OTHER INTERNATIONAL DEVELOPMENTS

Environmental Tribunals as a Mechanism for Settling Disputes

by Donald Kaniaru*

Formal and informal dispute settlement is an accepted mechanism or institution in our societies and, as the need arises, different jurisdictions establish different tribunals to deal with issues ranging from economic, social and commercial, to natural resource issues. In many countries,[1] tribunals have been established to address specialised areas or issues and may be either *ad hoc* or standing institutions. Many issue-based mechanisms have been formally established in response to needs under specific Acts of Parliament.[2] The list is inexhaustible.[3]

Of the different topical and substantive areas where tribunals exist, no area exceeds the environment, in terms of its scope and significance. The environment respects no political boundaries and impacts local, national and global dimensions. Critical issues in the field of the environment have in the past three decades been wrapped up in negotiated regional and global instruments such as policy declarations, principles, guidelines as soft law and treaties as binding. In these instruments, there is a measure of commitment by states particularly where states have declared the instruments binding, ratified them and enacted them into national law.

Tribunals addressing environmental matters have evolved differently in different countries and regions. For instance, in Scandinavia (Sweden, Finland), environmental tribunals originally focused on water. At present water and environment have been consolidated,[4] and the matters are handled under Environmental Courts, which are regional courts with an Environmental Supreme Court at the apex. In Australia they exist in several states. In particular, in New South Wales, the Land and Environment Court was established in 1979 and has been in operation longer than most other tribunals. It has made its name globally with well-established decisions which are widely cited.[5]

As the various tribunals evolve differently, in order to cater for distinct environmental concerns of different countries and regions, they have developed different attributes peculiar to their particular circumstances. Concerning jurisdiction, some tribunals have both original and appellate jurisdiction such as the Vermont Environmental Court (United States),[6] the New South Wales Land and Environment Court (Australia) as well as the Pakistani Environmental Tribunal.[7] The Kenyan, Mauritius[8] and Tanzanian[9] tribunals on the other hand only have appellate jurisdiction.

Lately, there has been tremendous growth in the importance attached to the subject of environmental management and the environment as a whole. Indeed, the past decade alone has been a period of intense activity and innovation around the world in the revision and formulation of national laws concerning natural resources and the Environment.[10] Subsequently, in the international community, the issue has experienced phenomenal growth, with the establishment and strengthening of institutions at national, regional and global levels, dealing with different aspects of the environment.[11] The purpose of such institutions being, to specifically provide adequate policy thrusts and enforcement mechanisms to support environmental laws and ultimately prevent damage, or further damage, or in some cases even reverse existing environmental degradation.[12] In numbers, however, environmental tribunals are still not abundant, in light of the size and importance of this mandate.

Particularly in Africa, however, environmental law as an emerging discipline has very few coherent enforcement tools. Few of the 53 African countries have tribunals in the field of environment. They include Kenya and Mauritius, and Tanzania, which has a provision for one.[13] Uganda does not have a tribunal thereby handling environmental disputes in ordinary courts including the High Court. In Uganda's favour, however, they have adopted environmental legislation[14] specifically dealing with environmental issues, and addressing judicial process.

Beyond Africa, we find tribunals in other commonwealth countries, including Guyana[15] and Trinidad and Tobago,[16] both of which address environmental concerns.[17] In Asia and the Pacific in addition to the above-mentioned tribunals in Pakistan, Australia and New Zealand, countries such as India and Bangladesh use their courts by focusing certain judges on the environment (termed as "green benches"). Superior courts act directly on the environment in Nepal and Sri Lanka. It is in enumerating the significant role environmental tribunals play that we can see their import as a concept in the management of the environment.

Tribunals as Desirable Tools of Environmental Management

Environmental tribunals address environmental issues and review many laws and regulations that impact the environment in a variety of land-use practices across sub-

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stantive areas. In order to ensure accurate and precise decisions, they make use of resource persons, whether employees, outside experts, commissioners, assessors or other "friends of the tribunal". Tribunals can and often do access experts in the various environmental fields for consultation. In this way disputes or areas of uncertainty can be squarely considered and decided upon.

In these respects, the Kenyan National Environment Tribunal's (NET) establishment, operations, composition and modalities of work are defined in the Environment Management and Co-ordination Act (EMCA),[18] and the Forest Act[19] and the Tribunal's Rules of Procedure.[20] The EMCA came into force in January 2000 and the Forest Act on 1 February 2007. The Tribunal which now draws its jurisdiction from both Acts became operational in 2002.

EMCA, as an umbrella[21] act, brings a number of stakeholders on board, such as lead agencies, which are subject to other specific laws but which provide invaluable assistance to NET's work and are or should be in harmony and consistency with relevant environmental management laws. Their participation helps ensure full coordination and respect of views of each institution and its laws.

Another important provision relates to the procedure of choosing, nominating or appointing the members of a tribunal. Such procedures vary from state to state[22] and criteria for those appointed are clearly stated: appointees must be experts in their own right in environmental law. EMCA[23] for instance, provides for the appointment of a chair and four members[24] and outlines the procedure for nominating each of these by name and appointment by the Minister. The chair is nominated by the Judicial Service Commission, and should be a person qualified to be a judge of the High Court of Kenya. The other two members should be lawyers; one nominated by the Law Society of Kenya and the other a lawyer with professional qualifications in environmental law appointed by the Minister. The two others are persons who have demonstrated exemplary academic competence in the field of environmental management appointed by the Minister. A different approach is taken in Guyana, where the Environmental Protection Act empowers the President to appoint the Chairman of the Tribunal, who must be an attorney of not less than 10 years standing. The chair of the Pakistani Tribunal is appointed by the President after consultation with the Chief Justice, and by law should be either a former judge of the High Court, or at least a person who would be qualified for such an appointment. Thus the tribunals have the advantage of both internal proficiency and outsourcing.

With the benefit of such expertise, environmental tribunals are able to thoroughly review and address all points of fact, process and pertinent law in matters before them. In the event of an appeal, therefore, it would be hardly necessary for the High Court to go over witnesses anew. In the Kenyan case, the High Court normally would, unhesitatingly, accept the NET's descriptions of facts, on any appeal from a NET ruling given the combination of legal knowledge and environmental management in the five NET members (of whom three are appointed on the basis of their skills in environmental law.) In this respect I am reminded of the sentiments expressed by Dr Ahmed Nazif, the Egyptian Prime Minister, on the occasion of the creation of the Union of Arab Supreme Courts for the Protection of the Environment,[25] who stated, *inter alia*:

> "we must enhance awareness of environmental authorities, *judges* and the public of the environment so that we can achieve sustainable development. Moreover *we need professional training of judges* and other legal stakeholders in this matter." Adding: "*we do not expect the Judge to be an expert on environment*[26] but *we expect that he be aware of the issues relating to the environment."*….. [emphasis added.]

Environmental tribunals relieve ordinary courts of backlog. Although violation of environmental law resembles any other criminal matter, under which the defendant must have shown the requisite *mens rea* (the guilty mind) and *actus reus* (the prohibited act),[27] the other elements of environmental adjudication would create a staggering backlog if included in conventional courts' Cause Lists – a backlog already exceeding one million cases according to the Honourable Justice Nyamu.[28] Environmental matters, moreover, impact investment decisions involving millions of shillings, loans and environmental health on one hand or pollution on the other hand. Undue delay would hardly be businesslike and might compromise critical issues. Environmental tribunals would therefore prove very helpful in this regard.

Further, in some countries, tribunals are speedy and cheap; that is, much cheaper than the courts. Presently there are no costs for filing appeals in NET, although the Honourable Chief Justice of Kenya notes that this issue is being reviewed. Both the Guyana Tribunal as well as the Trinidad and Tobago commission do not charge filing fees.

Environmental tribunals offer an escape from the rigidity that is embraced in court processes. Under Trinidad and Tobago's Environmental Management Act of 2000, for example, the Environmental Commission has the express power to apply mediation as an alternative dispute resolution method, and is statutorily encouraged to use this power.[29] The Pakistani Environmental Tribunal decided in a recent appeal[30] that:

> "the Environmental Tribunal being an administrative Tribunal, having remarkable distinctions, and not being a Court or special Court, did not bear inherent relaxations in respect of joining common factors as amounting to causes of action/charges but certainly not to negate the substantial principles of natural justice…."

Rules of Evidence and Civil Procedure Code

In Kenya (and also in Tanzania[31]) the NET is not to be bound by the rules of evidence as set in the Evidence Act.[32] According to its rules of procedure,[33] the NET "shall conduct the hearing in such manner as it considers most suitable to the clarification of the issues before it and generally to *the just handling of the proceedings* and shall, so far as appears to it appropriate, *seek to avoid legal technicality and formality in its proceedings*" (emphasis added). To this end, the Tribunal has consistently reminded advo-

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cates who have been tempted to invoke regular procedures before the Tribunal. However principles of natural justice and due process generally are inherent in the work of NET.

Environmental problems do not, in their nature, respect political boundaries. Therefore in the existing environmental tribunals, anyone can appear, whether in person or represented by an advocate. There is also no requirement to show interest, or injury. This is the case in Guyana,[34] Trinidad and Tobago[35] as well as in Tanzania's[36] Environmental Appeals Tribunal. In an appeal to the Commission of Trinidad and Tobago, for example, the qualification of an "interested person" appealing the decision of their Environmental Management Authority can be anyone who has "submitted a written comment on the proposed action during the public comment period of the given decision".

In Kenya, the NET's mandate arises from the challenges to actions and decisions of the country's National Environmental Management Authority (NEMA) and its committees, any of which can be appealed to NET. Any human being or legal entity has access without having to demonstrate in the Tribunal that they have suffered direct damage or injury. While such 'accessibility' to the Commission or Tribunal may seem flawed or even amorphous, the Kenyan context provides specifically that "Every person …. is entitled to a clean and healthy environment and has a duty to safeguard and enhance the environment."[37] Thus, although Kenya, before EMCA, and Nigeria formerly revered the common law rule of *locus standi* that restricted access, that concept now has no place in environmental matters. Even without the statute, the motivation of these countries to follow other jurisdictions (India and South Asia generally) in environmental matters would have been great. Tanzania went the South Asian way well before it enacted its Environmental Management Act and provided for the establishment of its Tribunal.

Environmental tribunals provide a flexibility that is key when adjudicating environmental issues. For instance, Guyana's Environmental Protection Act No. 11, 1996 in section 55(6) specifically enables appeal on grounds that would previously have been excluded from appeal in other contexts. Kenya's NET has so far[38] routinely visited sites at issue, either at their own instigation, or on invitation by a party. Site visits have occurred in order to appreciate issues better and have been useful in all cases.

Another measure of flexibility is the manner in which tribunals can be assisted by assessors-cum-experts. Tribunals often comprise a mix in their membership of lawyers and non-lawyers versed in environmental management, or scientists, or people of other disciplines altogether. Assessors can and do therefore assist in the reaching of well-balanced decisions, considering numerous issues in the field of the environment. The professionalism of these experts – their loyalty not only to those hiring them but also to their profession and broadly to environmental concerns – must be recognised as the factor that determines the value of these inputs.

An obvious yet important point is that the field of the environment, including the development of its legal and policy tools, is and will remain science-driven. The evolution of the concept of sustainable development has science as its backbone. Environmental tribunals, as well as the courts, are expected to draw from such processes in enhancing environmental law jurisprudence. Using the example of India (which does not have an environmental tribunal, even though they have considered such an option), the country has been hailed for handling some of their environmental issues through their High Courts and at appellate level, their "activist" Supreme Court. In the same breath, however, they are heavily criticised for the haphazard, if not inconsistent, way in which they apply environmental law. Their Air and Water Environment Acts for instance are not comprehensive enough to cover in great detail the environmental impact of large projects like dams on marine life. Without the benefit of jurisprudence from tribunals, these courts are limited to seeking different experts on different issues and applying this information in the limited context of their statutes.[39]

Another key factor in discussing emerging jurisprudence from tribunals, is their relationship with the higher courts. Various jurisdictions address this issue very specifically in the context of final determination of matters brought before the tribunals. The decisions of Trinidad and Tobago's Commission, for example, are final on questions of fact, damages, or compensation. However, an appeal lies with the Court of Appeal on any question of law upon entry of final judgement by the Commission.[40] In appeals from the Guyana Tribunal, the Court of Appeal can hear and determine any question or questions of law arising on the case and can either affirm, reverse or amend the determination in respect of which the case was stated. It could also remit the matter to the Tribunal with the opinion of the Court of Appeal thereon.[41] The Vermont Environmental Court legislation enables appeal directly to that State's Supreme Court. This appeal does not stay an order but if there was payment of penalty then this is stayed. If a respondent wants the order stayed then he has to make a specific application to the Supreme Court in that regard.[42]

In the Kenyan context, however, there is room for ambiguity due to the overlapping of various laws. Under EMCA, there is no express requirement that an appeal seeking final decision by the High Court[43] must be limited to points of law only and not facts. Further, the above-quoted right to a clean and healthy environment[44] means any person can proceed straight to the High Court without first appearing before NET on the environmental issue. Appeals through the NET, therefore, would be facilitative until the law in place is reviewed to different effect. In one matter, for example the Plaintiff had first gone to the High Court. At that point, the parties, acting by consent, asked the High Court to refer the matter to the Tribunal, which then invoked the procedure set forth in EMCA, sections 126 (2) and 132. I commend this approach, which should administratively be followed in the Courts. The matter having been heard and sieved through the NET would have the benefit of a review by experts at the NET level before a "final" appeal to the High Court following the procedure outlined in section 130 of EMCA. Had the High Court heard the case in the first instance and a party was dissatisfied, that party could proceed to the Court of Appeal. If such became the way of life, then no party would

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wish to go via the mandate established and provided in EMCA Part XII, which has, as the final appeal, the decision of the High Court.[45]

This ambiguity would warrant legislative clarification when the EMCA is revisited following some years of rigorous application. In addition to harmonising the various aspects of procedure, appointments, terms of reference and appeals from tribunals or appeal boards, this aspect of judicial authority and process should be finalised as well. The revision should underline and settle plainly that the appeal would be on law only (not facts), and also how many judges[46] should hear and what should happen if the Chair presiding over a Tribunal is at the level of a judge (or is a retired judge) as is the case in one tribunal. Several laws among the Commonwealth countries have been mentioned above, and these offer the way forward in future.

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A positive trend is emerging in this area. In his opening address to the 2006 Judicial Colloquium on Environmental Law, the Chief Justice announced that he was considering setting up a Land and Environment Division in the High Court, which would also deal with environmental matters and that NET appeals would be handled in that Division. This was established this year through Gazette Notice Number 301 of 2007. No appeals have been heard yet; however this division will effectively clarify matters. We now also have appellate jurisdiction for decisions taken by the Forestry Service Board under Act No. 7 of 2005 that has just entered into force on 1 February 2007 per LN No. 19 dated 26 January 2007 (Kenya Gazette Supplement No. 7 of 7 February 2007).

Challenges Faced by Environmental Tribunals

Like every environmental organ, tribunals face some serious challenges. Flexibility, although an important aspect, is lacking in some tribunals. Ordinarily a tribunal should manage its work and be able to proceed with its activities (if it does not have a vice-chair as some do not) by selecting one of its members to chair a specific meeting or to consider a matter in the absence of the Chair. This is, however, not always the case; in some tribunals, business may only be conducted under the Chair. The Guyana Tribunal as well as the Trinidad and Tobago Commission make provision for a vice-chairperson, who can take on this responsibility. However, the Pakistani Tribunal, like Kenya's NET, requires that the Chairperson be present for every sitting. Mauritius' Environment Protection Act also makes no alternative provision.

Ideally, the independence of the tribunals should be indispensable, both in fact and in perception, making it effective in its roles. This need is embodied or supported in decisions regarding financial allocation and recruitment of personnel, as well as in streamlined procedures of appointment of members of the tribunal, and renewal thereof. Physical accommodation, and the adequacy of premises, for example, play a key role in ensuring the independence of environmental tribunals. This goal, however, remains elusive. The Trinidad and Tobago Commission, though better provided for than many in that its finances are drawn from a consolidated fund, remains subject to political/budgetary controls, as the President still determines remuneration.[47] The Guyana Tribunal is wholly dependent on the President's decision regarding compensation and does not have the benefit of drawing from a consolidated fund.[48] In others like in Kenya, the Minister decides on remuneration which, to date, is yet to be determined. Mauritius' Tribunal has a special fund for their remuneration and expenses.[49]

No ideal situation exists, as yet; the independence of the judiciary, and its relationship to financial matters is a subject of discussion, at the behest of the judiciary in the Kenyan parliament. Tanzania in this regard however is closer to achieving the primary objective than the other African states, as the remuneration of its proposed tribunal is to be determined by Parliament and that sum is to be charged against a set fund for the purpose of enforcement of sustainable management of the environment.[50] The test, however, will be when the tribunal is set up and is operational.

Apart from financial independence, another hurdle Tribunals face is the need to establish independence from the existing environmental Authorities in their respective jurisdictions. At one time NET and NEMA were in the same premises. Erroneously, therefore, NET was referred to as NEMA's Tribunal – an image its members have vigorously fought and continue to fight in environmental awareness workshops with the public.[51] Pakistan seems to have effectively overcome this challenge. This is partly because there are several environmental authorities, which are known to be agencies that cater to different regions (federal and provincial) as well as different environmental aspects.[52] They, therefore, cannot be linked with the Environmental Tribunal in the minds of the public and other agencies.

Conclusion

The law on environmental tribunals is still developing. Apart from developed countries like Australia, the countries wrestling with this legal development challenge face many issues that still remain to be sorted out. Critical questions include whether tribunals should have both original and appellate jurisdiction and therefore be more closely integrated to the judiciary, as well as points relating to their funding, the mode of appointing their personnel and determination of remuneration or an appropriate working environment.

Despite such challenges, there is no doubt tribunals have a crucial role to play in the field of the Environment

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as can be evidenced by NET making inroads in the complex area of strengthening environmental management in Kenya. In barely two years, it has handled many complex cases and continues to attract several more, not only from Nairobi province but other provinces as well. Of the seventeen cases so far filed, none has come from Eastern, North Eastern, Nyanza and Western Provinces. The majority have come from Nairobi (twelve) and Rift Valley (three) and one each from Central and Coast Provinces. NET rulings are published in the Official Gazettee, and are also available through the Kenya Law Reports website.

Notes

1 This paper, while discussing Kenya's National Environment Tribunal, also landscapes the topic generally and in particular draws from other tribunals in Commonwealth developing countries. It therefore refers to developed countries but sparingly, and omits other countries with tribunals, such as Costa Rica, which is outside the Common law group of countries.

2 Informal mechanisms exist, or have existed, under clans, villages or chiefs for a range of issues. They contribute to societal stability.

3 Kenya for instance has not less than thirty tribunals including the Cooperative Tribunal (Cooperative Societies Act (No. 12 of 1997 Section 77(1)); Industrial Property Tribunal(Industrial Property Act (Cap. 509) Section(117,118(1)) to mention but a few.

4 This is unlike Kenya where EMCA of 1999 and the Water Act, No. 8 of 2002 provide for separate appeal mechanisms and seem to compete rather than cooperate. While section 148 of EMCA has, in case of conflict, pre-eminence over other acts, it has no impact on newer acts like the Water Act unless like in the Forest Act 2005 it is expressly so provided.

5 Chief Judge, Brian Preston, in his address to the colloquia, did full justice in his eloquent presentations and substantial papers on the Role of the Judiciary in Promoting Sustainable Development: the experience of Asia and the Pacific in 2006 and 2007; examples of the NSW citation are *He Kaw Teh v R* 1985, 157 CLR 523; *R v Wampfler* 1987, 11 NSWLR 541 at 546; Pereira v Director of Public Prosecution 1988,82 ALR 217; among others. Other decisions such as the *Locus classicus* case of *Leach v National Parks and Wildlife Service and Shoal Haven City Council and Another* are available in the *Compendium of Judicial Decisions on Matters related to the Environment (National Decisions) UNEP/UNDP/Dutch Government joint Project on Environmental Law and Institutions 2001; Environmental Law Case Book for Practitioners and Judicial Officers-Judicial Symposium on Environmental Law and Practice in Uganda* published by UNEP; Greenwatch 2005.

6 Vermont Statutes Annotated, Judge Meredith Wright Provision 8012 and 8013.

7 Constituted under Section 20 of the 1997 Act with exclusive jurisdiction to try serious offences and to hear appeals against the orders of Environment Protection Agencies (EPAs).

8 Act Number 34 of 1991 Environment Protection Act.

9 Yet to be set up.

10 For a comprehensive survey, see FAO Legal Office and Sustainable Development, *Since Rio: Legal Trends in Agriculture and Natural Resource Management* (FAO, 2003) and *Compendium of Environmental Laws of African Countries* by UNEP/UNDP published under Padelia, UNDP and UNEP in 8 volumes and supplements.

11 *Making Law Work: Environmental Compliance and Sustainable Development,* Volume 2, p. 427. Edited by Durwood Zaelke, Donald Kaniaru and Eva Kruzikova, 2005, Cameron May Limited.

12 *Environmental Jurisprudence* by Iwona Rummel-Bulska, Principal Legal Officer and Chief, Environmental Law Branch, UNEP, Kenya National Judicial Colloquium on Environmental Law, 17–22 April 2006.

13 See Tanzania's Environmental Management Act, 2004, Part XVII, Section 204(1) and 212(1). The Tribunal has not been constituted.

14 See Ugandan National Environment Act Cap 153 including Part XIV, sections 103–105 on Judicial Proceedings.

15 See generally Guyana's Environmental Protection Act No. 11, 1996 with good provisions on an Appeals Tribunal which is yet to be established.

16 See generally Trinidad and Tobago's Environmental Management Act, 2000. The Commission carries out essentially the same functions as Guyana's Appeals Tribunal.

17 The Appeals Tribunal and Commission are strongly founded; chaired by current or retired Judges appointed by respective Presidents with secure remuneration, and have equal standing with the High Court. Appeals from their ruling(s) go to their respective Courts of Appeal. In Tanzania, the Chair of the Environmental Appeals Tribunal is appointed by the President while the Registrar is designated by the Chief Justice and an appeal goes to the High Court but is heard by three High Court Judges (Section 209 (2)), not one as in the case of Kenya. See Tanzania's Environmental Management Act, 2004, Part XVII, Section 204(1) (a) and 212(1). All of these Tribunals have appellate jurisdiction, determining matters arising from the respective environment authorities in the various jurisdictions.

18 Environment Management and Co-ordination Act (EMCA) Act No. 8 of 1999. The tribunal is described in Part 12, Sections 125–131.

19 Act No. 7/2005.

20 Legal Notice 191 of 2003.

21 The Act is now strengthened by a number of subsidiary legislations in Legal Notices: 101 of 2003 on EIA, 191 of 2003 on Rules of Procedure of the Tribunal, 120 of 2006 on Water, 121 of 2006 on Waste Management, 131 of 2006 on Fossil Fuel Emission Control and 160 of 2006 on Conservation of Biological Diversity and Resources Access to Genetic Resources and Benefit Sharing.

22 See the Trinidad and Tobago's Environmental Management Act, 2000 section 82; Guyana's Environmental Protection Act No. 11, 1996 section 52 where the Chairman and his deputy should be attorneys of not less than 10 years standing appointed by the President. The other four members by virtue of their knowledge and experience in environmental issues shall also be appointed by the President. Tanzania provides for the Chair to be appointed by the President, from amongst persons qualified to be judges while the members are appointed by the minister concerned. See Tanzania's Environmental Management Act, 2004, Part XVII, Section 204.

23 Section 125(2) of EMCA Environmental Protection Act No. 11, 1996, section 56 of Guyana.

24 See section 125 (1), (2).

25 Proceedings of the Regional Meeting of the Arab World's Chief Justices. Cairo, November 24–25, 2004, published in 2005.

26 But, in my view, if he is, it would not hurt; rather it would enhance the process.

27 Susan Hedman, Expressive Functions of Criminal Sanctions in Environmental Law, 59, *George Washington Law Review* 889; even Uganda does not have a tribunal and handles environmental disputes in ordinary courts including the High Court as provided for in the Ugandan National Environment Act Cap 153; India too deals with environmental issues under the High Court and the Supreme Court with remedies such as injunctions and damages in tort.

28 See website www.dailynationmedia.com.

29 Trinidad and Tobago's Environmental Management Act of 2000, Section 84 (3).

30 *Shaheen Welfare Society vs Environmental Protection Agency Punjab Lahore* 2005, CLC 1267.

31 Tanzania's Environment Management Act of 2005, section 206.

32 EMCA, Cap. 80, Section 126(1).

33 Legal Notice Number 191 of 2003.

34 See Guyana's Environmental Protection Act No. 11, 1996. Part viii, Section 54.

35 See Trinidad and Tobago's Environmental Management Act, 2000, Section 69.

36 Tanzania's Environmental Management Act, 2004, section 207(5).

37 Kenya's Environment Management and Co-ordination Act 1999, Section 3(1).

38 In hearing appeal matters and in the only referral to date.

39 *Judges and the Rule of Law: Creating the Links: Environment, Human Rights and Poverty*. Edited by Thomas Greiber. IUCN Environmental Policy and Law Paper No. 60.

40 Trinidad and Tobago's Environmental Management Act, 2000, Section 86(5).

41 Guyana's Environmental Protection Act No. 11, 1996, Section 57(5).

42 Vermont Statutes Annotated, Judge Meredith Wright Provision 8013.

43 EMCA Part XII, section 130(5).

44 EMCA, Section 3(1).

45 EMCA Part XII, section 130(5).

46 Judges Kimaru and Visram mentioned that the practice in such appeals as from NET would be heard by two judges and that in the event of disagreement among them, the appeal would be dismissed. Judge Waweru, in his closing speech responded to concerns expressed by the author and others, stating "there is really no proper basis for this disquiet." In the case of Tanzania, appeals are heard by a panel of three Judges of the High Court. (Section 209 (2)).

47 See Trinidad and Tobago's Environmental Management Act, 2000 section 83.

48 See Guyana's Environmental Protection Act No. 11, 1996, Section 53.

49 See Mauritius Environment Protection Act of 1991, Part X section 51.

50 Tanzania's Environmental Management Act, 2004, section 205.

51 The Staff of NET is recruited by the Ministry and is approved by the Directorate of Personnel Management in the office of the President. Discussion of this issue took several years before decision in November 2006 while implementation still pends.

52 *Environmental Laws of Pakistan* by Jawad Hassan, at 117, First Edition, Bookbiz 2006 Pakistan.

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WTO

Retreaded Tyres
– Limiting the Environmental Safety Exception –

On 12 June 2007, a WTO dispute panel issued its report[1] on laws in Brazil which allegedly affect exports of retreaded tyres from the European Communities to the Brazilian market.[2] This matter was originally commenced by the European Communities in June 2005, and came quickly to the attention of non-governmental environmental groups, who recognised that a very broad array of environmental, health and safety issues lie at the central core around which any final decision would be reached. Clearly, the issues decided are much broader in import than the attempt to globalise the market for the products of European tyre recycling programmes.[3]

The legislation at issue in this case is relatively straightforward. Brazil had specifically adopted bans on the importation of retreaded tyres, and fines for the marketing, storage and transportation of *imported* retreaded tyres.[4] These provisions did not apply to retreaded tyres from domestic sources, and there was an exception under Brazilian law for retreaded tyres imported from other MERCOSUR countries. Notably, these various legislative provisions were not directed at all importation of used or recycled goods, but very strictly limited to used and/or retreaded tyres. Most of the laws in question did not apply to used tyres, unless they had been retreaded prior to importation.

The case's final decision, although not finding the relevant laws to be unacceptable trade restrictions under Articles XI and XX, came to many conclusions that could be very important for the future of national environmental and health measures. Like all WTO decisions, however, it is somewhat difficult to draw lessons from the report that can be applied to other legislative measures regulating harms from product entry and stand up to scrutiny.

Overview of the Legal Issues and Decision

In essence, Brazil fully recognises that the above measures unabashedly restrict importation and clearly call for differential treatment of imported goods as compared with similar domestic goods (as well as goods provided under MERCOSUR – a customs union consistent with GATT Article XXIV). As such, the measures are undoubted violations of GATT Article XI:1. Consequently, the entire scope of Brazil's argument focuses on the fact that the retread tyres measure was necessary "to protect human, animal, or plant life or health" and therefore is permitted under GATT Article XX(b).

In essence, the Panel agreed that, in fact these measures were necessary to and that the results obtained are critical to health and the environment. Despite this finding, however, the Panel ultimately held that the legislative package was not consistent with the GATT. Finding that Brazilian court orders were allowing some domestic companies to obtain "waste tyres" (not covered by the ban) as raw materials for their domestic recapping and other processes of retreading tyres, the Panel concluded that Brazil's commitment to the environmental objective must therefore be insufficient to support its claim that the environmental exception should apply enabling the measure to pass the GATT tests. On this basis, the Panel decided that the entire system was disguised protectionism, despite its recognised "critical" importance to health and environment.

Overview of the Environmental Issues and Decision

As noted, the case's focus on retreaded tyres conceals the scope of its environmental importance to some extent. It begins from two well-recognised environmental facts:

(i) If the tyre cannot be recycled as a tyre (retreaded), it is automatically converted into a serious waste disposal problem. It is difficult to find other uses for the primary components of the tyre at that point.

(ii) If they are not reusable, tyres must be disposed of, and the primary means of disposal – landfilling, permanent storage and burning – present risks and costs which make them, at least, controversial, environmentally.

This basic concern is only part of the problem, however. All methods of disposal or dumping create serious threats to health, arising from (most prominently):

(i) the chemical emissions and other pollution caused by burning or other attempts to breakdown or destroy the tyre; and

(ii) the fact that tyres are breeding grounds for mosquitoes that carry dengue fever, malaria and other diseases.

In Brazil, risks to human health and the environment from toxic pollutants and insect-borne diseases were recognised to be very high. Given that retreaded tyres have a much shorter lifespan than new tyres, they become a waste disposal problem much sooner. Consequently, their importation has the direct result of increasing the amount of waste-tyre stockpiling and land-filling, undisputedly enhancing the environmental risks and harms described above.

The Panel's decision fully recognised these environmental risks and specifically noted that they justified the most intensive measures possible, in order to protect human health and the environment. It held that Brazil's decision to curtail the importation of other countries' short-lifespan tyres was completely reasonable as a measure for maximising tyre recycling and cutting down the absolute numbers of spent tyres needing landfills, storage or de-

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struction. It was a necessary and appropriate method of cutting down the contribution of spent tyres to pollution and health/environmental harms described above. (The remaining statements of the Panel, however, undercut this recognition of the pre-eminence of human and environmental health matters, however, by general holding described above.)

Elements of interest

For environmental lawyers, policy makers and other advocates, the Report offers a wealth of useful determinations and comments. For example, the Panel noted with approval Brazil's argument that "few interests are more 'vital' and 'important' than protecting human beings from health risks, and that *protecting the environment is no less important*". Recognising specifically that "*Brazil's measure is as trade-restrictive as can be*, as far as retreaded tyres from non-MERCOSUR countries are concerned, since it aims to halt completely their entry into Brazil",[5] it went forward to make a number of significant findings that this extreme level was appropriate and justified in light of the nature and severity of the risks and harms that the measure was addressing. Environmentally, the most interesting of these findings include the following.

Risk Levels and Risk Calculation

The Panel specifically reaffirmed that "WTO Members have the right to determine the level of protection of health that they consider appropriate in a given situation". Although affirmed in many cases up to now, the Report is interesting in its general acceptance of "the reduction of the risks of waste tyre accumulation to the maximum extent possible" as Brazil's standard.[6] It directly ties the reduction in imports to this standard, in deciding the question of whether "such an effect is necessary for Brazil to avoid imports of shorter-lifespan tyres".

In the past, however, in determining the necessity of a measure, WTO cases have focused on the need to quantify the risks and to quantify the impact of the proposed measure in addressing them. To this question (must the risk and effectiveness of the measure be quantified in order to establish the necessity of the measure?), the Panel took a much more practical view than some other panels have done, noting that "this analysis relates essentially to the 'relationship of ends and means' between the objective pursued and the chosen measure". Thus, without requiring any statistical data, it turned its attention to whether the import ban actually contributed to the realisation of Brazil's objective of reduction of the number of waste tyres generated in Brazil and whether the reduction of the number of waste tyres can in turn contribute to the reduction of the risks to human, animal and plant life and health arising from waste tyres. On both of these points, it ultimately answered yes. It also determined that the import ban is capable of promoting the retreading and reuse of domestic used tyres, as further recognition of the effectiveness of the measure.

Health and the Environment

Two other critical recognitions, stated quite directly in the Report, are the vital importance of health matters, and especially, the critical importance of "the protection of human, animal and plant life and health". Regarding human life and health, the Panel restated and supported previous decisions,[7] and affirmed that "the objective of protecting human health and life against life-threatening diseases, such as dengue fever and malaria, is both vital and important in the highest degree".[8]

More groundbreaking, however, are its statements regarding *animal and plant life and health*, which were generally termed "the environment" in the supporting documents. In this respect, the Panel stated that:

> *the preservation of animal and plant life and health, which constitutes an essential part of the protection of the environment, is an important value, recognized in the WTO Agreement. The Panel recalls that in US – Shrimp1192, the Appellate Body underlined that the preamble of the Marrakesh Agreement establishing the WTO showed that the signatories to that Agreement were, in 1994, fully aware of the importance and legitimacy of environmental protection as a goal of national and international policy. Therefore, the Panel finds that the objective of protection of animal and plant life and health should also be considered important.*[9]

Alternatives and Options

Given the restrictive nature of the legal measure under scrutiny, significant attention would normally be given to the consideration of alternative measures to achieve the necessary level of protection against risk. Consequently, the question of alternatives was critical to the decision.

As a legal matter, it was first necessary to decide the burden of identifying options that are less restrictive than the complete import ban under consideration, and of establishing whether they are "reasonably available" to achieve the legislative objective taking account of the chosen level of protection (*i.e.,* the "reduction of the potential for exposure to the specific risks to human, animal, plant life and health that Brazil seeks to address"). On this point, the Panel clarified the decision of the Appellate Body in *US – Gambling:*[10] the complaining party, they said, bears the full burden of identification of measures and establishment of their consistency with the WTO. They cannot rely on the respondent to present better choices, but only to provide *prima facie* evidence that an option proposed by the complaining party is not "reasonably available".

Ultimately, suggestions that Brazil should address the risk posed by the influx of retreaded tyres by public awareness campaigns and improved management were relatively quickly disposed of, as Brazil's existing measures were seen to be as much as could be expected of them. Alternatives such as burning for energy production and incorporation into asphalt were quickly dismissed as controversial and not free from additional risks. ➳

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Results and Outcomes

The initial conclusions, that the measure was necessary in order to achieve a critical objective of protecting human, animal and plant life and health, the importance of that objective, and the seriousness of the risk being addressed, are somewhat ironic in light of the Panel's ultimate disposition on the legislation. It is worthwhile here to insert the Panel's summary of its conclusions on the necessity of the provision and the availability of other options:[11]

> *The Panel concludes that the prohibition on the importation of retreaded tyres is capable of making a contribution to the objective pursued by Brazil, in that it can lead to a reduction in the overall number of waste tyres generated in Brazil, which in turn can reduce the potential for exposure to the specific risks to human, animal, plant life and health that Brazil seeks to address….We have found that the objective of protecting human life and health against life-threatening diseases, such as dengue fever and malaria, is both vital and important in the highest degree, [although] we agree with the European Communities that the importance of human life and health in and of itself is not sufficient to establish that a measure is necessary for the purposes of Article XX(b).*
>
> *Alternatives that would involve management or disposal of the tyres once imported do exist, but raise their own concerns, either because they lead to the type of risks that Brazil seeks to avoid in the first place (unsafe stockpiling and emissions from incineration) or because they would not meet the level of protection sought by Brazil. The safest methods (material recycling) are useful but insufficient on their own to absorb the entire amount of waste from end-of-life tyres. …[I]t appears to us that non-generation measures, i.e. measures that avoid the generation of waste tyres in the first place, are a pertinent way of addressing the risks arising from the accumulation of waste tyres.*
>
> *Our examination of these alternatives suggests that none of these, either individually or collectively, would be such that the risks arising from waste tyres in Brazil would be safely eliminated, as is intended under the current import ban. In fact, it appears that Brazil already implements some of the alternative measures identified by the European Communities in order to address the challenges arising from the management of waste tyres. The imposition of an import ban on retreaded tyres thus appears to be consistent with other efforts by Brazil to control the risks arising from the accumulation and disposal of waste tyres.*

Beyond this, the Panel even agreed that the MERCOSUR exemption "form[s] part of the manner in which the import ban imposed by Brazil on retreaded tyres" which it had "provisionally justified under Article XX(b)" is implemented. Although noting the possibility that the MERCOSUR exemption might in future be applied in a way that might undercut the legislative objective of the ban, the Panel decided that it was a justifiable exemption, unless or until that time.

At this point, however, the Report turns a nearly complete "about face", holding that the Brazilian retreaded tyre industry's legal actions – in obtaining court orders allowing them to import used tyres for retreading – are occurring "in such quantities as to seriously undermine the achievement of the stated objective of avoiding the further accumulation of waste tyres in Brazil." On the basis of this finding, the panel decided that "the measure at issue is being applied in a manner that constitutes a disguised restriction on international trade."

Interpretation

The Panel's final determination is so dramatically opposed to the previous findings on environmental necessity and health and safety that it has been subjected to a variety of interpretations. One of the most interesting posits that "Brazil essentially lost the case because it should have been MORE trade restrictive. The Panel basically found … that if Brazil is serious about the risks of waste tyres, it should not only ban imports of retreaded tyres but also imports of used tyres. This makes a lot of sense. But it underscores how WTO dispute settlement can lead to less (rather than more) trade and, more importantly, how [Article XX] forces WTO members to engage in sound environmental policies. In that sense, the WTO has truly become an environmental treaty with Art. XX as a catch-all obligation to engage in sound and reasonable environmental policies."[12]

Once the decision is made the more important question, is how it can guide future legislative and administrative action. As in all WTO Panel Reports and Appellate decisions, this question cannot be answered. It does not appear likely that any legislative solution will be possible to enable Brazil to address its serious waste tyre disposal problem.

If one starts from the environmental findings and then reads the ultimate overall finding, the Report seems to indicate that the existence of multiple motives underlying a particular legislative action will inevitably lead to a determination that the measure is an unjustified restriction on international trade. Extrapolating from this decision, Brazil's environmental law makers, policy makers and judiciary face a difficult choice. On one hand, they can exclude and avoid all provisions that might make their law palatable to the affected industry (including any measures that buffer its effects on important, affected, implementing industry), thereby eliminating any chance that such industry will be able to play its assigned role in the environmental objective.[13] The only "other hand" that is clearly possible based on this decision would be to re-tool the Brazilian tyre-retreading and waste disposal industry, toward the creation of retreaded tyres, pulverised waste tyres and tyre waste processed for energy use, with a focus on exporting these products. For this approach to work, the same countries that have suggested that there must be a "reasonable alternative" would have to be willing to support and accept the reimport of their waste tyres as a product, transferring to those countries the task of addressing their disposal.

To conclude, the Retreaded Tyre decision provides some significant fuel for future cases involving environ-

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mental- and health-driven legislative measures. At the same time, it continues to bear the identifying marks of all WTO decisions, in that they do not provide any basis for determining how to respond or to learn lessons that enable countries to comply with the WTO and meet their most critical national objectives, such as the protection of human, animal and plant life and health. (TRY)

Notes

1 WT/DS332/R of 12 June 2007, "Brazil – Measures Affecting Imports of Retreaded Tyres" (herein, "the Report"). This article is entirely focused on the Report. In general, will footnote to particular sections, only where quoting from the report. All discussions of the Panel's conclusions are specifically taken from Part VII of the report.

2 Initial filing: WT/DS332/1 of 23 June 2005. When the initial consultations did not resolve the issue, a second filing calling for a dispute panel was filed: WT/DS332/4 of 18 November 2005. The Panel was established in early 2006: WT/DS332/5 of 17 March 2006 and WT/DSB/M/203, p. 13.

3 Among the NGOs which entered the fray were Humane Society International, the Center for International Environmental Law (CIEL), the Association of Combats against POPs (ACPO); Association for the Protection of the Environment Cianorte (APROMAC); Center for Human Rights and Environment (CEDHA); Conectas Human Rights; Global Justice; and the Law for a Green Planet Institute.

4 Listed in the Report at page 4. Brazil's federal system enabled the creation of a number of different variations on the basic bans at the level of individual states, with some for example allowing importation where the importer could prove the destruction of ten domestic used or discarded tyres for each tyre that is imported. This matter is discussed in detail in the Report at pages **000**.

5 Report para 7.114 and elsewhere.

6 Report para 7.108 and elsewhere.

7 Citing especially *EC – Asbestos*, Appellate Body Report, European Communities – Measures Affecting Asbestos and Asbestos-Containing Products, WT/DS135/AB/R, adopted 5 April 2001, DSR 2001:VII, 3243.

8 Report para 7.111 and elsewhere.

9 Report para 7.112.

10 Appellate Body Report, United States – Measures Affecting the Cross-Border Supply of Gambling and Betting Services, WT/DS285/AB/R, adopted 20 April 2005.

11 The following excerpts are from the Report at paragraphs 7.148 and 7.210–7.215. The author has made every effort to ensure that the general tenor of the quotation is not altered by selecting language out of context.

12 Joost Palwin, at http://worldtradelaw.typepad.com/ielpblog/2007/07/brazil-tyres-th.html.

13 It must be here remembered that the creation of a capable and profitable domestic tyre-recycling industry was a part of the overall objective of Brazil's programme, and the Panel recognised this as one element in its earlier determinations of the reasonable and appropriate nature of the ban, in achieving its environmental effect.

Arctic / UNCLOS

The Melting and Partitioning of a Global Commons

by Beverly G. Sobel,* Isaac Smith** and Armin Rosencranz***

On 2 August 2007, the Russian Federation planted its national flag, encased in titanium, on the seabed beneath the North Pole.[1] This action catapulted the question of who rightfully owns the Arctic to the forefront of international deliberation. The U.S. is now in the midst of a national debate as to whether it is in its interest to ratify the United Nations Convention on the Law of the Sea (hereafter UNCLOS or the Convention), 25 years after its adoption in 1982. UNCLOS is a comprehensive global treaty governing the management of the uses of one of the most important global commons: the ocean, its waters, and its marine resources. It establishes a uniform standard for territorial waters, rules for international navigation, environmental standards for marine life and water pollution, and the rights of nations to exploit seabed resources. Unlike other international agreements, UNCLOS formalizes a set of accepted international laws already in practice, dating back to the principle of *mare liberum* (freedom of the seas) first articulated by Dutch jurist Hugo Grotius in the sixteenth century.[2]

The main impetus for U.S. ratification is the melting of the Arctic Ocean and the new accessibility to an abundant supply of oil and natural gas reserves. At stake are substantial natural resources (i.e., oil, gas, diamonds, fish, and minerals) and desirable maritime and air routes. Already, other Arctic nations such as Russia are claiming extended sovereignty in the Arctic. If the U.S. were to ratify UNCLOS, it could potentially claim an area half the size of Alaska and 15 billion barrels of oil and natural gas.[3] The United States is the only major power that has not ratified UNCLOS. In this article, we focus on the current debate on U.S. ratification of UNCLOS, the competing claims for continental shelf extensions in the Arctic Ocean, and the future challenges UNCLOS faces in protecting the Arctic environment in this new era of global climate change.

Ratification at Last?

For the first time since 2004, the U.S. Senate is making serious moves toward ratifying the Convention. The Senate Foreign Relations Committee held two rounds of hearings in the last few weeks on the Convention and may vote on it in the near future. At the hearings, the Committee heard testimony that was overwhelmingly in favour of ratification. Deputy Secretary of State John Negroponte, for example, echoing sentiments made by other witnesses, called accession to the Convention a "win/win proposition," which would strengthen the maritime security of the U.S., protect the sovereignty of American economic claims in the oceans, and help protect the marine environment around the world. He also emphasized the necessity of the U.S. joining in order to preserve its current privileged position under the Convention.[4]

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Momentum on ratification began early in 2007 when President George W. Bush issued a statement urging the Senate to approve the treaty, citing the economic, national security, and environmental benefits of doing so.[5] The chairman of the Senate Committee on Foreign Relations, Joseph Biden (D-Del.), has expressed similar enthusiasm, as has the ranking minority member, Richard Lugar (R-Ind.).[6] Meanwhile, an unusual coalition of American pro-treaty advocates has emerged. The U.S. State and Defense Departments, the U.S. Navy, the fishing, shipping, oil and gas industries, and environmental activists all have come out in favour of ratification.[7] For environmentalists, UNCLOS is a vehicle through which pollution of the seas and oceans could be monitored and controlled. The Navy favours ratification because the Convention would allow the right of "innocent passage" through territorial seas and increase global naval mobility.[8] Additionally, industry sees the Convention as providing the security necessary for shipping, fishing, and natural resource extraction.[9]

Opposition to the treaty comes mainly from a small number of conservative Senators who see UNCLOS as an abridgment of U.S. sovereignty. With the change of party control in the 2006 congressional elections, however, these Senators no longer have the ear of the Majority Leader, as they did in 2004.[10] The current Majority Leader, Harry Reid (D-Nev.), has expressed support for the treaty and intends to have the Senate vote on the Convention by the end of 2007.[11]

A Contentious History

This shift in the tides, as it were, marks a possible conclusion to a long and drawn-out political drama in the U.S. over UNCLOS. Interest in codifying international norms for the world's oceans dates back to the middle of the twentieth century, when the United Nations began to hold conferences that resulted in some limited agreements on fishing and continental shelf claims. However, the lack of uniformity in nations' definition of territorial waters, as well as continued concern over the security of sea lanes, emerging concern over environmental degradation of the oceans, and interest in the economic potential of underwater mineral deposits, soon led over 160 nations to meet in New York City in 1973 to begin working on a comprehensive agreement. Nine years later, the Convention was presented to the international community for adoption, and in 1994 came into effect, following ratification by 60 nations.

Immediately after the Convention opened for signature, however, it became the source of controversy, particularly in the United States. Despite having been one of the major forces in the drafting of the agreement, the U.S. raised serious objections to the provisions of the Convention concerning seabed mining. Intended to establish a "parallel system" that would be a compromise between the developed and developing nations, the Convention created a new body called the International Seabed Authority (ISA), which would issue licenses and adjudicate disputes between mining companies, as well as a public mining company called the Enterprise that would extract minerals for the benefit of all nations. In addition, the Convention required the transfer of relevant technology from developed to developing nations and imposed substantial fees and limitations on extraction on private consortia engaged in mining.[12]

This arrangement was seen as unacceptable by many in the U.S. and other developed nations, including President Ronald Reagan, who refused to sign the Convention. Nevertheless, in his Ocean Policy Statement of 1983, he directed the U.S. government to abide by all provisions of the Convention not related to deep seabed mining. Subsequent negotiations significantly weakened the power of the ISA and in general made the seabed mining provisions much friendlier to the interests of developed countries. By 1994 the Convention was amended to the satisfaction of nearly all parties, and soon after, President Bill Clinton signed it and submitted it to the Senate for ratification.

In spite of the concessions made, UNCLOS has languished in the Senate for more than 13 years. Shortly after Clinton's signing, the Republican Party gained a majority in both houses of Congress. Jesse Helms (R-N.C.), an ardent opponent of multilateral agreements, became Chair of the Senate Foreign Relations Committee and prevented the Convention from reaching the Senate floor. After Helms' retirement, pro-treaty Sen. Lugar ascended to the committee chair, but as mentioned above, anti-LOS Senators blocked consideration until now. Meanwhile, the various institutions created by UNCLOS, including the ISA and the Commission on the Limits of the Continental Shelf, have become fully operational. Ironically, it is the latter body that has become the locus of controversy in recent years.

Claiming the Arctic's Riches

UNCLOS defines a coastal state's jurisdictional zones for the territorial and the contiguous seas.[13] Under UNCLOS, a coastal state has the right to claim sovereignty and resource control over an exclusive economic zone (EEZ). The EEZ "shall not extend beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured."[14] The establishment of EEZs is significant in allocating sovereign rights to marine resources and limiting the freedom of the seas. Thirty percent of the world's seas, 90% of commercial fisheries, and the majority of accessible mineral resources are now under national jurisdiction through EEZs.[15]

According to Article 76 of UNCLOS, "[t]he continental shelf of a coastal State comprises the seabed and subsoil of the submarine areas that extend beyond its territorial sea throughout the natural prolongation of its land territory to the outer edge of the continental margin, or to a distance of 200 nautical miles from the baselines from which the breadth of the territorial sea is measured where the outer edge of the continental margin does not extend up to that distance."[16] Presently, under international law, no one country owns the actual North Pole. In accordance with UNCLOS, each of the neighbouring five Arctic nations has a 200-mile

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EEZ from their coasts. However, with a potential economic windfall at stake in the melting Arctic, neighbouring Arctic nations are actively searching for any natural extension of the seabed that is geologically related to their continental shelves. According to Article 76, paragraph 8, a country may submit "[i]nformation on the limits of the continental shelf beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured … on the basis of equitable geographical representation."[17] This information is submitted to the Commission on the Limits of the Continental Shelf which evaluates the claim and makes a recommendation as to the outer limits of a coastal state's continental shelf. Moreover, the coastal state making such a claim is obligated to provide the Secretary-General of the United Nations charts and relevant data that definitively show the end point of its continental shelf.[18]

Russia's Assertion

This one allowance for proof of natural extension in Article 76, Paragraph 8 has resulted in recent territorial disputes and substantial claims to the North Pole and its vast underwater resources. In 2001, Russia made the first submission to the UN Commission on the Limits of the Continental Shelf, arguing that the Lomonosov Ridge, which covers much of the Arctic Ocean (even the North Pole), is in fact part of the continental shelf that extends from the Russian coastline.[19] The Commission rejected Russia's claims, but that has not stopped Russia from sending teams of geologists and oceanographers to measure the area and provide new evidence for its claim.

In summer 2007, Russia reiterated its claim.[20] As mentioned earlier, in August 2007, Russia sent two small submarines to the Arctic to plant a Russian flag underneath the North Pole, gaining extensive media coverage.[21] Although the move was largely theatrical, it put the other countries of the Arctic on the defensive. Later that month, Canada announced plans that it would build a new military training centre and its first deep-water port in disputed Arctic waters.[22] Although not a member of UNCLOS, the U.S. that same month sent the U.S. Coast Guard icebreaker Healy to map the Arctic seabed near Alaska to determine whether the U.S. could extend its continental shelf area.[23] In effect, UNCLOS has already set the rules of how the Arctic global commons will be partitioned and that partitioning will be done only by coastal states, not land-locked states. Under UNCLOS, land-locked states have no basis to make a claim in the Arctic.

The Rush to Own and Control Natural Resources

Although UNCLOS allows coastal states to control, manage, and potentially exploit fisheries, it contains a number of provisions designed to protect marine life and the marine environment. In Part XII, Protection and Preservation of the Marine Environment, UNCLOS obligates countries to safeguard the marine ecosystem from adverse environmental conditions such as pollution and over-fishing. Specifically, Article 194 asserts that "[s]tates shall take…all measures consistent with this Convention that are necessary to prevent, reduce and control pollution of the marine environment from any source, using for this purpose the best practicable means at their disposal and in accordance with their capabilities…"[24] Moreover, Article 194 requires that countries take measures that are "necessary to protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life."[25]

Most recently, the fabled Northwest Passage, the shortest maritime shipping route between Europe and Asia, was reported to now be open for several months of the year, due to the rapid melting of the Arctic sea ice.[26] Some scientists now believe that an ice-free Arctic may be a reality as soon as 2040, as an effect of global warming.[27] Black carbon particles found in Arctic snow are contributing to the pace at which the ice is melting.[28] Black carbon comes from anthropogenic pollution, and it absorbs solar radiation, causing the snow to melt faster.[29]

Because of the speed at which the Arctic Ocean is melting, the race among the Arctic nations to divide and conquer the riches and promises of the Arctic has greatly intensified. A U.S. study has asserted that 25% of the world's untapped oil and gas reserves lie in the Arctic region.[30] The five Arctic nations will be challenged in honouring UNCLOS' provisions that protect and preserve the marine environment. The increased global demand for oil and natural gas may prove to be particularly difficult and dangerous to extract in the environmentally sensitive Arctic. In 2007, the polar bear, for many the new symbol of global warming's impact on wildlife, was recommended for listing as a threatened species under the US Endangered Species Act (ESA).[31] If oil and natural gas drilling were to adversely impact an ESA-listed polar bear's sea-ice habitat, then operations may be halted until UNCLOS Article 194 was adhered to. Provisions under UNCLOS are not discretionary; they are mandatory.

With the rush for untapped Arctic resources under way, a number of inevitable disputes over claims are emerging. For example, the now opened Northwest Passage will continue to be a source of contention between the U.S. and Canada. Last year, Canada announced that the area will now be called "Canadian Internal Waters" despite the fact that the U.S. Navy heavily patrols it.[32] Another example is Hans Island; its ownership is disputed between Denmark and Canada. Moreover, Russia's claim to the Lomonosov Ridge is being challenged by both Denmark and Canada. Denmark could claim that the ridge is connected to Greenland, and Canada could argue that it is in fact an extension of their Ellesmere Island.[33]

Such disputes will be hotly contested in view of the enormous economic value of the Arctic's natural resources, shipping routes, and potential polar air space. UNCLOS may be an effective means to avert a polar war over the Arctic's riches. Article 301 of UNCLOS, Peaceful Uses of the Seas, provides a framework for peaceful resolution of disputes. Article 301 specifies that countries "shall refrain from any threat or use of force against the integrity or political independence of any State."[34] In this spirit, in September, 2007, Denmark invited its Arctic neighbours,

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to meet in 2008 to discuss their respective claims in the Arctic.[35] Such early discussion and negotiation seems crucial while Arctic nations wait for the Commission on the Continental Shelf to make rulings on their claims under UNCLOS. Such rulings may take years, especially because a country has 10 years after ratification to prove its Arctic claim. Currently, the ten-year clock has not started for the U.S., whereas Russia's claim deadline is 2009; Canada's, 2013; and Denmark's, 2014.[36] If the U.S. ratifies UNCLOS before the end of 2007, it would need to make a claim by 2017. Potentially, the U.S. could lose the most because it waited the longest to ratify UNCLOS and subsequently delayed its right to claim an extension of its continental shelf.

Conclusion

The task of managing the world's oceans, which cover approximately three-fourths of the world, has always been challenging. UNCLOS provides a massive, global framework to manage the world's oceans and national interests. The fact that 155 nations have ratified UNCLOS is an achievement in itself. However, many present and future challenges persist. For example, although UNCLOS has provisions that are designed to preserve and protect marine life and environment, the health of the world's oceans is in serious decline. One study has reported that 90% of the world's commercial fish and shellfish species may be gone by 2048 due to over-fishing, pollution, and habitat destruction.[37] UNCLOS appears to lack the strong enforceability and accountability measures necessary to be truly protective of the oceans. There is also increasing concern about the destructive nature and risks associated with deep seabed mining.

With respect to the Arctic, UNCLOS seems stretched by the new paradigm of exploitation. The North Pole, a global commons, is owned by no one country, per se. However, UNCLOS provides Arctic nations with an avenue to make claims to the Arctic and its abundant underwater resources. The U.S. has not yet ratified UNCLOS. Ratification is essential for its ability to make, negotiate, and dispute claims. By not ratifying UNCLOS, the U.S. has no seat at the international table. With increasing global energy demands, more claims will be made, disputed, and potentially questioned not only by neighbouring Arctic nations but by other nations as well. The U.S. seems poised to ratify UNCLOS. However, even if the U.S. were to ratify UNCLOS, the global climate change-caused melting of Arctic sea ice will raise new questions in the international community over the balance between preserving and exploiting the Arctic region.

Notes

1 BBC News. 2/8/2007. Russia plants flag under N Pole. Available at: http://news.bbc.co.uk/2/hi/europe/6927395.stm.

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3 Demos, Telis. 20/8/2007. "Arctic Circle Oil Rush." *Fortune*. 156: 4; 11-12.

4 See testimony of John Negroponte before the Senate Foreign Relations Committee, 27 Sept. 2007: http://foreign.senate.gov/testimony/2007/NegroponteTestimony070927.pdf.

5 See "Statement of President on Advancing U.S. Interests in the World's Oceans," 15 May 2007: http://www.whitehouse.gov/news/releases/2007/05/20070515-2.html.

6 See "Senate considers acting on sea treaty," by Jim Abrams, The Associated Press, 3 Oct. 2007: http://www.chron.com/disp/story.mpl/ap/politics/5185367.html; and Sen. Lugar's opening statement for hearing on the UN Convention on the Law of the Sea, 4 Oct. 2007:http://foreign.senate.gov/testimony/2007/LugarStatement071004.pdf.

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8 King, N. 8/22/2007. "U.S. Resistance to Sea Treaty Thaws." *Wall Street Journal*. A6.

9 See, for example, testimony of Chamber of Shipping of America President Joseph Cox before the Senate Foreign Relations Committee, 4 Oct. 2007: http://foreign.senate.gov/testimony/2007/CoxTestimony071004.pdf.

10 Charles Babington. "Criticisms Deep-Six Senate Vote on Sea Treaty". *The Washington Post*. 25 April 2004. Available at http://www.washingtonpost.com/ac2/wp-dyn/A39937-2004Apr24.

11 William Scally, "Law of Sea Treaty Revived with Senate Hearings". *CQ Green Sheet*, 24 Sept. 2007. Available at: http://public.cq.com/docs/gs/greensheets110-000002591199.html.

12 For a more complete account of drafting of the original Convention, see "The United Nations Convention on the Law of the Sea: A Historical Perspective", http://www.un.org/depts/los/convention_agreements/convention_historical_perspective.htm.

13 Hunter, D, J. Salzman, and D. Zaelke. 2007. *International Environmental Law and Policy*. 3rd Edition at 740.

14 UNCLOS. 1982. Part V, Exclusive Economic Zone, Article 57. Available at: http://www.un.org/Depts/los/convention_agreements/texts/unclos/closindx.htm.

15 Hunter, supra n. 13 at 741.

16 UNCLOS. 1982. Part VI, Continental Shelf, Article 76, Definition of the continental shelf. Available at: http://www.un.org/Depts/los/convention_agreements/texts/unclos/closindx.htm.

17 UNCLOS. 1982. Part VI, Continental Shelf, Article 76, Paragraph 8. Available at: http://www.un.org/Depts/los/convention_agreements/texts/unclos/closindx.htm.

18 UNCLOS. 1982. Part VI, Continental Shelf, Article 76, Paragraph 9. Available at: http://www.un.org/Depts/los/convention_agreements/texts/unclos/closindx.htm.

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Landmines, Landscape Degradation and "Proportionality"

by Kevin Kiernan*

Introduction

In a recent contribution to this journal reviewing the evolution of laws concerning the protection of the environment during armed conflict, Bothe[1] raised a number of interesting issues related to the severity and persistence of environmental harm. He also identified a number of unresolved issues in the laws surrounding armed conflict, including the need for new laws to ensure protection of particular special places during conflict, and the environmental consequences of specific weapons, including mines. The present contribution takes up these themes from the perspective of the geosciences. It considers the impact of landmines upon nature conservation and environmentally sustainable development, and the duration of their adverse impact on the environment, in the context of the "proportionality" of military advantage obtained from deploying land mines relative to the environmental harm that they cause.

Article 35 para. 3 of Additional Protocol 1 (AP 1), adopted by the Diplomatic Conference for the Reaffirmation and Development of International Humanitarian Law meeting in Geneva during 1974–77 as additional to the 1949 Geneva Conventions,[2] establishes a Duty of Care in providing that "It is prohibited to employ methods and means of warfare which are intended, or may be expected, to cause widespread, long-term and severe damage to the environment". Article 55 further provides that "Care shall be taken in warfare to protect the natural environment against widespread, long-term and severe damage. This protection includes a prohibition of the use of methods and means of warfare which are intended or may be expected to cause such damage to the environment and thereby to prejudice the health of survival of the population". As Bothe[3] observes, much hinges on what is implied by the words "long-term" and "severe". I contend that both are underestimated by the common tendency to over-emphasise biological and chemical indicators such as the degree of recolonisation of disturbed areas by a vegetation cover or contamination by oil spills [4] while paying insufficient regard to other critical elements of the environment.

The present contribution focuses primarily on mines, which represent part of the wider issue of explosive remnants of war (ERW) that also includes unexploded ordnance (UXO). Some related issues arise in considering all types of ERW. The term "mine" applies to any munition that is designed to be placed beneath or near the ground or other surface and which is designed to detonate in response to the presence, proximity or contact with a person or vehicle. Mines that are designed to explode in response to interaction with a human rather than a vehicle are termed anti-personnel mines. Mines may or may not be equipped with an "anti-handling device" that is intended to detonate in the event of the mine being interfered with or tampered with.[5]

Landmines and Nature Conservation

Accurate figures on continuing landmine use are difficult to obtain, but in 2004 at least six countries and a number of non-state actors were still using landmines, with one quarter of the countries on Earth still not committed to their banning, including some of the most powerful states in the world. In 2005 landmines were being actively used in 13 countries. Worldwide, there are vast areas of productive land that cannot be used safely unless cleared of landmines. Landmines are present in at least 82 countries and impact on the lives of significant numbers of people in at least 40 of these countries.[6]

International concern regarding the impact of landmines, and widespread support for their banning, are typically underpinned by the grave dangers that anti-personnel landmines in particular pose for individual civilians, and by the impediments landmines present to post-conflict social and economic recovery. However, an additional but often little recognised consequence of land mines is the significant impact they often have for nature conservation. This is perhaps most conspicuous in the tragic sight of animals maimed or killed by landmines, as described in the article by Eniang, Haile and Yihdego (at page 501), but the implications of landmines for nature conservation also extend to many other facets of natural heritage, including physical landscapes, soils and water. Some of these abiotic components of the environment are important as nature conservation targets in their own right, and they are also fundamental to sustaining many ecological processes. In addition, there is often an important nexus between impacts on these abiotic environmental components and human well-being, including social and economic recovery in the immediate post-conflict phase, and also longer-term environmentally sustainable economic development.

Although biodiversity conservation dominates many present-day discourses on nature conservation, many of the earliest nature conservation initiatives worldwide were focused not on biological phenomena but instead upon physical features. During the 19th century it was the geysers at Yellowstone, USA, that stimulated establishment of the world's first national park. The continuing significance of abiotic icons in nature conservation throughout the 20th century is highlighted by the fact that the formation of the world's first Green political party, in Tasmania in 1972, occurred in reaction to the proposed destruction of a remarkable physical feature, Lake Pedder. Opposition to the Lake Pedder development was stimulated mainly by the value attributed to the physical character of the site, evidence that significant biological values were also present not entering the public domain until very late

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in the campaign for conservation, and even then playing only a relatively minor role in the controversy. Recent years have seen revitalised recognition of the importance of geoheritage conservation, with the advent of new legislation, international geoconservation agreements, and tertiary education courses devoted to the discipline.[7, 8]

Minefield warning on the Golan Heights Courtesy: Wikipedia

Nature conservation initiatives typically involve a focus either on environmental attributes that are considered outstanding in some way, such as a particularly high waterfall or a stand of particularly tall trees, or else they adopt an alternative approach that is based on including within the conservation estate representative examples of particular types of phenomena, such as particular plant or animal species. Both approaches have a legitimate place in nature conservation.[9] The former approach is exemplified by the provision under the World Heritage Convention operational guidelines for "outstanding universal significance" status to be accorded to "superlative" sites.[10] A related perspective is also implicit in conservation initiatives that stem from human emotional responses to particularly charismatic animal species, plant species with particularly attractive flowers or landscapes that are perceived to be highly scenic. However, fashions change, aesthetic tastes differ, and what one person may perceive as an especially endearing aspect of chimpanzee behaviour may be perceived by another merely as a weakness that enhances the potential to obtain it as bush-meat to feed a family. The alternative approach, which focuses on ensuring that representative examples of all phenomena are contained in the conservation estate including conservation of phenomena that are rare, has the capacity to reduce challenges of this kind. This latter approach is fundamental to the concept of biodiversity conservation which currently dominates most nature conservation strategies worldwide.

However, biodiversity is only one aspect of wider environmental diversity. Geodiversity is another very key facet of this wider embrace. Geodiversity comprises the many different types of geological (bedrock) features, different types of landforms, different types of soils, and the natural processes that sustain all of these.[11, 12, 13] Just as there are many different species of plants and animals, so too are there many different types and assemblages of landforms and, as with plant and animal species, some types of landform are common and some are rare, some are robust and some are fragile. Progressive nature conservation strategies are increasingly recognising the need for a more broadly-based approach that incorporates geodiversity rather than biodiversity alone.[14] While this is partly due to recognition of the importance of abiotic features in their own right, it is also testimony to the fundamental importance of geodiversity as the stage upon which all terrestrial biodiversity is ultimately dependent. Some elements of geodiversity may be very adversely affected by landmines and other ERW.

The Importance of Abiotic Nature

Environmental attributes, whether biotic or abiotic, may be perceived as being significant conservation targets for a variety of reasons. First, they may be regarded as having intrinsic value in their own right, as legitimate a part of the cosmos as any other and requiring no further justification for respect and stewardship beyond the simple fact that they exist. Second, value may be attributed to a particular phenomenon for the role it plays in sustaining other environmental attributes, such as the significance of a soil which, while having value in its own right, is simultaneously significant because of the role it plays in allowing a particular plant species to grow within it, or an animal that grazes upon that plant to gain nourishment. Third, a natural phenomenon may be considered significant for its instrumental value to humankind, as a source of inspirational, spiritual, recreational, scientific, educational, economic or other goods derived from the ecosystem services the environment provides. The perceived value of particular phenomena varies both spatially and temporally over a wide variety of scales.[15]

Whether it be the patterns of sediment drift along coasts that enable ports to remain open, the manner in which river flooding replenishes the agricultural productivity of alluvial plains or the myriad other geo-processes that operate on Earth, either continuously or episodically, natural geoprocesses are fundamental to human well-being. The signature of the wild nature in which our human species evolved remains irrevocably etched in the biological and psychological essence of humankind. It is as manifest in our continuing requirement for the spiritual enrichment,

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aesthetic pleasure or inspiration furnished by nature, as it is in our continuous need for the chemical substances contained in the food that is necessary for us to sustain health, and indeed life itself.[16]

Values and Sensitivity of Landforms

While the prefix "geo" implies something that is of the Earth, it does not follow that all geo-phenomena are composed of solid rock or are large enough to negate the potential for damage or destruction by human action. The crystal floors of a limestone cave that took millennia to form may be crushed by a single incautious visitor underground, and a fossil that is a key to understanding some aspect of biological evolution can be vandalised or stolen for sale to a collector in a mere moment. The science of landforms is known as geomorphology, the root word *morphology* clarifying the centrality to the discipline of ground surface shape. Landforms are defined by contours, hence any unnatural change to those contours, at whatever scale, constitutes damage to the natural geomorphology, by definition. Only the significance of the particular landform and the magnitude of the damage caused to its values can be matters for debate. Damage to the significance of a landform may diminish its intrinsic value, its value in supporting the wider natural systems of which it forms part, or the instrumental values it offers humanity.

To illustrate the natural heritage value of some landforms and their potential sensitivity to the impacts of war, one type of environment in which warfare has been particularly focused is karst terrain, in which the relative solubility of the bedrock, typically limestone, dolomite or an evaporite, gives rise to the development by natural waters of underground drainage paths. This results in the formation of underground cave systems, and often a very rugged surface topography, typified by closed topographic depressions known as sinkholes, where infiltration of water into the ground is particularly focused.[17] Such terrain is especially well suited to intractable military operations as is evident from past or ongoing guerilla activity in certain karsts of the Middle East and some Pacific islands during the Second World War, and later conflicts in Cuba, Malaya, Viet Nam, Laos, Cambodia, Timor Leste, former Yugoslavia and Afghanistan.[18]

Some nature conservation values of karst landscapes may relate to the natural system context in which particular landform assemblages have evolved, broadly analogous to the bioregion concept in conservation biology. Alternatively, particular types and assemblages of landforms in an area may also be important as outstanding features, such as major cave systems, or in representing elements of geodiversity at a local, regional, national or international scale. Some karst landforms may be significant more for what they contain, caves and sinkholes often serving as receptacles in which other geomorphological, archaeological, palaeontological or biological values are preserved. Much cave-dwelling invertebrate fauna has evolved in constant darkness such that some species have no body pigment or eyes and have developed long sensory appendages. The limited nutrient supply keeps population numbers very low, hence the loss of even a few individuals due to changes in moisture flows or water quality may be sufficient to cause genetic drift or even extinction. Karst caves and other landforms also provide opportunities for instrumental use by humans for a wide variety of purposes including religious observance (such as at the small karst spring at Lourdes, France, or in the many Buddhist cave temples in southeast Asia), scientific research, recreation or education. Caves may play a role in the production of some foodstuffs, such as fine cheeses, and underground respiratory clinics have been established in some caves to take advantage of the reputed therapeutic qualities of cave air. More widely, caves and karst scenery are particularly important tourist draws in many parts of the world. ERW can impede some of these uses. For example, hand grenades and landmines have posed a hazard in the cave Tham Panoi in the Maung Ngoi Neua area of Luang Prabang province, Laos.[19]

The natural vegetation cover and soil biota plays an important role in acidifying the groundwater responsible for mineral dissolution and redeposition of these minerals as features such as stalactites and related speleothems in karst cave systems. This process can be seriously damaged where deforestation occurs.[20] The risks to karst are particularly great where participants or refugees in armed conflict base themselves or seek sanctuary in caves, because weapons capable of causing environmental harm may be focused on the site or may be stored there. In addition to the immediate harm caused by explosions, longer-term changes may be set in process. For example, one study of 100 craters in the Venetian fore-alps of Italy that were formed by the relatively small bombs available for deployment during World War I, found that half had since evolved into sinkholes, the explosions having simultaneously created topographic depressions that retain water while also shattering the underlying rock sufficiently to produce fractures that permitted the water to infiltrate and progressively enlarge the fractures by dissolving the limestone as it did so.[21] In addition, groundwater in karst travels through what are effectively natural pipes in which there is little opportunity for natural water purification, hence pollutants are able to spread rapidly, often in unexpected directions, posing risks both to environmental values and to human health. Hence, management of karst assets requires a whole-catchment approach because some very delicate balances need to be maintained, and this is unlikely to be achieved unless the wider natural system on which the cave environment is dependent is properly safeguarded.[22]

Values and Sensitivity of Soils

Humankind is fundamentally dependent upon the top few centimetres of the world's geomorphology: the soil that produces most of our food. Although engineers and many lay people loosely describe any body of unconsolidated earthy material on the ground surface as a soil, the definition of soil used by soil professionals such as agricultural scientists requires that the material has been converted into a medium suitable to sustain plant life as a result of having been acted upon by soil-forming

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(pedogenic) processes. This conversion is typically a lengthy process that involves the physical and chemical breakdown of rocks and minerals by weathering processes; downward leaching of soluble chemicals by infiltrating water; reduction and oxidation of iron minerals; enrichment of the soil surface by accumulated organic matter; physical disturbance by the swelling and shrinking of clays or by animals; and input of aerosols. Over time the natural movement of soil constituents and the addition of organic matter at the ground surface lead to the development of differentiated soil horizons that lie broadly parallel to the land surface, with the more productive organic-rich horizons being closest to the surface and less fertile material occurring at greater depth.

Numerous studies have highlighted the rapid rate at which soil erosion is occurring in many places around the world, but there have been remarkably few studies of the pace at which the development of new soil is able to replace eroded soil. A very important part of this process is chemical weathering whereby the mineral composition of rocks is changed chemically such that the rocks are reduced to soft residue through which water and chemicals can be transmitted. One useful benchmark is provided by considering the degree of weathering attained by fragments of fine to medium-grained igneous rocks in sediments of known age. Review of such evidence from temperate Australia,[23] North America,[24] South America[25] and Europe[26] indicates that weathering has generally penetrated no deeper than 1mm into such pebbles in sediments 12,000–20,000 years old. Although other processes that are important in soil formation also need to be taken into account, the fact that these rock surfaces have been weathered no more deeply than 1mm over at least 12,000 years amply demonstrates that the release of material to form the very mineral skeleton of soils is exceptionally slow. And it is against the slow rate of soil formation that the significance of the better-documented rates at which soil is eroded should be assessed, as should the degree to which accumulated soil capital is compromised by landmines.

Mine laying, detonation or clearance may contribute to soil damage. Erosion is only one of the ways in which soil degradation occurs. Other serious issues include soil nutrient depletion due to excessive exploitation of soil to produce crops, the loss of potential new nutrients by volatilisation when forest is burnt, and soil compaction, whereby the density of soil is increased thereby inhibiting root penetration, soil permeability, water storage capacity, soil aeration and biological activity in the soil. Soil profile mixing or profile inversion can also be major causes of soil degradation whereby mechanical disturbance causes the organic-rich uppermost part of the soil profile that is most critical to soil productivity to be diluted by mixing with less productive horizons from deeper in the weathering profile. Profile disturbance commonly reduces the ability of a soil to supply nutrients to plants. These various forms of soil degradation are very significant and long-lasting, and to them must be added soil pollution that involves the accumulation of chemical or other contaminants that impede productivity or contaminate crops, and landslides that involve the movement of very large masses of material down-slope, taking with them the productive soil horizons that had developed upon them.

There are also important linkages between soils and landforms that mean some soil disturbances caused by mines have the potential to trigger damage to landforms. For example, to revert to karst environments for another moment, soil plays a critical role in any karst area because respiratory and decay processes associated with plant roots and soil biota control the partial pressure of CO_2 in the soil which in turn governs the acidity of water that reaches the limestone bedrock. Simply opening up the vegetation canopy, such that increased solar radiation reaches the ground surface, can cause sufficient extra heating of the soil by the sun as to stimulate increased production of biogenic CO_2, in turn increasing soil acidity. This can trigger a positive feedback process whereby accentuated dissolution of the bedrock hastens enlargement of solution channels into which water and soil may be lost. This can lead to deposition of this eroded sediment elsewhere, or chemical degradation of previously-deposited speleothems such as the attractive stalactites that may adorn caves. Once this process has been initiated it can become irreversible and ultimately cause formation of rocky deserts, a process that has caused massive damage in some parts of the world.[27, 28]

Environmental Impact and Longevity of Damage by Landmines

Although the impact of landmines in degrading landscapes is visually less spectacular than the large bomb craters that may remain after aerial bombardment, landmines nevertheless cause significant damage to landscapes. Their environmental impact is multi-phased, involving potential disturbances of soils and landforms during mine deployment, detonation by a victim, de-mining operations after the conflict has ended, or by breakdown *in situ* over time. Only a relatively small ground disturbance is generated by landmine detonation but where this changes ground contours, damage to the natural geomorphology is implied, whether it be judged significant or otherwise. In some instances there may be important secondary effects such as changes in soil drainage or unnatural materials being left exposed to weathering processes, which may, for instance, entail changes to water seepage pathways into a karst cave or the production of leachates that degrade natural water chemistry.

More severe environmental impacts may accrue from de-mining processes.[29] For example, one de-mining technique employed in Afghanistan involved excavating the soil, passing it through a gravel crusher and returning it to the land. This process not only mixes the soil horizons with implications for soil productivity, but in the case of Afghanistan also left these desert soils prone to erosion by the wind. In densely forested Cambodia the vegetation must be removed before reliable de-mining can occur, and this not only depletes the surface biota and exposes the ground to erosion, but also often eliminates resource plants, such as medicinal plants, that may be poor re-colonisers of land thus disturbed, and which take many years or decades to regenerate.[30] Hence, administering agencies need

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to consider the environment as a core part of the de-mining and development process and not merely a peripheral issue.[31] De-mining in sensitive karst environments warrants particularly close scrutiny.

Where de-mining can be undertaken, social benefit undoubtedly flows if impoverished farmers are allowed access to the land, but these environmental costs of de-mining must be added to the war account. One should perhaps also add the environmental harm that may result from subsequent unregulated post-war recovery aspirations, because at times of great social stress community priorities typically change and environmental management is a common casualty.[32]

In an effort to raise world attention about the dangers of unexploded land mines, Diana, Princess of Wales, watches a land-mine clearing demonstration in Huambo, central Angola, in 1997

Courtesy: Encyclopedia of Espionage, Intelligence, and Security

Discussion

Bothe[33] identifies the use of herbicides during the American war in Indochina and the oil spills during the Gulf wars as the two principal examples of environmental damage caused by armed conflict, and concludes that it "appears that the environment has recovered relatively well in these cases". However, an appearance of environmental recovery based on revegetation, reafforestation or aesthetic appearance may mask a longer-term diminution of plant community diversity and an impoverished faunal assemblage, including invertebrate elements and the soil biota fundamental to pedogenesis. By these latter criteria, how significant is it that an environment "appears" to have recovered? Moreover, the majority of landform and soil damage, although perhaps hidden from view by recolonised vegetation, is likely to take from several human generations to hundreds of millennia to recover, if ever.

When considered against human time-scales, it is clear that landmines continue to wage war and generate environmental impacts long after overt hostilities have ceased. Over 14 million World War II land mines and 74 million other items or ordnance had been removed in Poland by the early 1980s, with 350,000 being located and destroyed each year.[34] As noted earlier, the landmine problem is part of the wider problem posed by explosive remnants of war (ERW). A little-publicised database released by US president Clinton during his visit to Vietnam in 2000, designed to assist in humanitarian ERW clearance, indicates that the USA dropped 2,756,941 tons of bombs, cluster bombs and other munitions in eastern Cambodia during the American war in Indochina, a figure greater than the combined total of 2,000,000 tons dropped by all the Allies in all theatres of war during World War II.[35] However, air ordnance represents only 20% of the ordnance being cleared, the remainder being ground artillery and munitions.[36]

An estimated 4–6 million land mines were planted in Cambodia. After ousting the genocidal Khmer Rouge regime, the Royal Cambodian Armed Forces (RCAF) of the new Viet Nam-backed Cambodian government created a densely-mined barrier stretching 700km along the Cambodia-Thailand border to prevent re-infiltration of the Khmer Rouge, and it also deployed other "nuisance" mines. After Viet Nam withdrew from Cambodia in 1998, scattered ill-defined and un-mapped minefields were laid by both sides. To what extent have the polluters paid? Funding for mine action in Cambodia in 2004 totalled $US 41.7 million provided by 14 countries, while in 2005 the figure declined to $US 25.6 million, again from 14 countries. In 2005 the USA was the largest individual contributor to mine action although it provided only 27% of the total funding. This contribution by the USA is roughly equivalent to just a few days of the many years of expenditure involved in its bombing, mine-laying and related activities that created most of the ERW problem in the eastern half of Cambodia. The Khmer Rouge is now defunct and incapable of contributing to the de-mining of the areas it contaminated. De-mining in Cambodia has primarily been undertaken by three humanitarian organisations. The engineering battalion of the RCAF has undertaken some mine clearance operations commercially under government contracts funded by the Asian Development Bank and World Bank, but without any independent confirmation of its claimed clearance results.[37]

Mine clearance is a slow, laborious and expensive process. Between 2000 and 2005, 71,136 anti-personnel mines were detected and destroyed in Cambodia. But at present de-mining efforts cover only about 20km^2/year. The largest operation, involving 2300 staff, managed to clear 22.1km^2 in 2005 and targeted another 22km^2 for 2006. In the first four months of 2006 it cleared 9km^2, destroying 10,353 anti-personnel mines and 457 anti-vehicle mines.[38] At this rate of progress complete decontamination of Cambodia from ERW would take many, many decades. ➳

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Article 8(2)(b)(iv) of the Rome Statute of the International Criminal Court (ICC) proscribes "widespread, long-term and severe damage to the natural environment which would be clearly excessive in relation to the concrete and direct military advantage anticipated". Could such scenarios as those described above reasonably be regarded as "widespread", "severe" and "long-lasting" environmental impacts of the techniques deliberately selected to prosecute armed conflict when viewed from a geoscientific perspective? Articles 35 and 55 in AP1 were weakened by restrictive provisions and Bothe,[39] who was a party to the negotiations, notes that the committee report suggests the duration of environmental effect of warfare was considered by some to be "measured in decades" with a minimum of 20–30 years, and that there was "a widely shared assumption that battlefield damage incidental to conventional warfare would not normally be proscribed by this provision". He suggests the difference between this time frame and the ENMOD Convention definition that "long-lasting" means "lasting for a period of months, or approximately a season" was intentional. Given that geodiversity is the foundation stone of environmental diversity, and from a geoscientific perspective, I would contend that any suggestion that the impacts of warfare upon the environment are relatively transitory is almost risible in most cases. Moreover, given the immense importance of soils and the damage that they may suffer simply through attempts to remove landmines, the environmental harm caused by landmine deployment cannot but be regarded as severe.

The concept of "carrying capacity" is well established in land management, particularly with respect to environmentally sustainable stocking rates in grazing areas. Similarly, national park managers and other protected area managers commonly need to restrict numbers walking across sensitive alpine vegetation in order to ensure that trampling pressure does not outpace the capacity of the plants to recover. Revegetation of a battlefield also occurs over time, and in that sense vegetation cover has a "battle carrying capacity", such that one could theoretically derive a balance between the number of battles permitted per unit time and the capacity of the vegetation to heal itself. However, vegetation is only part of the equation. Most landforms and soils evolve over geological rather than human time scales, and restoration of damage to them may take many millennia, if it happens at all, even though the landscape damage may be camouflaged under a blanket of green plant growth. Hence, there is a need for geodiversity to be addressed in assessing environmental harm against the law developed by the Environmental Claims Panel (F4) of the UN Compensation Commission, which states that the awarding of damages for environmental loss during war is for the purpose of restoring the environment to its previous condition and "overall ecological functioning".[40]

As Bothe[41] reports, in response to requests that NATO States be investigated for alleged war crimes, a commission established by the International Criminal Tribunal for the Former Yugoslavia (ICTY) took the environmental harm caused during the war sufficiently seriously to devote the first chapter of its report to alleged environmental crimes. In its report the commission drew attention to the fact that the three terms "widespread", "long-term" and "severe" were linked in AP 1 by the word "and", implying that all three criteria must be met for the damage thresholds of AP 1 to be reached, which the commission concluded was not the case in this instance.[42] However, while there may be difficulties with such a general term as "widespread", had the commission broadened its assessment to consider impacts on soils and landforms as part of "the environment", which it did not, and had it done so in accordance with present-day professional geoconservation principles, then it might well have concluded that the threshold for "severe" and "long-term" had indeed been met.

This raises questions as to whether "environment" was defined in an adequately comprehensive manner by the commission, and it highlights the need to ensure that similar shortcomings do not arise in future. The commission's conclusion may well in part be the outcome of the dominance of the biological paradigm in many nature conservation and environmental agencies. There is as much competitiveness for resources and influence in nature conservation as in any other human endeavour, and in recent decades biodiversity conservation has been ascendant leaving other aspects of environmental diversity, including geodiversity, relatively out of sight and out of mind. Inadequate environmental assessments can reasonably be anticipated as a natural outcome of lop-sided structures and mechanisms for procuring technical advice. This is an important issue that needs to be addressed in nature conservation generally.

Another key requirement for the future is to recognise that the geo-environment is not uniform in its vulnerability to disturbance. Landmines or bombs detonated against a large mountain of exposed solid rock will have less overall impact than will detonation in an environment where the substrate is less resistant, while some smaller elements of geoheritage may be crushed beneath a single human footstep. A crater formed in an active stream channel may be naturally filled by new water-deposited sediment within a matter of hours, but there is no potential for natural healing of an ice-age landform for many millenia until the next ice age comes – assuming human-induced climate change allows that to occur. There is an inherent weakness in any codifying of a very general position without recognising variation in the susceptibility of geo-environments to damage,[43] as there is in adopting measures that are not soundly based on rigorous science.

Issues of nature conservation, long-term sustainable development and human security are inextricably interwoven, and in a landmined landscape they must be dealt with in conjunction with one another. The present preoccupation of mine action policy with addressing the needs of affected people as rapidly as possible is understandable and appropriate, and emergency and humanitarian needs are, quite reasonably, likely to remain at the forefront. However, minimising harm to nature conservation values and long-term environmentally sustainable economic development is also important and in shaping policy, assessing any potential de-mining situation, or indeed in formu-

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lating an environmental policy of any kind, it is important that "nature" be interpreted more broadly than merely being synonymous with "biodiversity".[44] Adoption of a wider perspective that includes an informed awareness of the importance of abiotic nature will enhance not only nature conservation but also the outcome of mine action for long-term sustainable development of lands outside the conservation estate.

The UN works in partnership with other organisations to reduce the humanitarian and socio-economic threats posed by landmines and other ERW. There are five principal pillars to UN landmine policy: mine surveying, marking and clearance; mine risk education; victim assistance; stockpile destruction; and advocacy.[45] Improved awareness of the implications of landmines for geodiversity conservation should inform at least three of these pillars of international mine action, namely landmine and ERW clearance, stockpile destruction and advocacy. UN mine action programmes established in individual countries typically involve establishment of an in-country regulatory and policy body, a coordination body and a variety of operating organisations. Once again, for nature conservation to be accorded greater regard implies a need to increase awareness at all these levels, and for terms like "nature" and "environment" to be defined in an adequately comprehensive manner.

US Army soldier removes fuse from a Russian-made mine to clear a minefield outside of Fullujah, Iraq Courtesy: Wikipedia

Article 5 of the 1980 Convention on Prohibitions on the Use of Certain Conventional Weapons (CCW) provides for each state party to identify all mined areas under its jurisdiction and to ensure that these are quarantined until such time as all anti-personnel mines contained therein have been destroyed. However, shaping and implementation of mine action policy must be undertaken in full cognisance of the implications of ground disturbance, and difficult balances may need to be struck between mine action for earliest social benefit and the implications of the action proposed for nature conservation and longer-term environmentally sustainable development. The UN encourages development of equipment that will enable the landmine problem to be addressed in a safe, quick and cost-effective way. Among the aims of the capacity-building initiatives by the United Nations Development Programme (UNDP) are assistance to appropriate bodies with planning and prioritisation of mine action activities, and with exploring cost-effective alternatives to clearance operations based on humanitarian and socio-economic impact analysis.[46] This is entirely appropriate.

The question of the long-term environmental impact of mine clearing programmes is a very significant one. Mine clearance may not offer the maximum potential benefit in the short term.[47] Harris[48] has reviewed the financial costs of de-mining against the benefits in terms of human productivity, medical treatment and foregone agricultural production, and concluded that the annual cost of completely de-mining Cambodia over 25 years would be $US 140 million but that annual benefits would be only $US 0.7 million. He suggests this highlights the need to bring down the costs of de-mining, but also that policy makers concerned to advance the well-being of the Cambodian people should consider alternatives to de-mining. I would suggest that where landmine clearance can only be achieved by techniques that involve serious ground disturbance and soil profile mixing, a conservative approach may be particularly justified, providing that risky areas can be effectively quarantined from unsafe human access.

Strategic objective 2 of the UN Mine Action Strategy[49] is to mitigate the risk to community livelihoods and expand freedom of movement. However, because soil can be grossly degraded by some de-mining techniques, in adopting as an indicator the making available of community assets such as pasture and cropland, regard should also be given to the quality of the resource released, not merely its quantity. In some cases, the unwitting quarantine of land resources by ERW is likely to include some sites where soil resources might previously have become degraded through excessive or inappropriate use. Hence the period of quarantining by ERW might be regarded as an enforced fallow period, during which a degree of restoration has occurred, at least in terms of the benefits to soil fertility that accrue from accumulation of organic matter. This allows the possibility that provided low impact de-mining techniques can be developed, in some cases land could perhaps be returned to productive use in a better condition than was previously the case. However, this opportunity will be lost if inappropriate mine clearance techniques have been used.

UN sectoral policy on victim assistance focuses on those individuals injured by detonation of ERW. However, as deserving of assistance as those individuals are, the injury goes far wider into society, and overall local, regional or national recovery time is likely to greatly exceed the lifetime of any one individual detonation victim. Article 3 of the Universal Declaration of Human Rights[50] affirms that everyone has the right to life, liberty and security of person. United Nations mine action aims to improve human security, and it facilitates activities by other actors including those involved in development. But hu-

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man security has two principal components, namely freedom from want and freedom from fear.[51] Even in a country as heavily affected by ERW as is Cambodia, since the decline of the Khmer Rouge, food insecurity, communicable diseases, natural disasters and violence associated with the political system pose a far greater risk to overall security than does injury by ERW.[52] The fact that extensive areas remain contaminated by ERW may exacerbate some of the other effects, but employment of mine clearance techniques that diminish soil productivity has the potential to contribute to diminished rather than enhanced human security in the long term.

The challenges that arise in mine action/ERW policy are in large measure the inevitable consequence of the severe and very long-term environmental harm caused by landmines, which strike at both nature conservation and at social and economic development. Other ERW with greater explosive force pose still greater hazards than do landmines, and erosion that follows deforestation by chemical warfare, napalm or mechanical clearing, or more deliberate changes to landforms, soils and natural geoprocesses, further broaden the scope of the environmental harm caused by war. An excessively biological metric will almost invariably grossly underestimate the severity and longevity of the environmental damage caused by war, hence, a more broadly-based approach is essential in interpreting laws relating to the protection of the environment during armed conflict.

Notes

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