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Between the completion of the authors manuscripts, and editing and publication of the work, there has necessarily been some lapse of time. A footnote at the beginning of each chapter indicates the date of its preparation by the author. A major political change which has occurred since this study was commissioned is the division of Czechoslovakia into independent states - the Czech Republic and Slovakia - on 1 January 1993. However, the date of preparation of the reports is mentioned in a footnote at the beginning of each chapter.

The reports appear in the book according to regional groupings: i.e. Australia; Latin America (Argentina, Brazil); Eastern-Central Europe (Czechoslovakia); Asia (China, India); Sub-Saharan Africa (Nigeria); the Maghreb Region (Tunisia).

Preface

The involvement of the United Nations in environmental issues has a long history. The 1992 Conference on Environment and Development held in Rio de Janeiro is perhaps the most recent manifestation. However, since the United Nations Conference on the Human Environment in Stockholm in 1972, which expressed the commitment of the international community to protect and improve the quality of the environment, a number of UN agencies have been active in the field.

It was in this context that the United Nations Interregional Crime and Justice Research Institute (UNICRI), in co-operation with the Australian Institute of Criminology (AIC) and the European Institute for Crime Prevention and Control, affiliated with the United

Nations (HEUNI), initiated in 1991 a study on "Environmental Crime, Sanctioning Strategies and Sustainable Development". This volume contains the project results.

The monograph examines environmental crime and the legal frameworks for environmental protection in eight developing and industrialized countries, with civil law and common law traditions from diverse geographical regions. The authors also discuss sanctioning strategies and enforcement, elaborate proposals for reform and consider the need for legal and policy changes in order to better protect the environment.

The focus of the project was on the needs and concerns of participating countries to protect the environment with particular reference to environmental crime and sanctioning strategies, and within the perspective of sustainable development. We believe this study is of special importance to developing nations in which environmental protection is often hampered by a lack of resources, the pressures of poverty and unemployment and the need for socio-economic growth.

The work is the result of collaboration at two levels - institutional and professional. The research field guide was designed by UNICRI and AIC with assistance from the Max-Planck-Institute for Foreign and International Criminal Law. Eight experts carried out field research in their respective nations on behalf of UNICRI, AIC and HEUNI. Finally, the editing and publication was a joint venture involving UNICRI and AIC.

Further work in this area is now being sponsored by UNICRI. It will examine the potential and limits of criminal justice in the protection of the environment and culminate in a research workshop on this topic at the Ninth UN Congress on the Prevention of Crime and Treatment of Offenders in 1995. We hope that the present volume and current work will stimulate debate and contribute to new understanding about environmental protection - a subject of vital importance for our common future.

Rome, Ugo Leone
Canberra, Duncan Chappell
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Rounding Up: Themes and Issues
*by Anna Alvazzi del Frate**
*Jennifer Norberry ***

Introduction

In June 1992 the United Nations Conference on Environment and Development was held in Rio de Janeiro. Over 150 nations were represented. More than 100 heads of government or state were present, as were 8000 journalists and the representatives of 1400 non-government organisations. [1] Among other things, the Conference called for the enactment of enforceable and effective environmental laws, including the provision of sanctions designed to punish offenders, obtain redress, and deter future violations. [2]

In the past, some polluting behaviours were seen as normal and inevitable consequences of industrialisation and national progress. In many countries environmental protection was based on reliance on a non-punitive, conciliatory style of securing compliance with environmental laws and regulations. Increasing damage to the environment has, however, changed perceptions of acts of pollution, particularly in developed countries. In many countries some polluting behaviours are now seen as real crimes.

Significant research on the use of criminal law in environmental protection has already been carried out and a very extensive literature exists, especially from developed countries.[3] For example, the Max Planck Institute for Foreign and International Criminal Law (in Freiburg-im-Breisgau, Germany) has undertaken a broad comparative study entitled Environmental Protection by Means of Criminal Law? National and Transnational; the study dealt with 28 countries, most of them industrialised. Less attention has been devoted to developing nations.

In 1991, after consultations with the Max Planck Institute, UNICRI initiated a three-year study involving the gathering, analysis and presentation of data on environmental crime. The study has been carried out in collaboration with two United Nations affiliates, the Australian Institute of Criminology and the Helsinki Institute for Crime Prevention and Control (HEUNI).[4] The first phase of the study is now complete, having involved the gathering of information at a national level using a field guide designed by UNICRI.[5] The field guide relies in part on the methodology adopted by the Max Planck Institute for its comparative study. It was desirable, therefore, to include in the UNICRI study some of the countries that were not participants in the Max Planck study. Particular attention was given to developing countries, and regional representation was considered in order to reflect different political, cultural, social and economic backgrounds. The regions included in the UNICRI study are Africa (Nigeria and Tunisia), Asia (China and India), the Pacific region (Australia), Eastern Europe (the former Czechoslovakia) and South America (Argentina and Brazil). An expert from each country was asked to collect information [6], in accordance with the field guide. Interim reports were delivered in October 1991. In December 1991 an international seminar entitled 'Protection of the Environment and Penal Law' was held by the International Centre of Sociological, Penal and Penitentiary Research and Studies in Messina, Italy, to discuss the preliminary results.[7] Final reports from each nation were submitted by the end of 1992.[8] These final reports are collected in this monograph.

Based on the final reports, this overview chapter describes the main issues identified in the field guide. When available, for some topics reference is made to national reports prepared for the 1992 United Nations Conference on Environment and Development.[9]

This overview is not an attempt at comparison: there are many difficulties inherent in comparing nations as diverse as those participating in this study. First, environmental protection operates at quite different levelsnational, state or provincial, and localor combinations of levels, in many of the participating countries. Second, it was not possible to compare enforcement data between nations: in some cases environmental protection systems are so recent in origin that little information is available about their

operations; in other cases access to data appeared to be a problem; in yet other cases few laws directly aimed at protecting the environment exist.

The approach therefore is to identify and briefly discuss some issues, providing examples from the national reports, in which the issues are more fully described and developed. In particular, this overview deals with environmental problems and community involvement, aspects of the historical development of environmental protection laws, the constitutional framework in which those laws exist, the administrative structures provided to implement environmental regulations, the legal framework of environmental regulation, legal sanctions and the use of the criminal law, the enforcement of environmental protection laws, and international treaties.

Environmental problems and community involvement

Some of the world's most significant ecological disasterssuch as Bhopal (India, in 1984) and the process of deforestation in Amazonia (Brazil)have received widespread attention from the general public and generated greater local awareness of environmental protection issues. [10] It appears that most developing countries face problems of environmental damage as a direct consequence of human behaviour. National reports confirm that the countries involved in this study are affected by serious environmental problems. Most of them report air, water and marine pollution, deforestation, desertification and devastation of territories, problems associated with hazardous waste disposal, and noise pollution.

Air pollution, which is one of the most serious problems reported, may be the result of industrialisation, coal combustion or traffic, and it particularly affects large cities.[11] It is a major problem in many countries and, as the former Czechoslovakia reports, can be attributed to concentrations of thermal power plants, industries and brown coal mines. As well as continuing air pollution problems, environmental accidents such as the toxic gas leak at Bhopal need particular attention.

Water pollution is one of the oldest environmental problems. All participants in this study cite it as a major concern. Among others, Brazil reports chemical pollution of drinking water in cities and marine pollution threatening the tourist industry; Australia reports beach, marine and waterway pollution from sewage, water pollution caused by pesticides, sediments and nutrients, and water salinity. Water pollution may be the result of industrialisation, urbanisation and waste disposal.

Many project participants express concern about problems of deforestation, desertification and devastation of territories. For example, in the former Czechoslovakia the construction of large nuclear power plants has led to the devastation of vast tracts of land. Australia reports problems with contaminated land sites and urban stormwater run-off. In Tunisia, state investments for reforestation and soil conservation are considerable.

The problem of waste disposal can be a consequence of urbanisation (garbage disposal in cities) or a product of industrial, medical or other processes (toxic or hazardous

waste). The problem is considered very serious by all participating countries. For example, Nigeria reports that waste disposal and industrial pollution are the most important environmental problems in the country, although the popular perception is that other problems such as refuse disposal and environmental sanitation are more serious; China highlights problems of toxic waste disposal and garbage disposal in big cities; Australia raises the issue of hazardous waste disposal.

Finally, noise pollution is a common problem in Asian countries[12], and is reported by Australia as a consequence of traffic in cities.

Environmental concerns for the future were expressed by many participating countriesthe enhanced greenhouse effect, global warming, erosion, and the use and release of genetically manipulated organisms. It appears that less-industrialised countries have reached a level of awareness of environmental problems related to industrialisation that will ensure that when new industrial complexes are built environmental precautions will be taken.

Level of attention in the media and among political and citizens' groups and associations

Most of the participating countries report that environmental issues are regularly dealt with in national newspapers. The mass media show a great, and increasing, interest in national and international environmental issues.[13] Only one country, Argentina, reported little interest in domestic environmental problems and a tendency towards disaster-oriented coverage of foreign issues in the mass media.

Political parties in many countries are expressing a growing interest in environmental issues. Most participating countries report that the major political parties have included environmental issues in their programs. In India, at least three political parties include environmental issues in their agendas (the Congress Party, the Bharatiya Janata Party and Janata Dal). In Australia, the four major political parties at state and federal level devote attention to environmental issues in their policy platforms, to a greater or lesser extent. The same applies to Nigeria and Argentina. 'Green' parties exist in most countries, although they appear to be more successful at the local level. As the report from Argentina observes, it is interesting that environmental issues are often promoted by individuals rather than political parties.

All participating countries report a proliferation of environmental protection groups. Argentina, Brazil, the former Czechoslovakia, Nigeria and Tunisia comment on the growth and activity of ecological associations and non-government organisations dealing with environmental problems. These groups often collaborate with government agencies responsible for environmental protection. [14] In Australia there are about 350 organisations that are either 'green' or of interest to green associations. Some have thousands of members: in 1990 membership of Greenpeace, the Wilderness Society and the World Wild Fund for Nature was 47000, 14500 and 28000 respectively. In India

some 800 organisations are associated with environmental issues and some of them receive government assistance in their work.

It appears that in some countries the concept of pollution is closely associated with industry, and that major corporate bodies are therefore regarded as major polluters. Other participating countries do not clearly identify their major polluters.

Sometimes there are contradictions between community feelings and national policy: for example, the Nigerian report notes that an 'annual pollution discharge' tax is paid by industries to government and this hampers control of the industries' compliance with environmental protection norms.

Historical Development of Environmental Protection Laws

The countries participating in this study include developing and developed nations. Concepts of environmental protection may be grounded in antiquity in some of these countries. In India, for example, the Rig-Veda, Yazur-Veda and Atharva-Veda all identify water as a sacred substance and water pollution as an offence. In China, many thousands of years ago laws were made for the purpose of protecting living resources and preventing soil and water losses. It is, however, with more recent legal approaches that this study is concerned. These approaches can be typified in two waysaccording to their subject matter and according to their locus. In most of the participating nations early concerns focussed particularly on public health and on water as a medium because of its known potential for disease transmission. The prime focus of these laws was human well-being rather than protection of the environment. Another area of concern was the development and exploitation of natural resources. Many of the nations participating in this study were subject to colonial rule by Western European powers and, while colonialists may have believed that the resources in their new domains were almost inexhaustible, they did wish to regulate their exploitation. Thus, in Brazil penalties for felling trees were calculated in accordance with the trees' economic value.

Heine[15] has described the development of statutory environmental protection in a number of developed countries as a process marked by an increasing use of criminal law. The criminal law has long been used to protect the environment, albeit indirectly, in many of the countries participating in this study. The ways in which early legislators sought to deal with environmental matters were through public health [16] or resource[17] statutes, in some cases through civil codes18 and in other cases through the criminal law. The last typically sanctioned pollution of environmental media in the context of endangerment of public health or nuisance.[19]

Of the study participants, the former Czechoslovakia appears to provide an exception to this schema. It reports that early environmental protection laws were concerned with the protection of nature and the establishment of nature reserves. Public health legislation containing environmental provisions was not enacted until the 1950s and 1960s, and it was not until the 1970s that legal rules relating to particular environmental sectors such as waters and forests were made.

Use of public health, resource and criminal laws typically dates from the nineteenth and early twentieth centuries. In most cases special environmental protection and anti-pollution laws began to emerge in the mid-twentieth century. A number of factors were at work here. First, the discovery of natural resources in commercial quantities: as this occurred it became apparent that exploitation of those resources could damage the environment. Second, the onset of industrialisation: in many developing countries industrialisation was achieved with the use of outdated technologies, and it resulted in rapid and unplanned urbanisation to provide labour for new industries, visible and widespread pollution, and serious pollution incidents. Last, the 1972 United Nations Conference on the Human Environment is cited by the national experts involved in this study as giving rise to an enhanced awareness of the environment and the need to provide for environmental regulation.

Constitutional Frameworks

Constitutional matters are of importance to this study in two ways. First, a nation's Constitution may itself contain guarantees of environmental protection. Second, constitutional divisions of power in federations may affect the efficient allocation of responsibility for environmental matters and may be an impediment to coordinated and cooperative approaches to environmental protection between tiers of government.

The introduction of constitutional guarantees of environmental protection is a recent response to increasing interest in environmental issues in nations such as Brazil[20], China[21] and India. [22] Significantly, the Constitution of each of these nations seeks to foster environmental protection by placing an obligation not only on the state but also on its citizens to enhance and protect the environment. The Constitutions of Brazil and China recognise that consequent upon the imposition of citizen obligations should be the creation of citizen rights. Both nations endow citizens with the constitutional right to take legal action to remedy environmental degradation. In the former Czechoslovakia, the Charter of Basic Human Rights and Freedoms provided that citizens had rights relating to environmental quality.

As Heine has remarked, though, the mere existence of constitutional guarantees does not of itself enhance environmental protection. [23] A theme running throughout this UNICRI study is the existence of implementation gaps. They emerge at a constitutional level as well as at legislative and enforcement levels. In Brazil, for example, the Constitution (Article 225, paragraph 4) extends penal liability for environmental degradation to legal persons. But Brazilian constitutional provisions are not self-executing. Article 225, paragraph 4, has not been given effect in ordinary law and the Brazilian judiciary has been unwilling to recognise the liability of legal persons before this occurs. Similarly, in the former Czechoslovakia, rights contained in the Charter of Basic Human Rights and Freedoms need to be legislatively activated.

National Constitutions typically predate the development of widespread interest in the environment as a discrete subject. In countries such as Argentina, Australia and Nigeria the provinces or States enjoy residual power over matters not specifically enshrined in

the federal Constitution. In none of these countries does the national Constitution specifically mention the environment. National governments have, however, typically enacted environmental laws incidental to other heads of constitutional power such as commerce, territorial seas and foreign affairs. These laws exist together with State or provincial legislation on the environment. A number of difficulties may result. Confusion and uncertainty may exist concerning the division of responsibility for environmental protection at national and provincial level (Argentina). Conflict may result from the national government attempting to take the lead in environmental protection matters traditionally regarded as the realm of State governments (Nigeria). An absence of cooperation and coordination may mean that environmental standards, offences and penalties differ markedly between States in a federation, with consequent potential for the creation of 'pollution havens' (Australia).

Administrative Frameworks

Typical of the nations under review is a multi-tiered environmental protection structure that may involve national, State or provincial, and local governments. Within this structure a number of models of environmental protection can be identified. Agencies may be specialised; that is, environmental protection may be the core function of an organisation. Agencies may be non-specialised; that is, environmental protection is merely an incidental responsibility for them. In the case of jurisdictions with specialised agencies, environmental protection may be centralised, with one agency having responsibility for almost all aspects of environmental protection[24], or it may be segmented, typified by the existence of a number of environment protection bodies each endowed with one or more of the functions of policy formulation, standard setting, administration and enforcement.[25] Even in 'specialist' systems, many other government departments and agencies may have functions that impinge on environmental protection; for example, mines and forestry.

Administrative arrangements for environmental protection are no less important than constitutional allocations of power. Sources of concern stated in most of the reports prepared for this study were lack of coordination between agencies, inadequate definition and delineation of responsibilities, and the potential for conflict between agencies operating at national, State and provincial, and local levels. Although the reports were required to focus on national laws, the existence and interplay of different agencies operating at different levels of government are also very important when considering the development and implementation of coherent environmental laws.

Efforts to coordinate the activities of the many agencies with environmental protection responsibilities have been made in Nigeria with the establishment of interdepartmental committees and the Federal Environmental Protection Agency, on which government departments with environment-related functions are represented. In the former Czechoslovakia the Federal, Czech and Slovak Governments formulated a State Program for Care of the Environment to coordinate environmental activities.

Legal Frameworks

Heine identified two models of legal protection for the environment. The first involved a central environmental code; the second involved separate laws for different environmental media.[26] These models are not mutually exclusive. Among the jurisdictions whose legal framework generally corresponds to the former model are the Australian States of Victoria[27], Western Australia [28] and Tasmania.[29] In nations such as China[30] and India[31], and in the Australian States of New South Wales[32], Queensland[33] and South Australia[34], the second model is more in evidence. To these could be added a third model of nations such as Argentina, Brazil and Tunisia, whose coverage of environmental protection is primarily indirectthrough laws governing natural resources such as fisheries, forests, minerals and waters.

In this study the descriptions of legislative frameworks overwhelmingly refer to fragmentation, inconsistencies, duplication and gaps. In some cases these problems are magnified by continuing and piece-meal amendments to environment-related legislation that dates back to the early part of this century. In other cases statutory coverage of particular pollution problems is either absent or dealt with incidentally in other legislation. For example, environmental protection in China is marked by an absence of laws regulating solid waste, and in India the very significant problem of noise pollution is dealt with in a number of statutes, including the Factories Act 1948, the Aircraft Act 1935 and the Railways Act 1890.

Any description of the legal framework of environmental protection would be incomplete without mention of substantive criminal law. The criminal law provided one of the first mechanisms through which the environment could be indirectly protected. It continues to play a role, which varies in importance according to the jurisdiction under consideration. In India, for example, individual citizens and voluntary organisations have used and continue to litigate using the Indian Penal Code, which contains public health and safety provisions, and the Code of Criminal Procedure, which enables magistrates to order the removal of a nuisance (including pollution) and to penalise those who ignore such an order.[35] In some cases there has also been a move to introduce substantive criminal offences against the environment. Consideration is currently being given to the inclusion of a crime against the environment in the Criminal Code Act of Nigeria; in China, it is reported that the Legislation Committee of the National People's Congress is considering adding an article on environmental crime to the Criminal Law; and in the Australian State of South Australia the usefulness of creating a crime against the environment has been reviewed by the Government. [36]

Sanctioning Strategies

Legal sanctions

In the jurisdictions under review three basic types of legal sanction are in use. The first involves criminal law, including quasi-criminal (regulatory) offences. The second involves administrative sanctions. The third involves civil sanctions. Although many of the nations participating in this study have attempted to protect the environment predominantly by civil or administrative sanctions, there is evidence of an increasing

resort to criminal penalties.[37] Criminal sanctions may be contained in criminal codes or crimes statutes or appear in administrative environmental protection statutes. When examining criminal sanctions, important issues include the nature of the sanctions and their appropriateness in achieving environmental protection.

Typically, the penalty for an environmental offence is a fine or imprisonment, or both. Fines are a traditional approach to penalising environmental offenders. In recent times, in some of the participating nations, concern has been expressed about the inadequacy of maximum fines provided for in statutes and imposed by the judiciary. Where reform of environmental law has occurred, the fine continues to be at the centre of sanctioning frameworks. Attempts have, however, been made to strengthen its impact by such means as increasing maximum fines, legislating for minimum fines, subjecting repeat offenders to higher fines, making corporations liable to much higher fines than individuals, and providing for daily fines for continuing offences. The rationale for such amendments is to deter potential offenders by threatening them with a significant economic penalty and to combat the view that fines are merely a cost of doing businessa cost that is cheaper than the cost of installing and maintaining effective anti-pollution technology.

Imprisonment is another sanctioning tool for environmental offenders. Present in public health offence and nuisance provisions in criminal codes, it has also emerged in the administrative environmental statutes of some nations. In China, for example, environmental protection laws provide that certain behavioursuch as marine pollution resulting in substantial property loss, injury or deathmay be dealt with under the criminal law.[38] In Nigeria[39] and Argentina[40] breaches of hazardous waste laws may result in incarceration, the maximum penalty for a breach in Nigeria being life imprisonment. In some Australian jurisdictions those found guilty of aggravated pollution may be imprisoned for up to seven years. [41]

Apart from the question of what criminal sanctions exist for environmental offences there is also the question of who is liable to be criminally sanctioned. Natural persons may, of course, be subject to criminal sanctions. In some jurisdictions, officials from environmental protection agencies may be criminally (as well as civilly) liable for environmental degradation that results from a breach of statutory duty. However, with the exception of Australia and Nigeria, and with limited exception in China[42], it appears that criminal liability cannot be assigned to legal persons. Attempts to target corporations indirectly by penalising responsible corporate employees were made in the former Czechoslovakia. These different ways of dealing with harm done by corporations reflect the historical division between societies in which corporations have been liable to criminal sanctions and those in which a presumption of societas delinquere non potest exists.

Debate about the appropriateness of the criminal law as a sanctioning tool for environmental transgressions has occupied commentators in both civil law and common law countries. Some commentators have expressed disquiet about the use of criminal sanctions on the basis that they are a clumsy and inappropriate instrument for achieving protection of the environment.

Heine, in particular, outlined a number of problems associated with the use of criminal law in the protection of the environment.[43] The first derives from the relationship between criminal and administrative law. He identified three models.[44] Difficulties that Heine sees as arising from the existence of mala administratione prohibita include the possibility that criminal law will be inflated and its value correspondingly diminishedthat the 'public perception of what is truly blameworthy criminal conduct can diminish, when both murder and mere disobedience of administrative orders are defined as criminal'. [45] Heine has also charted the conflict that may occur between administrative environmental protection agencies and prosecutorial agencies in the enforcement of environmental laws.[46] Some of these difficulties are seen in some of the nations participating in this study. In particular, the potential for derogation of the criminal law by selective prosecution and the imposition of relatively low penalties is dealt with in the following section.

Problems of proof also present difficulties in applying criminal law to environmental pollution. These difficulties include establishing mens rea, proving pollution or deleterious effects, and linking the pollution, the substance and the polluter. Because of these obstacles, in some industrialised nations there has been a trend towards introducing devices that facilitate the attribution of criminal responsibility.

In some nations strict liability has been used as a means of overcoming some of the difficulties associated with the use of criminal law. Strict liability operates irrespective of fault, although a defence of honest and reasonable mistake is available. It is little seen in the countries participating in this study, although in Australian jurisdictions it is generally found in administrative environmental protection laws.[47] It is apparently under consideration in China. In Nigeria, strict liability is a matter of debate because the Criminal Code Act imports mens rea into offence provisions. There is some argument, however, about whether recent legislation on hazardous wastes contains strict liability offences.

Even in those jurisdictions where strict liability is employed, it has been criticised as making unjustifiable inroads into the framework of the criminal law. Its detractors have a variety of 'in principle' concerns:

The doctrine of strict responsibility has never been placed on a secure theoretical foundation ... It is not clear how far the exclusion of principles normally applicable in criminal cases is to be carried. For example, since strict responsibility operates to exclude evidence of intention or due care the question may arise whether it also excludes evidence of compulsion or automatism. As so often in confused parts of the law the answer is to some extent bound up with terminology, in this instance the anachronistic common law analysis of crime into actus reus and mens rea. The theoretical basis of responsibility seems to be that it excludes evidence of the absence of mens rea and negligence but not of the absence of actus reus. Since actus reus includes part of the mental element in crime, it follows that evidence of absence of part of the mental element may be given on a strict responsibility charge if the part in question is properly referable to actus reus but not if properly referable to mens rea.

This is a manifestly unsatisfactory basis for criminal responsibility.[48]

Defenders of strict liability take a more pragmatic approach. They argue that strict liability offences are usually confined to petty offences and are designed to protect public welfare, typically being employed in pollution, motor traffic, employment, licensed premises and public health statutes. Furthermore, without strict liability, it is argued that problems of proof would render public welfare legislation largely nugatory.[49]

Encompassing corporate activities within a criminal law framework also has its difficulties. In particular, these relate to the appropriateness of criminal sanctions for bodies corporate and problems of attributing responsibility to the corporation itself. Obstacles to establishing corporate liability in cases of aggravated pollution requiring proof of intent have led to reforms in some jurisdictions. These include statutory provisions that evidence that an officer, agent or employee had a particular intention is evidence that the corporation also had that intention.[50]

The need to establish that a particular corporate official had the necessary intention to commit an offence may also be problematic. Once again, in some jurisdictions attempts have been made to overcome these difficulties by reversing the onus of proof. For example, there may be provision that where a corporation is in breach of environmental regulations it is assumed that the directors and managers of the corporation are also guilty unless they can establish one of a specified number of defences, including due diligence and lack of knowledge of the contravention.[51] While the imposition of criminal penalties on legal persons may bring with it its own difficulties, these are not necessarily removed by confining criminal sanctions to natural persons. It is interesting to note that in the former Czechoslovakia a significant number of prosecutions brought under environmental offences legislation were discontinued because the responsible person could not be located. This may mean that it has been extremely difficult to identify the appropriate worker in a corporation.

Apart from private citizens, and corporations and their officials, government agencies may be directly responsible for environmental degradation. They may also be indirectly responsible for environmental degradation through failure to comply with their statutory duty. In many nations tradition has decreed that criminal liability should not attach to government agencies. Thus, in Australia the doctrine of sovereign immunity, based on the view that the monarch could do no wrong, precluded the Crown being held criminally liable. It was thought absurd for the executive government to penalise itself and it was considered that controls on the activities of government agencies could be more effectively imposed through political or bureaucratic means.[52] Such views sharply contrasted with reality: 'governmental instrumentalities have ... [an unenviable record] ... for occasioning severe forms of unjustifiable harm'.[53] In socialist nations, state ownership of the means of production and distribution created similar dilemmas.

Reluctance to pursue government agencies for environmental degradation they cause is being overcome in some jurisdictions. Under Brazil's Penal Code, a public authority that fails to prevent an activity endangering public safety may be guilty of a crime. And in

the Australian State of New South Wales the policy that government agencies would not be prosecuted was reversed in 1990. Prosecutions of government agencies for environmental offences have occurred in both Nigeria and Australia. In India the heads of government agencies may be liable for offences committed by their agencies under section 17 of the Environment (Protection) Act 1986.

In the majority of nations participating in this study greater legislative emphasis is given to administrative sanctions than to criminal penalties. The former are commonly seen as more appropriate (both philosophically and practically), more effective, and speedier than the use of the criminal law. Administrative sanctions include fines, confiscation of materials and equipment used in polluting or waste transportation activities, suspension or cancellation of permits or licences, alterations to licence conditions, warnings, awarding of compensation, and clean-up orders.

Civil remedies may also be available. They include ordering a stop to polluting activities, shutting down an industry, compensation and restoration. The advantages of civil sanctions as opposed to criminal penalties include a lower burden of proof, an emphasis on prevention of pollution rather than punishment after the event, and more rapid judicial response.

Enforcement

Knowledge about enforcement is incomplete for most of the countries participating in this study. There are several reasons for this. First, environmental protection laws may be so recent that it is impossible to draw conclusions about their implementation. Second, enforcement data may not be collected or published. Third, lack of public disclosure laws may make it difficult to obtain information if it does exist.

With these caveats in mind, some impressions can be gleaned from the national reports. We can examine what sanctions are most commonly applied, who is sanctioned, and why enforcement is generally regarded as inadequate.

In the case of the sanctions applied, the majority of the reports state that monetary penalties, whether administratively, criminally or civilly based, are the most common. Imprisonment is little used, although there are several reports of it.[54] It must be emphasised that, apart from its traditional use as a sanction in criminal codes, imprisonment has only recently been incorporated in the environmental protection legislation of some nations.

According to the reports, there is considerable variation in the type of polluter sanctioned. In some nationsfor example, Argentina and Nigeriait appears that small corporations and individuals are more likely to be sanctioned than large companies or government agencies. In others, such as India, corporations are more likely to be prosecuted than individuals.

The authors of the various reports have differing views about whether prosecution profiles are representative of polluters. Some support such a view; others consider that transnational corporations and government agencies are simply treated more favourably than less powerful actors such as members of the public or small business.

As Webb points out, there is a common misconception that failure to apply pollution laws suggests that either the legislation or its administrators are deficient.[55] The reports prepared for this study, however, generally take the view that statutes are being inadequately and sometimes inconsistently enforced, as evidenced by continuing (and on occasion alarming) pollution problems.

There are many reasons for this. The first, and most obvious, relates to the desire to enhance industrial developmenta desire common to both developing and developed nations. In developing nations, a desire for the economic, social and political benefits of industrialisation, coupled with inequalities of bargaining power and fear that foreign or transnational corporations may locate elsewhere if environmental protection requirements are too rigorous, may all play a part.

Government, official and public attitudes to pollution are also important in determining what statutory protection is given the environment and how that protection is implemented. Political orientations may also affect attitudes to pollution. In some socialist countries, the belief that pollution was a capitalist phenomenon meant that it could not, by definition, occur in a socialist state.

The way business enterprise is characterised may also influence attitudes to enforcement, especially when criminal sanctions are mooted. Three decades ago Kadish remarked on the tensions involved in sanctioning business activities.[56] These tensions arose because business activities were identified as a social 'good' and because, before an activity could be regarded as a crime, moral opprobrium needed to be attached to it. Although opinion polls in some developed nations show that the public believes pollution is a serious act deserving severe penalties, the reports from developing countries suggest that pollution is seen as a much less important issue. Some authors report that the public does not view corporations as 'criminal entities'. In addition, the public is concerned with more immediate priorities, such as food, housing and employment. Finally, the widespread presence of domestic pollution brought about by lack of infrastructure (sewerage systems, for example) may normalise industrial pollution. Such attitudes may be less pervasive in industrialised nations but they do continue to exist. In the former Czechoslovakia, for example, the authors report that little public or police reporting of environmental incidents occurs because there is a lack of general concern about environmental issues.

Compliance with legislative requirements may be sought through means other than enforcement; conciliation is another strategy. Traditional dispute resolution might be conciliation based. The Chinese report remarks that throughout Chinese history conciliation has been used and continues to be used today because it is believed to enhance public involvement in and awareness of environmental issues.

A preference for alternative means of preventing or controlling pollution may also stem from other sources. In China continuing reliance on conciliation is also said to result from deficiencies in environmental laws, the complexity of environmental issues, and the rigidity in procedures and remedies that characterises criminal law.

Education is another compliance strategy; it is often used in conjunction with conciliation. This is the case in Australia, where environmental protection agencies administer licensing and permit schemes, often give advice to industry, and also enforce environmental protection laws. Many of these agencies regard industry as their clients or customers and see enforcement as non-productive. Prosecution is viewed as a final resort and a sign of failure.

Other dealings with industry may disincline agencies towards prosecution. For example, requirements that industry pay substantial discharge fees (with obvious revenue advantages to government) may make government unwilling to commence, or less interested in commencing, enforcement actions against those industries. It appears that this has occurred in Nigeria.

Inadequate resources may affect the enforcement of environmental protection laws in developing countries. Lack of infrastructure has been cited as a cause of pollution incidents. Where it is perceived to be the responsibility of government alone to provide infrastructure and where the absence of infrastructure has contributed to the existence of pollution, government agencies may hesitate to sanction polluters, as appears to be the case in Nigeria.

Resource constraints may affect the enforcement of environmental protection statutes because of the costs of detection, sampling and monitoring equipment, of setting up or contracting out work to laboratories, and of training inspectorial staff. Where criminal sanctions are available, adequate training in criminal investigation techniques will also be necessary. In addition, formal sanctioning strategies of whatever type involve intensive use of staff time and financial resources. Environmental protection officials in industrialised nations such as Australia have referred to the resource-intensiveness of criminal sanctions as one reason that other avenues are often tried first; they have also noted the need to provide training in criminal investigation for enforcement officers in their agencies.

Environmental protection agencies may be disinclined to pursue enforcement because of judicial processes or attitudes. Some authors report substantial delays in the hearing of court cases, the expense of litigation, the imposition of minimal sanctions, and bias.

Enforcement may be patchy because the approaches of different agencies or different levels of government vary. For historical or other reasons, particular agencies may be inclined more towards conciliation than prosecution. For example, in Tunisia it appears that the Ministry of Agriculture is more inclined to refer a case to the Public Prosecutor's Office than to the National Agency for the Protection of the Environment, which tends to opt for conciliation. In Nigeria it is reported that local government generally takes the

view that punishment is more effective than conciliation, whereas the Federal Environmental Protection Agency and some State government agencies (for example, Lagos State Ministry of Environment) favour conciliation. In Australia there are marked historical differences in attitudes to prosecution between the States. Victoria and New South Wales have been more inclined to prosecute polluters, whereas Queensland, Tasmania, South Australia and Western Australia have preferred conciliation and education.

This section has concentrated on the enforcement of environmental protection laws by means of criminal sanctions. There are undeniable impediments associated with the application of the criminal law to environmental problems. These must be confronted. To focus on these difficulties should not, however, detract attention from the fact that, at least in many of the nations participating in this study, environmental laws have been largely unenforcedirrespective of whether administrative, civil or criminal sanctions are available. The authors of the Czechoslovakian report, for example, comment that until 198990 administrative sanctions were the primary legal tool available but they were not often used and when they were the fines imposed were minimal.

International treaties

Environmental issues of international concern are increasing in number and seriousness. The number of existing international conventions and agreements dealing with environmental issues is impressive and the nations involved in this study tend to sign most of them.[57] All countries are part of the Treaty Banning Nuclear Tests in the Atmosphere, in Outer Space and Under Water (Moscow 1963), the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxic Weapons and on their Destruction (London, Moscow, Washington 1972) and the Convention on the Control of Transboundary Movement of Hazardous Wastes and their Disposal (Basel 1989). Other international treaties that have been signed by most of the countries involved in this study are the International Convention on Civil Liability for Oil Pollution Damage (Brussels 1969, as amended London 1976), the International Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London, Mexico City, Moscow, Washington 1972), the United Nations Convention on the Law of the Sea (Montego Bay 1982), the International Convention on the Regulation of Whaling (Washington 1946, as amended 1956), the International Convention for the Prevention of Marine Pollution from Ships (MARPOL) (London 1973, as modified by the Protocol of 1978) and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (Washington 1973). In addition, the Organization of African Unity promoted the Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa (Bamako, 1991) which demonstrates the need for developing countries to enter into multilateral agreements to protect themselves from hazardous waste pollution.

Nevertheless, in many countries the process of transformation of international prescriptions into national laws is very slow. [58] It appears that some broader political

approaches to advance international cooperation, technical assistance and solidarity to the developing world are needed in order to achieve the goals of the United Nations charter and the proper implementation of international conventions concerning the protection of the environment. Related activities have been undertaken in some countries, such as the conference of Ministers of the Environment from French-speaking countries held in Tunisia in April 1991. The conference adopted the Tunis Declaration on Environment and Sustainable Development, in view of the 1992 United Nations Conference on Environment and Development.

In addition to multilateral conventions and protocols, many countries have signed bilateral agreements. For example, China reports having signed two bilateral agreements on environmental matters, with Japan and the United States, and Nigeria has several such agreements with neighbouring countries.

Conclusions

The question of how to respond effectively to environmental pollution continues to engage academics, regulators, industry, and environmental groups in developed nations. Environmental pollution poses even more dilemmas for developing nations. Experts from developing countries participating in this study pose a number of important questions. One is 'How clean can we afford to be?' Another relates to how to tackle pollution and the enforcement of environmental laws when many polluters may be private citizens who pollute because there is a lack of infrastructure such as sewerage systems or who cause environmental degradation and pollution through activities such as deforestation in order to obtain wood for domestic heating and cooking.

Other problems for developing nations include: 'debt service obligations, declining terms of trade, high costs of capital, structural adjustment, and reduced development assistance'.[59] These problems may be exacerbated by lack of environmentally sustainable development aid and, in some cases, by multinational corporations operating without adequate pollution control equipment or maintenance of that equipment.

The themes that emerge from this study are not confined to the role of the criminal law in sanctioning environmental crime and they relate to both developed and developing countries. They can be summarised under the following headings: legislation; implementation; access to information; education and training; research; and assistance for developing nations.

Legislation

Comprehensive rather than piece-meal reform is needed, not only of environmental protection legislation but also of development laws, so that environmental considerations are integrated into the development process.

A clear idea of the goals and guiding philosophies of environmental protection legislation is needed.

Sanctioning mechanisms appropriate for the particular nation, given its cultural and legal history, should be adopted.

Careful consideration must be given to the introduction of criminal sanctions in nations where pollution is not identified as a 'crime' in the public mind and where corporations are not identified as 'criminal actors'. Failure to do so will lead to implementation gaps.

Implementation

Legislation must not be seen as the end of the process of environmental protection. The importance of implementation must also be acknowledged. This includes ensuring that administrative mechanisms are available to enhance coordination and cooperation between agencies and between different levels of government.

Administrative agencies or other bodies responsible for the implementation of environmental protection laws should be given real autonomy, resources and power, and hence the ability to implement laws and influence decision making.

Addressing the problem of implementation gaps means taking account of all legal sanctions availableadministrative and civil as well as criminal.

Access to information

An important theme that emerges from this study is the need for the public to have access to information about the enforcement of environmental protection legislation, as part of the process of evaluating the effectiveness of environmental protection regimes.

Education and training

If criminal law is to be used to sanction environmental offences, appropriate, continuing training in criminal investigation techniques is essential for regulatory agency personnel. If the police or public prosecution agencies are to be involved, appropriate training in environmental law and the importance of that law must be provided for them.

Education for judicial personnel is also an issue, especially when courts or tribunals hearing environmental matters are non-specialist or rank low in the court hierarchy.

Research

More research is needed to identify who pollutes, whether sanctioning strategies should be appropriate for different sorts of polluters, and what those strategies might be. A number of questions should be asked and answered: what are the most appropriate strategies to combat pollution caused by private citizens? domestic small, medium or large businesses? transnational corporations? government instrumentalities? and so on.[60]

Research is important not only to identify appropriate sanctioning mechanisms but also to establish appropriate sanctioning mixes. There is a need for further research into ways

of providing for the effective implementation of all types of sanctions, not just criminal sanctions.[61]

Assistance for developing nations

Much has been written about the global nature of pollution and the need for global action to combat it. If developed nations wish developing countries to pursue the goal of a cleaner environment, assistance must be providedincluding financial aid, access to information and appropriate technologies, and access to advice. In this way development of a sustainable kind will be achieved, taking account of the political, social, cultural and economic milieu of the developing nation. In its report, Tunisia cites the 'Swap for Nature' program, in which foreign debt is reduced in exchange for establishing environmental projects.

Funding for the research needs identified should also be available.

Consideration must be given to the specific needs of developing countries in the fight to combat pollution. For example, the dumping practices of developed countries mean that external as well as internal controls must be developed and implemented.

Aid must be provided for the alleviation of poverty and the provision of housing and infrastructure. When these essential needs have been satisfied it may be easier to convince developing countries and their citizens of the need to prevent and control pollution.

References and notes

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[1]PM Haas, MA Levy & EA Parson, 'Appraising the Earth Summit. How Should We Judge UNCED's Success?', Environment, 1992, vol. 34, no. 8, pp. 611, 2633.

[2]United Nations Conference on Environment and Development, Report of the United Nations Conference on Environment and Development , Rio de Janeiro, 314 June 1992, vol. I, A/CONF.151/26.

[3]D Chappell & R Moore, The Use of Criminal Penalties for Pollution of the Environment: a selective and annotated bibliography of the literature , Department of Justice, Canada, Ottawa, 1989.

[4]HEUNI has recently conducted a study entitled 'The Policy of Criminal Law in the Protection of Nature and the Environment in a European Perspective'. The project started in 1991, covered 13 European countries and consisted of a questionnaire sent to national experts to obtain information about the existence and activity of enforcement agencies. In April 1992 a seminar was held in Lauchhammer, Germany, to present the

project results. See Criminal Law and the Environment, edited by HJ Albrecht and S Leppä, HEUNI Publ. no. 22, Helsinki, 1992.

[5]See Annex A at the end of this volume.

[6]ArgentinaLic. Maria Onestini and Dr Claudio Abelardo Palos, Department of Environmental Evaluation, Committee on Ecology and Environment, Buenos Aires City Council; AustraliaMs Jennifer Norberry, Australian Institute of Criminology, Canberra; Brazil Prof. Jose Arthur Rios, Rio de Janeiro; ChinaMs Zou Jing, National Environmental Protection Agency, Beijing; CzechoslovakiaDr Jaroslava Novotna, General Prosecutor's Office of the Czech and Slovak Federal Republic, and Dr Milan Kindl, Institute of Law, Czechoslovak Academy of Sciences, Prague; IndiaDr DR Singh, Head, Department of Criminology and Correctional Administration, Tata Institute of Social Sciences, Bombay; NigeriaMrs Omobolaji O Adewale, Senior Research Fellow, Nigerian Institute of Advanced Legal Studies, University of Lagos; TunisiaProf. Ridha Mezghani, Law and Political Sciences Faculty, University of Tunis.

[7]The seminar proceedings are now published in Protection of the Environment and Penal Law, edited by C Zanghì, Cacucci, Bari, 1993.

[8]The information contained in this overview and in the national reports must be read in light of this time frame. Legislative as well as political changes have occurred in the intervening months. The most significant of these has been the dissolution of the Czechoslovakian federation. Two new states, the Czech Republic and Slovakia, came into being on 1 January 1993.

[9]For example, see Achieving Sustainable Development in Nigeria, Federal Environmental Protection Agency, Lagos, 1991; Informe Nacional a la Conferencia Sobre Medio Ambiente y Desarollo de las Naciones Unidas, Secretaria General Comision Nacional de Politica Ambiental, Republica Argentina, 1991; Australian National Report to the United Nations Conference on Environment and Development, Department of the Arts, Sport, the Environment and Territories, 1991.

[10]Brazil reports that government investments have been aimed at financing programs for Amazonia as a priority. However, in the past many of the programs did not protect the environment and created further damage to the forests.

[11]It is well known that Beijing (China), Rio de Janeiro (Brazil) and Bombay (India) are among the cities with the highest sulphur dioxide levels in the world.

[12]China reports that 40 per cent of people in urban areas live in noisy environments. In India noise pollution is a consequence of traffic, industry and religious festivals.

[13]Nigeria, Brazil and Tunisia report a growing interest in, and debate about, environmental matters, which is reflected in media coverage of the environment. India and Australia report increased attention devoted to environmental stories in recent

years. Most newspapers carry stories on the environment and some have regular features on environmental issues.

[14]For example, in Nigeria a number of non-government organisations collaborate with the Federal Environmental Protection Agency.

[15]G Heine, 'Criminal law and environmental protection: an international comparison', interim report on Environmental Protection by Means of Criminal Law? National and Transnational? 1990, unpublished. The work of Dr Günter Heine is cited extensively in this overview since he played a key role in the Max Planck study referred to previously.

[16]For example, NigeriaPublic Health Act 1917.

[17]For example, Brazilforests, mining, waters, hunting and fishing codes; TunisiaForestry Code, fishing laws, Water Code.

[18]ArgentinaCivil Code.

[19]ArgentinaCriminal Code 1921; NigeriaCriminal Code Act 1916; BrazilPenal Code 1940; IndiaPenal Code 1860; AustraliaNew South Wales, Crimes Act 1900.

[20]Federal Constitution of 1988: Article 225, related Articles include Article 5, LXXIII; Article200; Article 216, V, 1; Article 186, I & II.

[21]Constitution of the People's Republic of China, Articles 6, 26.

[22]Indian Constitution, Articles 21, 47, 48A, 51A(g).

[23]G Heine, 'Elaboration of norms and the protection of the environment', in Protection of the Environment and Penal Law, op. cit ., pp. 5779.

[24]For example, AustraliaVictorian and New South Wales Environment Protection Authorities.

[25]For example, BrazilNational System for the Protection of the Environment (SISNAMA) includes a Federal Council of Environment Protection (CSMA), which assists in the drafting of national environmental policy, a National Board on Environment (CONNAMA), which makes decisions about norms and standards, and the Brazilian Institute of Environment and Renewable Natural Resources (IBAMA), which coordinates and implements national environmental policy. Chinathe National Environmental Protection Agency formulates laws and standards, promotes research and supervises pollution prevention and control; the Commission of Environmental Protection formulates guiding principles and policy.

[26]G Heine, 'Criminal law and environmental protection: an international comparison', op. cit.

[27]*Environment Protection Act 1970.*

[28]*Environmental Protection Act 1986.*

[29]*Environment Protection Act 1973.*

[30]*For example, Environmental Protection Law of the People's Republic of China, Law on Prevention and Control of Air Pollution, Law on Prevention and Control of Water Pollution, Marine Environmental Protection Law.*

[31]*For example, Environment (Protection) Act 1986, Water (Prevention and Control of Pollution) Act 1974, Air (Prevention and Control of Pollution) Act 1981.*

[32]*For example, Clean Air Act 1961, Clean Waters Act 1970, Noise Control Act 1975.*

[33]*For example, Clean Air Act 1963, Clean Waters Act 1971, Noise Abatement Act 1978.*

[34]*For example, Clean Air Act 1984, Marine Environment Protection Act 1990, Noise Control Act 1976.*

[35]*S Shastri, Pollution and Environmental Law, Printwell Publishers, Jaipur, 1990.*

[36]*M Goode, 'Criminal law, the environment, fault and corporate criminal liability', unpublished, 1992.*

[37]*CzechoslovakiaAct of the Federal Assembly No. 159 of 1989 Sb. (on Offences and the Penal Proceedings Code) created criminal offences of endangering the environment and penalties including imprisonment, fine and shut-down. ArgentinaNational Law 24051 on Hazardous Waste creates offences of endangerment. ChinaLaw of the People's Republic of China on the Prevention and Control of Water Pollution, Law of the People's Republic of China on the Prevention and Control of Air Pollution, Law of the People's Republic of China on the Protection of Marine Environment; these laws render those who cause substantial pollution and damage to persons or property liable to penalties under the criminal law.*

[38]*Law of the People's Republic of China on the Protection of Marine Environment, Article 44.*

[39]*Harmful Waste (Special Criminal Provision) Act, section 6.*

[40]*Law 24051 on Hazardous Waste, Articles 55, 56, 57, 58.*

[41]*New South WalesEnvironmental Offences and Penalties Act 1989, section 8; VictoriaEnvironment Protection Act 1970, section 59E.*

[42]*Law on the Protection of Wild Animals.*

[43]*G Heine, 'Elaboration of norms and the protection of the environment', op. cit.*

[44]*What Heine calls 'absolute dependency' of the criminal law on administrative decision making requires breach of an administrative requirementfor example, discharge without a licence or discharge in excess of emission standardsto attract a penal sanction. 'Relative dependency' occurs when pollution or environmental damage without a permit or licence is penalised. In this model the protection of environmental media rather than protection of administrative instruments is paramount. 'Absolute independence' of the criminal law on administrative law is seen when concrete endangerment to life is penalised irrespective of the existence of an administrative permit. Examples of the first model are found in the Nigerian Oil in Navigable Waters Act, which sanctions the discharge of oil into prohibited areas; and in the Indian Air (Prevention and Control of Pollution) Act, which penalises discharges in excess of standards. Examples of the second model are found in the New South Wales Clean Waters Act, which penalises water pollution unless in accordance with licence conditions and in Victoria under the Environment Protection Act, which penalises the pollution of water, air or land unless the discharge is within licence limits. The third model is seen in the Law of the People's Republic of China on the Prevention and Control of Water Pollution, which penalises pollution that results in substantial property loss, injury or death.*

[45]*G Heine, 'Elaboration of norms and protection of the environment', op. cit., pp. 7879.*

[46]*ibid.*

[47]*For example, New South WalesClean Waters Act 1970, section 16. A further development has occurred in the state of Victoria, where offences of absolute liability are present in environmental protection legislationEnvironment Protection Act 1970, section 39.*

[48]*B Fisse, Howard's Criminal Law , 5th edn, Law Book Company, Sydney, 1990, p. 536.*

[49]*P Gillies, Criminal Law, Law Book Company, Sydney, 1985.*

[50]*AustraliaNew South Wales Environmental Offences and Penalties Act 1989, section 10(4); Victoria Environment Protection Act 1970 , section 66B(2). NigeriaFederal Environmental Protection Agency Act.*

[51]*AustraliaNew South Wales Environmental Offences and Penalties Act 1989, section 10(1); Victoria Environment Protection Act 1970 , section 66B(1A)). NigeriaFederal Environmental Protection Agency Act.*

[52]*B Fisse, 'Controlling governmental crime: issues of individual and collective liability', in P Grabosky (ed.) Government Illegality , Australian Institute of Criminology, Canberra, 1987, pp. 12143.*

[53]*B Fisse, Howard's Criminal Law, op. cit., p. 595.*

[54]*Examples of the use of imprisonment are provided in the Nigerian report. In Argentina preventive imprisonment is reported and in China there is evidence of suspended prison sentences being employed.*

[55]*K Webb, Pollution Control in Canada: the regulatory approach of the 1980s, Law Reform Commission of Canada, Ottawa, 1988.*

[56]*SH Kadish, 'Some observations on the use of criminal sanctions in enforcing economic regulations', University of Chicago Law Review, 1963, vol. 30, pp.42349.*

[57]*According to the Register of International Treaties and other Agreements in the Field of Environment (UNEP, Nairobi, 1989), Argentina signed 21 agreements, Australia 37, Brazil22, China 16, Czechoslovakia 24, India 24, Nigeria 21, and Tunisia 31. In many cases differences are due to the fact that some treaties and agreements deal with a specific geographic region.*

[58]*For example, in Nigeria, out of some 30 international conventions signed, only five have been transformed into national laws (see Nigerian report). Argentina reports on the conversion into national laws of many international agreements. In Australia, most of these conventions are reflected in a number of Commonwealth and State statutes.*

[59]*HJ Leonard, Environment and the Poor: development strategies for a common agenda, Transaction Books, New Brunswick, 1989, p. 3.*

[60]*Some suggestions on 'setting an agenda for research' can be found in D Chappell, From Sawdust to Toxic Blobs: a consideration of sanctioning strategies to combat pollution in Canada, Department of Justice, Ottawa, 1989.*

[61]*At present, UNICRI, the Australian Institute of Criminology, HEUNI and the Max Planck Institute for Foreign and International Criminal Law are developing a project to deal with analysis of different policy options and their implementation, including the promotion of research as an instrument for evaluation.*