

17. Considering Contextuality in Dual-Use Discussions: Is There a Problem?

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Introduction

As dual-use ethics continues to grow as a topic of discussion, a number of features are increasingly becoming identifiable in the discourse. While many of these have been well discussed in a number of other volumes,¹ this chapter focuses on a little-examined characteristic: how issues relating to contextuality in life-science research are currently addressed in dual-use ethics.

The issue of contextuality in dual-use ethics is an interesting topic for consideration because it may be simultaneously argued that there is too much focus as well as too little. Those suggesting that dual-use ethics has been predominantly context driven will point to the central role that the ‘web of prevention’ rhetoric and policy development have had in the evolving discussions on responsibility. And they would not be wrong; indeed, much of the discourse in dual-use ethics has evolved out of control and regulatory discussions and continues to be strongly influenced by them.

The alternative—that current approaches to dual-use ethics are largely de-contextualised—is more difficult to defend (and ultimately much less popular). As this chapter will elaborate, however, examining the contextual oversights in dual-use ethics raises some extremely important considerations. In particular, these considerations shed light on how and why scientists in developing countries remain marginalised from dual-use ethics discourse and are unlikely to gain more prominence if current approaches are continued.

In order to elaborate on this position, the chapter will start by briefly examining dual-use ethics in light of the latter position. It will then go on to highlight how assumptions made through this position may impact on scientists in non-Western countries. These issues are supported by fieldwork observations from

¹ Such as National Research Council 2011, *Challenges and Opportunities for Education about Dual-Use Issues in the Life Sciences*, The National Academies Press, Washington, DC.

dual-use ethics research conducted in Africa. The chapter will conclude by highlighting some areas that need to be further examined if dual-use ethics is to become a globally debated topic in the scientific community.

Contextuality in dual-use ethics

Dual-use ethics is an expanding field of study following the recent widespread endorsement of increasing capacity in ethics education for the life sciences—particularly from the West. Since 2001 international bodies such as the UN Policy Working Group on the United Nations and Terrorism, national organisations like the British Medical Association, and international agencies including the International Committee of the Red Cross, have made calls for the enhanced education of scientists, administrators, physicians and others about the potential for destructive application of the biomedical and medical sciences.²

Importantly, many of these calls have emphasised the need for promoting ethical decision-making, which serves to indicate a responsibility for scientists beyond legal and regulatory compliance.³ In *Globalization, Biosecurity, and the Future of the Life Sciences*,⁴ the report commissioned by the National Research Council of the United States, it was argued that it was prudent to establish a ‘decentralized, globally distributed, network of informed and concerned scientists who have the capacity to recognize when knowledge or technology is being used inappropriately or with the intent to cause harm’.⁵ This implies that the familiarisation of scientists with the legal requirements of bio-risk management is the starting point for ethics education, rather than an end in itself, and that the development of a sense of individual responsibility is desirable within the science community.⁶ Indeed, as the National Science Advisory Board

2 Rappert, B. and Davidson, E. M. 2008, ‘Improving oversight: development of an educational module on dual-use research in the west’, in *Uganda National Academy of Sciences Promoting Biosafety and Biosecurity within the Life Sciences: An International Workshop in East Africa*, Uganda National Academy of Sciences, Kampala, p. 127.

3 The extent of individual responsibility of scientists within dual-use dilemmas is a subject of considerable debate, but will not be addressed here due to space limitations. It is well reasoned in Miller, S. and Selgelid, M. J. 2007, ‘Ethical and philosophical considerations of the dual-use dilemma in the biological sciences’, *Science and Engineering Ethics*, vol. 13, pp. 523–80.

4 Committee on Advances in Technology and the Prevention of their Application to Next Generation Biowarfare Threats 2006, *Globalization, Biosecurity, and the Future of the Life Sciences*, National Research Council, Washington, DC.

5 Ibid.

6 Uganda National Academy of Sciences 2008, *Promoting Biosafety and Biosecurity within the Life Sciences: An International Workshop in East Africa*, Uganda National Academy of Sciences, Kampala, p. 6. This is in line with Article IV of the Biological and Toxin Weapons Convention.

for Biosecurity (NSABB) stated: ‘an enhanced culture of awareness is essential to an effective system of oversight and is a critical step in scientists taking responsibility for the dual-use potential of their work.’⁷

Current approaches to dual-use ethics discourse and pedagogy

Current approaches to dual-use ethics have therefore focused predominantly on identifying and understanding the responsibilities that scientists have towards ameliorating the dual-use potential of their research. These discussions of responsibility have been heavily influenced by the development of the ‘web of prevention’ model that promotes multiple stakeholders in biosecurity. This approach dates to the early 2000s when the International Committee of the Red Cross (ICRC) launched an initiative on ‘Biotechnology, Weapons and Humanity’, calling for the reaffirmation of norms against biological weapons and better controls on potentially dangerous biotechnology.⁸ This web of prevention emphasised the crucial need for the involvement of security, health and judicial communities in addressing the dual-use issue.⁹

Crucially, the web of prevention concept has built on existing biosafety and biosecurity initiatives to include security, law-enforcement and life-science organisations, and the coordination of international oversight. In one formulation it was suggested that any ‘web of prevention’ include (and/or improve) initiatives such as

- export controls
- disease detection and prevention
- effective threat intelligence
- biosafety and biosecurity initiatives
- international and national prohibitions
- oversight of research
- education and codes of conduct.¹⁰

Dual-use ethics has played an important role in shaping understanding of the notions of both distributed responsibility and partial responsibility that the

7 National Science Advisory Board for Biosecurity (NSABB) 2007, *Report of the NSABB Working Group on Oversight Framework Development*, National Science Advisory Board for Biosecurity, Bethesda, Md.

8 Feakes, D., Rappert, B. and McLeish, C. 2007, ‘Introduction: a web of prevention?’ in B. Rappert and C. McLeish (eds), *A Web of Prevention: Biological Weapons, Life Sciences and the Future Governance of Research*, Earthscan, London, pp. 1–14.

9 Ibid.; and International Committee of the Red Cross (ICRC) 2003, *Biotechnology, Weapons and Humanity*, International Committee of the Red Cross, Geneva.

10 <<http://www.brad.ac.uk/bioethics/EducationalModuleResource/EnglishLanguageVersionofEMR/>> (viewed 25 August 2013), see lecture 2.

web of prevention model engenders for scientists. When considering the notion of partial responsibility, it is important to note that dual-use ethics has widely endorsed the idea that although '(t)he misapplication of peacefully intended research may cause moral distress among scientists ... it is difficult to argue that researchers should (solely) be held morally accountable for harm caused by unforeseen acts of misuse'.¹¹ Indeed, scientists are usually suggested only to have a limited amount of responsibility regarding the reuse of their data, and bioterrorist activities are thought of as 'beyond the responsibility of most life scientists either to prevent or to respond to'.¹²

This notion of partial responsibility is intimately connected to the idea of distributed responsibility. As suggested by Ehni,¹³ 'only a mixed authority which is constituted by the scientific community together with governmental bodies, but with the participation of scientists meeting their responsibilities so far as possible, can solve the problem'. Indeed, the web of prevention model engages a wide range of stakeholders who bear some responsibility towards addressing and controlling the dual-use potential of the life sciences, including security, health and judicial communities. The web of prevention model has been very influential in structuring discussions regarding dual-use controls and most commonly includes a number of different areas of interventions including public health initiatives, security surveillance, biosafety and biosecurity controls, and the education of scientists and the development of codes of conduct.¹⁴

The web of prevention model has thus been influential in promoting the idea that scientists bear only partial responsibility for dual-use issues, and that they cannot be expected to address the dual-use potential of their research alone. While there has been general agreement on this, there remains considerable discussion on how this idea of a partial responsibility may be understood.

In recent years, there have been a number of attempts to determine 'lists of (conditional) duties' for scientists that will clearly elucidate the expectations that they have towards dual-use concerns. These, as promoted by Kuhlau et al.,¹⁵ may be summarised as follows

- the duty to prevent bioterrorism
- the duty to engage in response activities
- the duty to consider the negative implications of their work

11 Kuhlau, F., Eriksson, S., Evers, K. and Høglund, A. T. 2008, 'Taking due care: moral obligations in dual use research', *Bioethics*, vol. 22, no. 9, pp. 477–87 at p. 483.

12 *Ibid.*, p. 477.

13 Ehni, H.-J. 2008, 'Dual use and the ethical responsibility of scientists', *Archivum Immunologiae Et Therapiae Experimentalis*, vol. 56, pp. 147–52 at p. 151.

14 As discussed in Rappert and McLeish, *op. cit.*

15 Kuhlau et al., *op. cit.*, pp. 483–6.

- the duty not to publish or share sensitive information
- the duty to oversee or limit access to dangerous materials
- the duty to report activities of concern.¹⁶

These duties (and similar ones, such as Ehni's)¹⁷ are predominantly presented as deontological duties and thus come with two important characteristics. First, these duties are usually presented as globally applicable (or at least, any discussion to the contrary is absent) and may be applied in any laboratory context around the world. Second, by virtue of being deontological, these duties are presented as moral obligations for scientists. Thus, there is the (explicit or implicit) understanding that the failure to fulfil them has ethical import.

This duty approach has made a considerable impression on current dual-use ethics, and formulations similar to the one presented above are often used in ethics pedagogy to inform discussion on responsibility and expectations.¹⁸ This presents an interesting contrast in current dual-use educational initiatives, and for ethics discourse in general. Although there is considerable discussion about the interplay between the (contextual) web of prevention and the ethical responsibilities of scientists, and although there is extensive debate on contextually suitable styles of pedagogy,¹⁹ dual-use responsibilities continue to be presented to scientists as a list of 'globally applicable' duties with little discussion about how they are applied in a contextual fashion. The next section considers this idiosyncrasy in further detail.

'Web of prevention' aside ...

Of course these duties are an excellent means of presenting dual-use responsibility discourse to scientists, and should not be viewed otherwise; however, that is not to say that this approach is not without its problems. In order to understand what these problems are, it is important to go back to these duties and examine them properly in light of the broader web of prevention. In particular, it becomes crucial to ask: what expectations about the research environment do these duties make?

16 Ehni proposed similar duties (Ehni, op. cit., p. 150): 'not to carry out a certain type of research; systematically to anticipate dual-use applications in order to warn of dangers generated by them; to inform public authorities about such dangers; not to disseminate results publicly, but keep dangerous scientific knowledge secret.'

17 Ibid.

18 National Research Council, 2011, op. cit.

19 There is a considerable amount of discussion about how dual-use ethics should be taught and who should be teaching the scientists. For an extensive discussion, see Rappert, B. (ed.) 2010, *Education and Ethics in the Life Sciences*, ANU E Press, Canberra.

The duties for scientists, as proposed by Kuhlau and her colleagues above, were subjected to a number of different conditions²⁰

- it must be within their professional responsibility
- it must be within their professional capacity and ability
- it must be reasonably foreseeable
- it must be proportionally greater than the benefits
- it must be not more easily achieved by other means.

A brief survey of these conditions, it must be noted, does not make provision for any deficiencies in research environments, lack of support or problems with carrying out the duties. Rather, these conditions seem to delineate student scientists from principle investigators, and technicians from researchers. Thus, these conditions provide little in the way of support for scientists working under research conditions that may be markedly different from the 'Western norm'.²¹

It therefore becomes important to question whether 'dual-use responsibility duties' such as those proposed above make implicit assumptions about research environments and the implementation of webs of prevention. If the duties discussed above are therefore re-examined in light of this, a number of key considerations are noted. First, the duty to prevent bioterrorism, while a laudable goal, may be seen to be largely dependent on the existence of a web of prevention in action. Without the combined efforts of the security, health and judicial stakeholders, it is difficult to conceptualise how this duty may be carried out. Without the integrated involvement of governmental and international bodies,²² it is difficult to conceptualise how such a duty would be acted upon.

Second, the duty to engage in response activities raises important questions about the responsibility of scientists in the absence of coordinated activities. Is it their responsibility to lobby for the establishment of response activities, or have they fulfilled their obligations solely due to the absence? Furthermore, if scientists are obligated to engage in response activities, are they similarly obliged to be involved in those not created in their own milieu? Are scientists, for example, in developing countries morally obliged to actively participate in any Western response activity, or is that in fact a form of ethical imperialism?

Third, although the duty to consider the negative implications of their work may at the outset be seen as self-explanatory, it is vital to consider that risk and benefit are interpreted quite differently around the world. Therefore, it is

20 Kuhlau et al., *op. cit.*, pp. 481–2.

21 As will be discussed in the following sections, these differences could be in regulatory controls, funding, extra-laboratory service provision, governmental involvement and support, and access to the international life-science community.

22 As proposed by Miller and Selgelid, *op. cit.*

highly likely that scientists in non-Western countries—particularly countries experiencing food insecurity, considerable healthcare challenges and (non-bioterrorism) security issues—may view the negative implications of their work in a totally different light to their Western colleagues.²³ Thus, are scientists to consider what they perceive to be the negative (and positive) implications of their work, or simply the negative implications according to a Western perspective?

The third, fourth and fifth duties (not to publish or share sensitive information, to oversee or limit access to dangerous materials and to report activities of concern) all depend on the provision of national structures that will allow scientists to report concerns, control their research and manage their security. In the absence of such structures, it becomes crucial to question where scientists' responsibilities lie. Furthermore, will issues such as the fear of losing international funding or collaboration mean that, in such circumstances, scientists will not seek international alternatives?

Even the briefest of critiques of these duties in light of differing research contexts highlights the importance of a more deeply contextualised dual-use ethics discourse. As not all research environments are equal in their social, physical and extra-laboratory support provisions, it becomes important to ask: what happens when scientists cannot fulfil these duties through no fault of their own?

Properly considering research environments

Such considerations, of course, present difficulties to any notion of 'global duties' for dual-use responsibility amongst scientists. In turn, it may be suggested that this presents a crossroads to dual-use ethics discourse. Either the notion of 'global duties' must be abandoned in favour of more contextually sensitive suggestions or the 'global duties' must be thoroughly excavated to eliminate the implicit expectations that they contain about research environments.

Such debates are, of course, extremely complicated and beyond the scope of this chapter. Nonetheless, although not offering answers, the rest of the chapter will concern itself with highlighting why such issues need to be taken extremely seriously—particularly in the realm of dual-use ethics pedagogy. If one considers the issues raised above, a number of questions immediately spring to mind. These may include whether it is unfair to expect scientists to act as whistleblowers when the likelihood of losing their job is near 100 per cent; whether it is feasible to expect scientists to report their concerns when there

23 Bezuidenhout, L. (forthcoming), 'Moving life science ethics debates beyond national borders: some empirical observations'.

are no structures in place for them to do so; and whether, in the face of extreme public health crises in many countries, the risk of losing funding outweighs any threat of terrorism and thus perceptions of risk.

These concerns all require serious consideration. They suggest not only that achieving a ‘common culture of awareness and a shared sense of responsibility’²⁴ amongst the global scientific community may be more complicated than initially envisioned, but also that current methods of raising dual-use awareness may alienate—rather than incorporate—scientists from non-Western research environments. If scientists are presented with such duties during dual-use ethics education without accompanying discussion on the strengths and limitations of implementing them contextually, it is just possible that such initiatives may do more harm than good.

Such hesitations relate to another chapter in this volume, by Judi Sture, which examines the concept of ethical erosion within communities of learners. It is possible that the presentation of ‘idealised’ duties or ‘unattainable’ standards of behaviour may significantly detract from attempts to engage scientists in discourse about dual-use responsibilities. Indeed, studies with scientists in a number of African laboratories strongly suggest that the wholesale importing of Western ethical approaches to teach dual use to these scientists was limited in success.²⁵

These issues are further complicated by the lack of capacity in most developing countries to invest in home-grown ethics initiatives—at least for the moment. Thus, as it stands, within developing countries ethics education often remains largely in the hands of foreign funding agencies or interest groups. It is thus plausible to reiterate the question: is a lack of understanding of the structure of research within developing countries hampering efforts to build capacity within ethics?

Researching in developing countries

One of the reasons that these issues of contextuality are so poorly represented in dual-use ethics discourse is because of its historical legacy. Dual use has really only become a topic of concern in the life sciences since the terrorism events of 2001. In the subsequent years of the ‘war on terror’, the majority of dual-use discussion, quite naturally, occurred in the United Kingdom, the United States and a small number of other developed Western countries.

24 National Science Advisory Board for Biosecurity (NSABB) 2006, *Globalization, Biosecurity and the Future of the Life Sciences*, The National Academies Press, Washington, DC.

25 Bezuidenhout, op. cit.

Within these countries, the physical research environments of laboratories and the regulations governing biosafety and biosecurity have high degrees of similarity. Indeed, widely endorsed prerequisites for biosafety and biosecurity provisions²⁶ have further strengthened the harmony and standardisation between these laboratories. Thus, in the case of most dual-use discussions, the presence of a minimum level of biosafety and biosecurity regulation (that is implemented effectively) is not discussed *because it is already in place*.

Furthermore, when one considers the process of daily life-science research in light of any web of prevention, it becomes evident that a number of additional assumptions are also made about research environments *because of key similarities between laboratories in the United States, the United Kingdom and the European Union*. These include issues such as

- the existence of core funding for research facilities
- stable, adequate and reliable water, electricity and transport services
- stable, adequate and reliable postal, telecommunications and internet provision
- skilled support staff, such as technicians and those who maintain or repair equipment
- efficient and informed customs controls
- national regulations governing and guiding biosafety and biosecurity measures
- capacity and protection for the reporting of misconduct.

Unfortunately, outside a Western context, such provisions should not be automatically assumed. Indeed, many laboratories around the world represent extremely different working conditions—ones that challenge these assumptions. Many laboratories in developing countries, as will be discussed below, struggle daily with problems that range from a lack of core funding for facilities to unreliable electricity supplies.

Despite these different working conditions, it is vital to note that the research in these laboratories should not necessarily be considered unethical, unsafe or insecure. Rather, scientists have often found innovative ways to work around the limitations of their environments²⁷ and produce high-quality research;

²⁶ Laboratory biosafety includes areas such as recruiting and retaining qualified individuals, training, laboratory work practices (for example, disinfection, waste handling, material control and accountability), personal protective equipment, medical surveillance, maintenance, access controls, self-assessments, documentation, corrective actions, reporting requirements, and incident response plans. Attempts to standardise such procedures have been spearheaded by the World Health Organisation (WHO), which has published guidelines such as World Health Organisation (WHO) 2004, *Laboratory Biosafety Manual*, World Health Organisation, Geneva.

²⁷ There are a number of innovative low-cost alternatives to many biosafety and biosecurity requirements while still ensuring that the laboratories comply with international standards.

however, what does need to be considered is whether the current Western-centric approach to dual-use responsibility as presented in current ethics education may potentially alienate scientists by presenting them with duties they cannot fulfil.

Research environments in developing countries

Literature on laboratory life in developing countries is comparatively scarce. Indeed, the majority of discussion of laboratory environments, provisions for research and national support structures often comes from research and development (R&D) focused policy reports aimed at capacity building and investment. These reports tend to focus more on the shortcomings of these research environments rather than innovative alternatives; however, they provide some important considerations about research environments in developing countries.

The issues identified in these reports include²⁸

- small, undifferentiated institutions
- lack of funding and lack of effective mechanisms for utilisation of funds
- high teaching burden
- lack of experienced mentors due to brain-drain
- history of poor investment in higher education and research
- lack of buy-in by institutions for new initiatives (such as centres of excellence)
- need for networking and networks
- corruption, mismanagement and institutional rigidity
- lack of governmental support, funding and control
- lack of vetted information about possible collaborators and institutions
- need for strong administrative and managerial skills
- inadequate resources and allocation thereof.

Furthermore, very few developing countries currently contribute even 1 per cent of their gross domestic product (GDP) to science R&D. Because of this lack of governmental involvement, many of these laboratories lack dedicated core funding, meaning that all day-to-day research expenses must somehow be

28 As informed by the fieldwork; Kiringia, J. M., Wambebe, C. and Baba-Moussa, A. 2005, 'Status of national research bioethics committees in the WHO African region', *BMC Medical Ethics*, vol. 6, no. 10; Fine, J. C. 2007, 'Investing in STI in sub-Saharan Africa: lessons from collaborative initiatives in research and higher education', *Global Forum: Building Science, Technology and Innovation Capacity for Sustainable Growth and Poverty Reduction*, Washington, DC; and Council on Health Research for Development (COHRED) 2010, *Fact Sheet: NEPAD-COHRED Strengthening Pharmaceutical Innovation in Africa*, COHRED, Johannesburg.

covered by grants for dedicated projects. This has far-reaching implications, as often salaries for researchers and technicians are not guaranteed by the research institutions.

Taken together, such characteristics raise some important considerations for the duties presented above. In particular, the disjunction between the 'ideal and real' research environments as well as the distance between the 'desired and actual' behavioural outcomes may have significant impacts on attempts to engage developing-country scientists in dual-use discussion.

Between 2011 and 2012, I conducted a large number of interviews with scientists in a range of African life-science laboratories.²⁹ This research, which is also discussed in a number of publications,³⁰ aimed to examine whether developing-country scientists engaged easily with the dual-use debate as it is currently presented in educational modules. This study thus, incorporating the issues raised above, questioned whether the current approaches to dual-use responsibility were too 'Westernised' for scientists in these countries and needed re-examining.

The majority of the participants in this study had problems with the concept of dual use as it was presented in current educational modules. In particular, the strong focus on bioterrorism and the perceived lack of sensitivity towards the problems they experienced in their daily research were often used as justifications for this negative reaction. The two following sections detail a couple of the most prevalent responses: first, that dual-use was not a problem for African scientists, and second, that even if it was a problem, there was nothing that could be done about it.

Why is dual use my problem?

Many of the scientists interviewed approached the concept of dual use as a problem far removed from their personal research. While many of the scientists expressed a strong academic interest in the problems associated with dual use, they nonetheless maintained that it was not a problem for African scientific research. In many interviews participants made comments similar to: 'I think that in Africa we just don't deal with such questions. I think it's more in the domain of the Western world, America, UK, where the threat of bioterrorism is a very real threat and so I think this issue is poignant there.'

Some of the reactions, on the other hand, were more extreme and at least 20 per cent of interviewees expressed hostility regarding the concept and its presence

29 At least 40 interviews in four different sites (three countries) with participants ranging from postgraduate students to heads of departments and institute directors.

30 See Bezuidenhout, *op. cit.*; and Bezuidenhout, L. (forthcoming), 'Ethics in the minutiae: examining the impact of daily laboratory processes on ethical behaviour and ethics education'.

in international debates. In many cases, as below, scientists expressed frustration at what they saw as a skewed Western perspective of the state of science, emphasising the other serious issues that they felt should take precedence. One participant was emphatic in their opinion, stating:

I thought it was totally irrelevant and paranoid on the part of the Western world for this threat that often doesn't materialise and it's just huge amounts of money that go into fighting this phantom threat where I feel like we have more important things to do here as we're in the middle of such a huge HIV and TB epidemic and we just want to get on with doing the research. It was not an issue that I'd ever considered before and quite frankly I don't feel it's very relevant.

Many similar responses mentioned that dual use was 'just not a topic for discussion' because of the considerable healthcare and food-security challenges within these countries that the scientists were attempting to address through their research. Such perceptions of risk and benefit obviously differ from the expectations of current dual-use discourse, and may significantly challenge how the 'duty to consider the negative implications of their work'³¹ was interpreted by these African scientists. Furthermore, one must question how the 'duty to prevent bioterrorism' might be interpreted if, as with the participant quoted above, scientists perceived the topic to be 'totally irrelevant and paranoid'.

Such considerations have far-reaching consequences for the success of ethics education and the perpetuation of dual-use awareness. Lack of personal buy-in to the concept of dual use due to differing perceptions of risk and benefit has severe consequences for ethics pedagogy, as students will struggle to make the connection between the information received during their instruction and their daily behaviour. This undermines the concept of a culture of responsible awareness and questions the effectiveness of concepts such as codes of conduct for the life sciences.

Nonetheless, during this fieldwork a number of the participants manipulated the dual-use concept to fit the concerns within their own environment. Thus, still taking dual use to refer to 'the potential for beneficial scientific research to be misused for nefarious purposes by a third party',³² the scientists connected the harm caused by a third party to fearmongering within irresponsible scientific journalism instead of bioterrorism. By contextualising the concept within their own research environment, the participants were then able (and willing) to critically re-examine the concept and its utility within their daily research.³³

31 One of the duties proposed by Kuhlau et al., *op. cit.*

32 As proposed by Miller and Selgelid, *op. cit.*

33 This is extensively examined in Bezuidenhout, 'Ethics in the minutiae', *op. cit.*

Even if dual use is a problem, what can I do about it?

Another characteristic of many of the participants interviewed was that they removed themselves from responsibility for the dual-use problem by emphasising their lack of agency for engaging with any sort of dual-use control. This was often related to a number of characteristics within their environments. In many cases, participants suggested that '[b]eing alone you can't change the system [and] you just become a problem to the institution. It has to come from above. If you come somewhere personally and tell them about standards you are causing problems.' The participants commonly associated these feelings with issues within their research environments.

Those at all the field sites mentioned the difficulties of getting reagents and samples in and out of their countries. They mentioned that poorly trained border officials, unrealistic foreign export and import requirements and poor transport infrastructure significantly complicated their daily research. Statements such as '[i]t already takes four to six weeks to get a delivery through, so any extra restrictions will make it even worse' regularly appeared in the interviews. In such cases, it must be asked whether expecting scientists to 'raise awareness of dual-use concerns'³⁴ and draw attention to 'the negative implications of their work'³⁵ are remotely feasible.

At one of the field sites I was made aware of the fact that the government did not provide any core funding for the facility, and that the entirety of their running costs and research budget came from foreign grants. This, fieldwork participants suggested, raised two important problems for the dual-use control duties. First, as the possibility of losing their funding had implications far beyond stopping a project, many participants stated that they would be unwilling to 'report activities of concern'³⁶ due to the possibility that 'misunderstandings might shut us down entirely'. Second, the participants highlighted that any expectations of improving security or 'limiting the access to dangerous materials'³⁷ were unrealistic as general facility maintenance and improvement were 'not included in project-specific grants'. Thus, the participants viewed themselves as in a difficult position in which not raising dual-use concerns was indeed the 'lesser of two evils'.

In all of the facilities participants also regularly asked me what 'response activities' they had a duty to engage in, and to whom they could 'report activities of concern'. In both cases it was patently clear that a lack of government involvement and low levels of institutional buy-in for dual-use control meant

34 One of the duties proposed by Kuhlau et al., *op. cit.*

35 One of the duties proposed by *ibid.*

36 One of the duties proposed by *ibid.*

37 One of the duties proposed by *ibid.*

that there were often no answers to be had. It was my impression that presenting these duties without a proper, contextually considered understanding of how it may be implemented often turned the participants off the dual-use discussion in its entirety, as it was once again perceived as ‘not a problem for Africa’.

If, as is the case in dual-use ethics, the duties continue to be presented as moral obligations, it is also easy to see how these scientists are placed in ethically untenable positions that compromise their ethical development. Thus, structural issues within the research environment, if unaddressed, have the potential to undermine ethical training. Continually facing deficits in the ethical conflicts between expected duties and the characteristics of the research environment may cause frustration and resignation amongst the scientists and lower the potential for them to get involved in ethical discussions. It must be asked how to reflect these environmental issues within ethics training.

Starting to re-contextualise dual-use ethics

This chapter thus presents a contrasting perspective of dual-use ethics discourse and pedagogy to prevailing norms. Based on the theoretical analysis and the fieldwork discussed here and elsewhere it strongly suggests that the current dual-use ethics discourse is largely de-contextualised due to the absence of discussion on variations in research environments. This has significant implications for discussions on responsibility and duty rhetoric and consequently for the building of a ‘common culture of awareness and a shared sense of responsibility within the global community of life scientists’.³⁸

The majority of responsibility and duty rhetoric within dual-use discussions is strongly influenced by the web of prevention model of dual-use oversight. Despite a strongly deontological, global approach to these discussions, the chapter highlighted that these duties have a number of implicit assumptions about the laboratory (and extra-laboratory) environments in which life-science research takes place. Unsurprisingly, due to the historical legacy of the dual-use discussion, these assumptions are based predominantly on a Western understanding of a ‘minimum level of research environment’. Such an environment includes key contributions from the government, the research institution and the general surrounding society.

As this chapter points out, however, such an environment only reflects a portion of laboratories around the world, and in many different countries high-quality research is occurring under significantly different conditions. In such

38 National Science Advisory Board for Biosecurity 2006, *Globalization, Biosecurity and the Future of the Life Sciences*, Washington D. C., The National Academies Press. See pp 5.

cases, the implicit assumptions about research environments inherent within ethics discourse may serve to alienate scientists from engaging within the dual-use debate. Paradoxically, as the life sciences become increasingly global, these previously marginalised communities of scientists are precisely the ones that urgently require representation.

So, it remains to be asked, what can be done? As mentioned above, it may be that dual-use ethics—particularly responsibility ethics—needs to be critically re-evaluated. Either the notion of ‘global duties’ for dual-use control must be abandoned in favour of more contextually sensitive suggestions or the ‘global duties’ must be thoroughly excavated to eliminate the implicit expectations that they contain about research environments. Of course, this is a complicated discussion and will require considerable attention from the dual-use ethics community.

Much else, however, can be done. Within much dual-use discussion there is a tendency to talk about research environments as largely homogenous bodies. Although, of course, much of the discourse remains centred in (and on) Western countries, developing a sense of awareness of the heterogeneity of research environments (even within these countries) cannot help but strengthen current discourse. Furthermore, cultivating an awareness of the challenges faced by developing-country researchers will no doubt facilitate their inclusion in international discourse.

Within ethics pedagogy, any gestures towards contextual sensitivity will no doubt be much appreciated. In particular, educationalists should consider how discussions about *implementing duties into daily life* may be fostered by pedagogical initiatives. With regards to developing-country scientists, however, future educational initiatives should also consider whether developing ‘more context specific case studies’³⁹ can really fix current problems, or whether considerable and sustained attention needs to be paid to the problems identified above.

It has often been quoted that dual use cannot be addressed within national borders or in institutions, but requires a regional—indeed an international—response due to the nature of the threat and the characteristics of modern life sciences. In order to adequately realise this need, a global body of dual use-aware scientists is vital. It is therefore becoming increasingly important that the previously marginalised groups of scientists from developing countries become key players in the development of a truly international dual-use discussion. In order to do so, the first step is to recognise the differences inherent in others.

39 National Research Council, *op. cit.*