invasion and annexation of Abyssinia (now Ethiopia) in 1936. Libya's offensive biological, chemical and nuclear weapon programmes are only now being dismantled. Moreover, the apartheid government's clandestine programme to develop biological and chemical weapons ('Project Coast') in South Africa until the 1990s experimented with a number of agents intended to kill opponents of apartheid and to develop so-called non-lethal agents for use against demonstrators and other civilians.²⁰ A leading expert on 'Project Coast' concluded that:

On a continent that has a great deal of experience of national conflicts, there is a potential incentive for acquiring [biological weapons]. We therefore need to be aware of the danger posed by the development of biological agents that can

be used to quell civilian uprisings against bad governments.²¹

Africa has witnessed many destructive conflicts in the last half-century, some of which simmer on. The prospect cannot be excluded that certain African governments will view biological agents as attractive weapons against each other, as has happened in the past. Unless norms against poison and the deliberate spread of disease are strongly embedded in the region's political culture through adherence to the relevant international treaties and practical and transparent risk reduction measures to build mutual confidence, the use of biological weapons is increasingly likely, as they are becoming cheaper and easier to develop.

2. Most African countries have formally accepted legally binding obligations to prevent poisoning and the deliberate spread of disease

The 1925 Geneva Protocol and the BTWC are among the most widely adhered to disarmament and arms control norms. One hundred and thirty-two countries adhere to the Geneva Protocol, including 33 African states. Likewise, the BTWC has 154 states parties, of whom 32 are African, along with one signatory.²² In the previous decade the Chemical Weapons Convention (CWC) joined them, with 43 African members and seven signatories.²³ These norms command the overwhelming support of the international community, but are not universal in Africa yet.

A formal treaty implementation and verification system seemed out of the question in the depths of the Cold War when the BTWC was negotiated. The drafters of the BTWC contented themselves with general provisions that would ensure the continued relevance of the convention as times changed and technology advanced. When times did change, the international community lost little time in equipping a related norm, the CWC, with a robust national implementation and verification regime in the 1990s. The CWC includes a specific legal requirement, for instance, for each state party to establish and maintain a national authority to coordinate activities related to the obligations of the treaty, including domestically. While national authorities are also considered a

sensible idea with respect to the BTWC, there is no such explicit requirement.

However, the general intent of the BTWC is clear. In Article 1 of the BTWC:

Each State Party to this Convention undertakes never in any circumstances to develop, produce, stockpile or otherwise acquire or retain: (1) Microbial or other biological agents, or toxins whatever their origin or method of production, of types and in quantities that have no justification for prophylactic, protective or other peaceful purposes; (2) Weapons, equipment or means of delivery designed to use such agents or toxins for hostile purposes or in armed conflict.

Article 3 states that:

Each State Party to this Convention undertakes not to transfer to any recipient whatsoever, directly or indirectly, and not in any way to assist, encourage, or induce any State, group of States or international organizations to manufacture or otherwise acquire any of the agents, toxins, weapons, equipment or means of delivery specified in article I of this Convention.

Together, these articles are often referred to as the 'general purpose criterion', usually with regard to the applicability of the convention's prohibitions to new advances in the life sciences.²⁴ The CWC contains equivalent provisions. But it also means that BTWC states parties are expected to take action *consistent with* implementation of its prohibitions, even if these are not spelt out in detail.

Unfortunately, indications are that in the African region such action is patchy, at best. This is probably due more to lack of capacity than to lack of support for the relevant norms. A considerable number of African states lack adequate domestic legislation to criminalise the use of biological weapons, for instance. A recent global survey of national legislation implementing the BTWC by its states parties was unable to identify any relevant legislative information for 56 of them – 24 in the African region alone.²⁵ This not only casts into doubt the political will or judicial ability of these countries to take action against culprits carrying out a biological attack within their own borders, it makes such countries

more attractive as trans-shipment points. The author of the report concluded: 'In effect these states are in non-compliance with their legal obligations' and called for greater transparency as it 'will not only encourage states to regularly review the effectiveness of their measures, but it will stimulate information-sharing and the mobilization of international assistance to those states parties which need it'.²⁶

Gaping loopholes such as these, which create opportunities for those with hostile intent with regard to biological weapons, have not been overlooked by countries most centrally involved in the 'war on terror'. For instance, United Nations Security Council (UNSC) Resolution 1540, passed in April 2004, indicates that patience is wearing thin. The resolution, which was intended as a 'get-tough' measure against countries that allow proliferation of nuclear, chemical and biological weapons, as well as their means of delivery, defines these collectively as 'a threat to international peace and security'. UNSC 1540 sets out a number of legally binding requirements for *all* states to enact and implement domestic laws and other measures to help prevent the proliferation of biological, chemical and nuclear weapons, based on international norms such as the BTWC. Moreover, the Security Council 'to this end calls upon States to present a first report no later than six months from the adoption of this resolution to the Committee on steps they have taken or intend to take to implement this resolution'.²⁷

3. Greater vigilance towards the prevention of poisoning and the deliberate spread of disease could fit in with a broader public health framework in Africa, conceptually and for obtaining additional resources

Despite the greater focus recently on military and law enforcement responses to 'bioterror' threats, the prevention of deliberate poisoning and outbreaks of disease has to be seen through the prism of broader public health responses if it is to be effective and feasible. It may after all be some time before it is ascertained that an incident resulted from deliberate attack – if ever.

In the meantime, public health, and possibly humanitarian, responses will be required.

These may entail disease surveillance, diagnosis, treatment, quarantine, inoculation, or other activities. This has been recognised and harnessed (with varying degrees of success) internally by a number of developed countries, by bolstering spending on biodefence-related health capabilities and improving coordination between relevant agencies.²⁸

The flipside of the recognition that public health infrastructure and other societal responses need to be more closely integrated is awareness that the effects of biological attack are potentially global, particularly where the spread of infectious disease is concerned. SARS and avian flu virus H5N1 have shown that unusual outbreaks of disease can quickly become pandemics, unless international public health infrastructure and coordination are up to the task – and that depends primarily on national capabilities. Yet even without the threat of biological attack, ‘infectious disease poses a direct threat to stability and prosperity throughout the developing countries. The region currently experiencing the greatest amount of disease-induced poverty and instability is sub-Saharan Africa.’²⁹ Unless these national and regional capabilities are boosted, the prognosis is not good for the stability and viability of many African societies, with negative flow-on effects in areas such as migration, the incidence and intensity of conflict, and degradation of the environment.

One of the most fundamental of these capabilities is timely collection and distribution of disease surveillance data. Indications are that such networks are currently not used optimally. In 2003, only three of 53 countries in Africa published disease surveillance reports for any of the following: tuberculosis, malaria, cholera, influenza, dengue fever, yellow fever, plague or legionnaire’s disease, anthrax, botulinum (a potent organic toxin) and brucellosis. This represents a major failure by African countries and the broader international community to exploit a low-cost faculty that could yield great benefit as an early-warning system against disease outbreak, whether natural or intentional:

In most cases there is no significant technical impediment to posting data online as soon as possible. Acquiring the necessary information on the ground is

another matter. The facilities and trained clinical and laboratory personnel required are scarce in many parts of the world, particularly in those where new diseases are more likely to emerge. These are also the locations where [biological warfare] agents might be tested. It is in the interest of all nations to make sure that at least every region has the necessary capabilities to monitor infectious disease outbreaks and can deploy them rapidly when necessary.³⁰

There are acute resource shortages in many African societies, as in other parts of the developing world. But capabilities such as adequate disease surveillance are vital to enable sound risk assessment and response. There is clearly a synergy between mitigating or preventing human costs incurred by the hostile use of biological agents and broader public health imperatives. It is therefore surprising that more African countries did not play active roles in specifically mandated discussions in the BTWC Experts Group on this topic in 2004, or in taking the initiative in other international forums, such as the World Health Organisation (WHO). African countries have a solid case for receiving external assistance to build their public health infrastructure (for instance under Article 10 of the BTWC), which should have broader benefits for the health and development of their societies.

4. If the African region is perceived as being seriously engaged in preventing poisoning and the deliberate spread of disease, this may enhance its prospects of achieving developmental and economic objectives

Apart from South Africa and a few others – such as Kenya, Libya and Nigeria, on a more sporadic basis – the level of proactive participation by African countries in the BTWC context has always been low. Consequently there has not been much of an African dimension in BTWC review meetings (South Africa aside), protocol negotiations, or the deliberative expert discussions that began in 2003.

This lack of broad African engagement decreases the potential effectiveness of the convention and of possibilities of strengthening it. If there are practical difficulties that prevent

African governments from upholding their responsibilities under the BTWC, then other states parties to the convention need to be made explicitly aware of this at intergovernmental level. It is then incumbent on states parties collectively to take action if they are consistent in their commitments to effective implementation of the BTWC.

African perspectives are also valuable in adding balance to efforts at international level to reduce the risk of poisoning and the deliberate spread of disease. For example, infectious diseases of concern to some members of the BTWC as potential hostile agents against humans, animals and plants are already endemic public health problems in some parts of Africa – not hypothetical security scenarios. This factor is sometimes overlooked by governments involved in these processes, who may view such risks purely through the prisms of ‘bioterror’ and biodefence (because participation is biased towards wealthier industrialised nations). If the concerns of such countries are to be taken seriously, they ought to apply more moral and practical efforts in order to minimise the effects of these diseases or to eradicate them from impoverished societies afflicted by them. Such perspectives are important at a time that attention at international level has shifted from cooperative international capacity-building to ‘bioterrorism’ and concerns of non-compliance.

The BTWC protocol negotiations are an example of opportunities missed by the absence, or insufficient weight, of perspectives that African and other developing countries could bring to the table. One theme in the negotiations on a draft protocol for the BTWC concerned the introduction of measures dealing with aid and cooperation that would apply to members of the eventual treaty. (These measures are consistent with Article X of the BTWC.³¹) The proposed measures included enhancing training and exchange opportunities, assistance in improving epidemiological surveillance capabilities (which would, of course, also monitor natural outbreaks of disease), help with establishing and maintaining national authorities, and even visits by an international inspectorate to help facilities in areas such as biosafety and occupational health and safety.³²

Moderate countries in both the developed and developing world were of the opinion that such measures might make compliance more attractive to those with fewer resources. However, certain states involved in the protocol negotiations effectively highjacked the prospect of aid and cooperation measures. They linked these so-called promotional measures with the abolition of informal export controls such as the Australia Group, because they wished to undermine compliance. It was difficult for many developed countries to accept this action and it eroded the possibility of a deal on the protocol, and thus new forms of aid to countries that wanted it. Moderate voices at key junctures from developing regions such as Africa could have had a positive influence on these dynamics. The lesson is that ‘developing countries need to strengthen their participation in international negotiations in order to advocate for the implementation of Article X [of the BTWC] because it is in their interests to do so. Developed countries are unlikely, of their own volition, to advocate for the full implementation of Article X because it is not in their economic interests to do so.’³³ Nor should African concerns be delegated to other developing regions or countries, because their interests may differ and they can be expected to act in their own interests.

5. Improving awareness in the scientific, medical and health professional communities that preventing the hostile use of the life sciences is low cost, high gain

Advances in the life sciences have, on the whole, been of great benefit to humanity. However, new scientific developments and technologies deriving from them have always possessed the potential for hostile use, whether in the nuclear, aviation, electronic or other fields. Biotechnology is no different.

Most actors in the life science community maintain that their *raison d'être* is to improve the existence of humankind. It follows that this community has a strong interest in preventing the abuse of its advances for hostile purposes.

There is a perception – not least among some in the African diplomatic community – that the above has little relevance for the region, lagging as it does in many parts in education,

technology and industrial infrastructure when compared to most other regions. There is some truth in the second observation. The commercial life sciences do tend to be capital-intensive businesses, and have traditionally been concentrated in advanced economies. And African countries *have* traditionally been viewed as recipients of new developments in the life sciences, for example vaccines and genetically enhanced crops, rather than innovators. But the assertion about the lack of relevance to Africa is erroneous, for two reasons.

First, African countries are already becoming witting or unwitting partners in life science developments as commercial interests in the field of biotechnology are becoming increasingly involved in their economies. African countries may provide useful locations for biotech activities, because they have less stringent regulatory regimes, are cheaper to operate in, or provide a good vantage point for research into local biodiversity for eventual profit. 'Globalization means that companies increasingly seek new bases from where to operate, and countries may thus misuse the expertise they so acquire for hostile purposes (as has been observed with the development of nuclear energy). In the same way that Benin became known for allowing the West to use it as a dumping ground for toxic waste, we need to guard against the use of African countries for the production of harmful organisms for hostile use.'³⁴

Second, there are already commercial and governmental facilities in Africa that are capable of producing biological agents with potential for hostile use, not just capacities imported from abroad. There will soon be more. African countries are developing biotech facilities that will enable them to manufacture vaccines and other biotech products themselves, for instance. For example, the production of vaccine in Africa is being targeted since large multinationals regard it as unprofitable. Researchers in South Africa, however, claim they will be soon be able to produce plant-based vaccines at between a tenth and a hundredth of the cost of conventional vaccines.³⁵

As new developments in the life sciences diffuse throughout the globe and become socially pervasive, the ethical and legal issues highlighted by the ICRC appeal will become

more pertinent. Interaction involving the ICRC and civil society actors such as the BioWeapons Prevention Project with communities has shown that there is enormous openness in Africa to these messages. This openness needs to be increased and sustained. In addition, rational self-interest should compel African scientists and medical and health professionals – in academia, in business and in official laboratory work – to raise their level of vigilance as to the risks of the hostile use of the life sciences, in the way communities in other regions around the world are beginning to do. They have much to lose financially and in terms of reputation (not to mention the humanitarian consequences) when their advances are put to hostile use. At individual and institutional levels their intimate knowledge of their working environments should lead them to take preventive steps – whether they are obliged by local rules or not. Multinational business, on its part, has a responsibility not to exploit disagreements between developed and developing countries in matters of safety and biosecurity. And African political and military leaders must ensure that proper regulatory structures are put in place and that the culture of responsibility that is the aim of the ICRC's 'web of prevention' prevails in the domains of government laboratories and biological activities. The World Health Assembly Advisory Committee on Health Research reached a similar conclusion, which is more generally applicable than the prevention of hostile use: 'All sectors of society including politicians, health-care professionals, educators and the public need to be educated about the fundamental principles of genetic research, its inherent risks and the ethical issues that it raises.'³⁶

Conclusions

It is in the political interest of African countries to take cognisance of the increasing potential of the life sciences being misused for hostile purposes. Preventive action will reduce the vulnerability of these countries to endemic diseases as well as to biological attacks. This does not imply that they should divert existing resources from important developmental priorities. But the current multilateral discourse on

norms concerning poisoning and the deliberate spread of disease in the UN Security Council, in the G8 and in the BTWC centres on 'the war on terror' rather than the war on global poverty and disease. If developing countries want greater assistance in fighting these challenges – which, it may be argued, lie at the root of many forms of hostile intent – they need to make their cases heard and demonstrate their commitment to the security concerns of oth-

ers. It is simply not enough to vote in favour of consensus resolutions on disease or biological weapons in the UN General Assembly.

Africans can take the following steps, for instance:

- They can ensure that their countries are members of multilateral regimes such as the BTWC and CWC and, just as importantly, implement these rules in their domestic laws.

Appeal of the international committee of the Red Cross on biotechnology, weapons and humanity

Alarmed by the potential hostile uses of biotechnology, the International Committee of the Red Cross (ICRC) appeals to

- all political and military authorities to strengthen their commitment to the international humanitarian law norms that prohibit the hostile use of biological agents, and to work together to subject potentially dangerous biotechnology to effective controls; and
- the scientific and medical communities, industry and civil society in general to ensure that potentially dangerous biological knowledge and agents be subjected to effective controls.

The ICRC appeals in particular: to all political and military authorities

- to become parties to the 1925 Geneva Protocol and the 1972 Biological Weapons Convention (if they have not already done so), to encourage states that are not parties to become parties, and cast aside their qualms about the 1925 Geneva Protocol;
- to resume with determination efforts to ensure faithful implementation of these treaties and develop appropriate mechanisms to maintain their relevance in the face of scientific developments;
- to adopt stringent national legislation, where it does not yet exist, for implementation of the 1925 Geneva Protocol and the 1972 Biological Weapons Convention, and to enact effective controls on biological agents with potential for abuse;
- to ensure that any person who commits acts prohibited by the above instruments is prosecuted;
- to undertake actions to ensure that the legal norms prohibiting biological warfare are known to and respected by members of the armed forces;
- to encourage the development of codes of conduct by scientific and medical associations and by industry to govern activities and biological agents with potential for abuse; and
- to enhance international cooperation, for example through developing greater international capacity to monitor and respond to outbreaks of infectious disease.

To the scientific and medical communities and to the biotechnology and pharmaceutical industries

- to scrutinise all research with potentially dangerous consequences and ensure that it is subjected to rigorous and independent peer review;
- to adopt professional and industrial codes of conduct aimed at preventing the abuse of biological agents;
- to ensure the effective regulation of research programmes, facilities and biological agents that may lend themselves to misuse, and supervision of individuals with access to sensitive technologies; and
- to support enhanced national and international programmes to prevent and respond to the spread of infectious disease.

The ICRC calls on all addressed here to assume their responsibilities as members of a species whose future may be gravely threatened by the abuse of biological knowledge. The ICRC appeals to you to make your contribution to the age-old effort to protect humanity from disease. We urge you to consider the threshold on which we all stand and to remember our common humanity.

The ICRC urges states to adopt at a high political level an international declaration on 'Biotechnology, Weapons and Humanity' containing a renewed commitment to existing norms and specific commitments to future preventive action.

Geneva, September 2002

- African countries should establish national authorities to monitor the domestic implementation of these norms, which could be combined with CWC national authorities to manage resources efficiently. Such authorities would facilitate interaction between African countries on issues of infectious disease.
- They should improve their level of commitment to epidemiological surveillance reporting to existing networks.
- African governments should participate more actively in international processes related to poisoning and the deliberate spread of disease, including the security sphere, with a clear sense of their own longer-term interests.
- Support for a high-level declaration such as that of the ICRC could focus attention on their broader concerns about the threats of infectious diseases and remind the public and other governments of the link.
- Practical action is required at individual, institutional and national levels to assess and reduce the risk of the development and use of biological weapons.
- Concurrently, there should be efforts at improving transparency and accountability of government activities in the biodefence field as a safeguard against the state-sponsored use of biological weapons.

Regional organisations such as the AU could play a facilitating role in a number of these areas.

Issues associated with preventing poisoning and the deliberate spreading of disease should be seen in the light of objective risk management, rather than as a crusade undertaken for transient or politically expedient reasons. In the long run this 'web of prevention' approach should be most effective in precluding the hostile use of the life sciences, because it is based on rational self-interest and not just on cajoling from multilateral bodies. A culture of responsibility is the cornerstone of any effort to prevent the hostile use of the life sciences, just as it is vital to public health responses to unusual outbreaks of disease. With more power comes more responsibility.

Notes

- 1 These attacks killed five people and made at least a dozen others gravely ill.
- 2 L Rothstein, C Auer & J Spiegel, Rethinking doomsday, *Bulletin of the Atomic Scientists* 60(6), November/December 2004, p 39.
- 3 See the Royal Society, Making the UK safer: detecting and decontaminating chemical and biological agents, Policy document 06/04, April 2004, and The individual and collective roles scientists can play in strengthening international treaties, Policy document: 05/04, April 2004, both available online at <<http://www.royalsoc.ac.uk>>. For the United States, the so-called 'Fink Report' (after its chairperson, Professor Gerald Fink) is a useful introduction: National Research Council of the National Academies, *Biotechnology research in an age of terrorism*, Washington, DC, National Academies Press, 2004.
- 4 Professor Malcolm Dando, Department of Peace Studies, University of Bradford, United Kingdom, Statement to the Conference Commission on Biotechnology, Weapons and Humanity, 28th International Conference of the Red Cross and Red Crescent Movement, 4 December 2003, <<http://www.gva.icrc.org/Web/Eng/siteeng0.nsf/iwpList515/E56B5C2E41BC67FC1256DFD003ECAAB>> (24 September 2004).
- 5 Documents from these meetings are available at <<http://www.opbw.org>>. The following December, at the Fifth BTWC Review Conference, Under-Secretary of State for Arms Control John Bolton made it clear that the US administration saw the draft protocol as an example of 'arms control approaches of the past', which 'will not resolve our current problems'. For useful evaluations of the post-Fifth Review Conference 'Expert process' in the BTWC see Jonathan B Tucker & Raymond A Zilinskas, Assessing US proposals to strengthen the Biological Weapons Convention, *Arms Control Today*, April 2002, pp 10-14, and Nicholas A Sims, Biological disarmament diplomacy in the doldrums: reflections after the BWC Fifth Review Conference, *Disarmament Diplomacy* 70, April-May 2003, at <<http://www.acronym.org.uk>>.
- 6 A useful, and brief, introduction to these issues is by Mark Wheelis & Malcolm Dando, New technology and future developments in biological warfare, *Disarmament Forum* 4, Geneva, United Nations, 2000, pp 43-50.
- 7 Examples are the inadvertent increase in the lethality of mouse pox (an orthopox virus in the family of smallpox) by Australian researchers through recombinant DNA splicing, and increasing research into synthetic construction of viruses, as first reported in the US journal *Science*. See Ronald J Jackson et al, Expression of mouse Interleukin-4 by a recombinant ectromelia virus suppresses cytolytic lymphocyte responses and overcomes genetic resistance to mousepox, *Journal of Virology* 75(3), February 2001, pp 1205-1210,

- and Jeronimo Cello, Aniko V Pail and Eckard Wimmer, Chemical synthesis of poliovirus cDNA: generation of infectious virus in the absence of natural template, *Science* 297, 9 August 2002, pp 1016-1018.
- 8 For a full text of the ICRC appeal on biotechnology, weapons and humanity see the ICRC website, which also contains other resources and links on this subject, at <<http://www.scienceforhumanity.org>>.
 - 9 Bulletin international des Sociétés de la Croix-Rouge, CICR, Genève, April 1918.
 - 10 More information, including various presentations from this meeting, is available on the BioWeapons Prevention Project's website at <<http://www.bwpp.org>>.
 - 11 The posters can be downloaded in electronic format: <<http://www.gva.icrc.org/Web/eng/siteeng0.nsf/html/pS200402?OpenDocument>> (27 September 2004).
 - 12 See the ICRC's website for further details: <<http://www.scienceforhumanity.org>>.
 - 13 Cultural liberty in today's diverse world, Human Development Report 2004, UNDP, pp 127-138, <<http://hdr.undp.org/reports/global/2004/>> (27 September 2004).
 - 14 *The Economist pocket word in figures: 2003 edition*, London, Profile Books, 2003, pp 78-83.
 - 15 Severe acute respiratory syndrome (SARS).
 - 16 According to the *Far Eastern Economic Review* of 24 April 2003, as quoted in Yanzhong Huang, Mortal peril: public health in China and its security implications, Special Report 7, Health and Security Series, Washington DC, Chemical and Biological Arms Control Institute, 2003, p 75. According to the World Health Organisation (WHO), the first known case of SARS occurred in Foshan City, Guangdong Province in China, on 16 November 2002, although it was not diagnosed as SARS until much later. By 22 May 2003 the global cumulative number of cases exceeded 8 000 in at least 19 countries on four continents, including Africa. See WHO SARS update 95 at <<http://www.who.int>>.
 - 17 Yanzhong Huang, op cit, pp 44-45.
 - 18 South Africa also recently experienced a foot and mouth disease outbreak, which fortunately was brought swiftly under control.
 - 19 CIDRAP news, Avian flu hits ostriches in South Africa, Minnesota, University of Minnesota, Center for Infectious Disease Research & Policy, 6 August 2004, <<http://www.cidrap.umn.edu>>.
 - 20 See Chandré Gould & Peter Folb, Project Coast: apartheid's chemical and biological warfare programme, Geneva, United Nations, December 2002.
 - 21 Chandré Gould, On the need for civil society monitoring of norms against biological weapons in southern Africa, BWPP Regional Centre on Networking, Johannesburg, 7 April 2004, p 3. <<http://www.bwpp.org>>.
 - 22 These adherence figures are unofficial, and are instead to the best of the authors' knowledge, as of 21 October 2004, compiled from various UN and other sources.
 - 23 The signatories, according to an unofficial list on the website of the Organisation for the Prohibition of Chemical Weapons (OPCW), as of the time of writing are the Central African Republic, Comoros, Congo, Democratic Republic of the Congo, Djibouti, Guinea-Bissau, Liberia, Madagascar and Sierra Leone. See <<http://www.opcw.org>> for more information.
 - 24 For more analysis of the 'general purpose criterion' of the BTWC see 'Non-lethal' weapons, the CWC and the BWC', *The Harvard-Sussex CBW Conventions Bulletin*, September 2003, Issue 61, pp 1-2.
 - 25 Benin, Botswana, Burkina Faso, Cape Verde, Congo, Democratic Republic of Congo, Gambia, Ghana, Guinea-Bissau, Kenya, Lesotho, Mali, Morocco, Niger, Rwanda, Saint Lucia, Sao Tome and Principe, Sierra Leone, Sudan, Swaziland, Togo, Tunisia, Uganda and Zimbabwe.
 - 26 Angela Woodward, Time to lay down the law: national legislation to enforce the BWC, London, Verification, Research, Training and Information Centre, 2003, p 47.
 - 27 UN Security Council Resolution S/RES/1540 (2004) of 28 April 2004, operative paragraph 4.
 - 28 The US government's 'Project Bioshield', for instance, includes legislation that sets aside around US\$60 billion over ten years for the development of new vaccines against diseases considered of particular concern as potential biological weapons; vaccines that could potentially be used in areas of the world where these diseases are endemic. Government agencies from the Department of Health and Human Services to the Department of Energy have bid for extra resources justified on the basis that they will bolster public health infrastructure against a biological attack. These capacities include new information networks for medical practitioners, enhanced disease surveillance and, perhaps most controversially, the construction of new high-containment laboratories to work with dangerous biological pathogens.
 - 29 Andrew T Price-Smith, *The health of nations: infectious disease, environmental change and their effects on national security and development*, Cambridge/London, The Massachusetts Institute of Technology Press, 2002, p 178.
 - 30 J Woodall & R Aldis, Gaps in global surveillance, BioWeapons Prevention Project Occasional Paper Number 1, Geneva, BioWeapons Prevention Project, December 2003, p 4.
 - 31 '(1) The States Parties to this Convention undertake to facilitate, and have the right to participate in, the fullest possible exchange of equipment, materials and scientific and technological information for the use of bacteriological (biological) agents and toxins for peaceful purposes. Parties to the Convention in a position to do so shall also cooperate in contributing individually or together with other States or international organizations

to the further development and application of scientific discoveries in the field of bacteriology (biology) for prevention of disease, or for other peaceful purposes.

'(2) This Convention shall be implemented in a manner designed to avoid hampering the economic or technological development of States Parties to the Convention or international cooperation in the field of peaceful bacteriological (biological) activities, including the international exchange of bacteriological (biological) and toxins and equipment for the processing, use or production of bacteriological (biological) agents and toxins for peaceful purposes in accordance with the provisions of the Convention.'

- 32 This reflected proposals by a cross-group of countries including Brazil, Chile, New Zealand and Norway from late 1998 or so for an assistance component to routine visit activities checking on facility declarations (when requested), so as to enhance local capacity for effective implementation in the longer term of the BTWC's prohibitions.
- 33 Chandré Gould (2004), op cit, p 4.
- 34 Ibid, p 3.
- 35 See Megan Lindow, Pharms take root in South Africa, *Wired News*, 20 October 2004, <<http://www.wired.com/news/medtech/0,1286,65401,00.html>>.
- 36 Fifty-Seventh World Health Assembly, Genomics and world health: report of the Advisory Committee on Health Research, A57/16, WHO, 1 April 2004, p 2.