DEPARTMENT OF AGRICULTURAL ECONOMICS AND EXTENSION

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METHODOLOGIES AND INSTITUTIONS IN ZIMBABWE'S EVOLVING ENVIRONMENTAL ASSESSMENT FRAMEWORK

by

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1 Introduction

Environmental assessment (EA) is "a procedure for assessing environmental implications of a decision to enact legislation, to implement policies or plans, or to initiate development projects ... and the conveying of this information at a stage when it can materially affect their decision, to those responsible for sanctioning the proposal". (Wathern, 1988). As a regulation it has become integrated into land use planning to greater or lesser degrees in countries throughout the developed and developing world. As a technique for decision-making EA is often claimed to promote sustainable development if it is rigourously applied. Although this is a grandiose claim, the provision of timely information to decision-makers and the *ex ante* highlighting of possibly unforeseen impacts may be expected to enhance environmental management. Indeed, the World Commission on Environment and Development (Brundtland Report) (WCED, 1987) specifically advocated the use of this technique to promote the management of natural resources.

This paper will first give a brief review of how environmental assessment developed as a widely recognised technique for the appraisal of development initiatives internationally. Since the development of the techniques in the US under the influence of Federal legislation, environmental assessment has now become widely known and discussed. In Zimbabwe, EA legislation is at a formative stage, with some experience of the techniques in both private and public sector development. The next section highlights some current thinking in the economic, as well as the physical, appraisal of environmental impacts, and stresses the complementarity of the techniques with reference to a case study of a proposed dam project in Zimbabwe. There then follows a discussion of the constraints on regulators and developers on the implementation of these and other environmental policies, drawing from the experience of other countries with existing legislation.

2 Internationalisation of Environmental Assessment

The techniques of EA were developed during the 1960s in the US, and were associated mainly with pollution control. Subsequent guidelines on screening criteria tend to follow those of the National Environmental Policy Act of 1969, this legislation initiated the requirements of EA for federal expenditure and was then taken up by local and state legislation to re-establish their primary role in land use planning. During EA's evolutionary period investments by federal authorities requiring sensitive land uses were subject to the legislative process and submitted environmental impact statements on the advice of the Council on Environmental Quality, also established by the Act. At the margin of federal legislation, the legal system was required to determine whether an environmental assessment was required which was felt to increase public accountability of the development proposals.

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In the European Community (EC) the Environmental Assessment Directive (Council of the European Communities, 1985) enforced a similar set of guidelines to those in place in the US, but it was at the

discretion of the Member States to implement these. The rationale of a common standard, as well as minimising environmental damage, was to set the same environmental standards across the EC, in order to reduce non-price competition advantages and the "export" of pollution between states. Eighty types of development projects were listed along with a set of the minimum information required.

EC member states are obliged to incorporate EC Directives into their national legislative systems, and this has been carried out by member states in various types of legislation. In the UK, EA has been incorporated into the land use planning system. The competent authority tends therefore to be local planning authorities, mineral planning authorities, or the de facto planning authority, such as the Forestry Commission in the forestry sector. The regulations then cover private and public sector development, from large capital projects, such as motorway construction and the dumping of nuclear waste, to relatively small afforestation and intensive agricultural developments where the environmental impacts are likely to be significant. There are important exceptions to the regulations in the UK: public or private projects which are approved directly through parliament (such as the Channel Tunnel) and projects connected with national defence are often exempt. It is important to note therefore, the aspects of development to which EA does not extend in any set of regulations, though it is argued that in the UK, the environmental impacts of these project. tend to be fully documented in the planning procedures which they follow.

It has been postulated that foreign aid, from multilateral and bilateral agencies has contributed to environmental degradation both through ill conceived project lending, or through perverse incentives in policy lending. Multi-lateral agencies through the 1980s, had begun to adapt environmental assessment principles to project lending. The World Bank procedures in project appraisal have become more comprehensive in identifying environmental impacts, with an environmental department in each regional directorate. This is seen as a complementary exercise to economic evaluation: the Bank's position still firmly lies within the monetary evaluation approach (or CBA approach) as:

"a greater effort needs to be made now to "internalise" as many environmental costs and benefits as possible by measuring them in money terms and integrating these values in the economic appraisal" (Munasinghe and Lutz, 1991, p6).

Two levels exist concerning EA in developing countries: EA as carried out by international agencies as donors and national EA legislation on national government or private development proposals. The report by Environmental Resources Limited for the International Commission for Environmental Assessment (ICEA, 1990a) highlights the differences in these separate developments. Those carried out by international agencies have been criticised for the specificity of the impacts on which they focus at the project level, and additionally have not contributed as yet to institution building and assistance to developing countries in the development of their own sets of procedures. Weaknesses in developing countries mirror institutional weaknesses in all countries implementing EA procedures in that:

1) techniques are unfamiliar to those carrying out and administering the assessments
2) independent appraisal and enforcement through post development monitoring is lacking
3) rent-seeking incentives exist for administrative and consultative groups.

The influential World Commission on Environment and Development (WCED, 1987) in its discussion of environmental issues and sustainability also perceive a need for environmental assessment at both the project and programme level:

"broader environmental assessments should be applied, not only to products and projects, but also to policies and programmes, especially major macro-economic finance and sectoral policies that induce significant impacts on the environment" (WCED, 1987, p222).

Although the WCED provoked much debate for advocating prescriptions with conflicting aims, almost making the manifesto infeasible (Redclift, 1988; Hueting, 1990), some of the specific recommendations with regard to EA were taken up:

"Interested governments should create an independent international assessment body to help developing countries, upon request, evaluate the environmental impact and sustainability of planned development projects" (WCED, 1987, p222).

This became the brief for the International Commission for Environmental Assessment (ICEA), which has conducted reviews of the international position, funded case studies, and assessed the role for an organisation to coordinate EA internationally. The activities of the ICEA included a review of institutions and legislation in various countries, and specific impact assessments where methodological issues were addressed. Methodological issues in appraisal of developments was not specifically addressed. There follows a review of the advantages and weaknesses of economic and environmental assessment techniques which are highlighted with reference to ICEAs Zimbabwean case study of the proposed Osbourne Dam.

2 Methodological Issues

2.1 Extended Cost Benefit Analysis and Environmental Assessment

The internationalisation and uptake of the techniques of environmental assessment pre-supposes that they will provide more relevant and timely information to decision-makers than will alternative decision criteria, and may be seen partly as a reaction to the negative environmental impacts of implemented projects (which have traditionally been analysed under a set of economic efficiency criteria in a cost benefit framework). The range of possible techniques to provide timely information to decision-makers can be conceptualised as a spectrum from traditional cost-benefit analysis, where any non-monetised environmental effects are listed but not enveloped in the analysis; through revisionist (or extended) CBA where non-market or surrogate

market techniques may be included, or critical environmental assets are treated differently; to the advocacy of environmental assessment techniques which are seen as the main decision aid, with an efficiency standard as one necessary criterion.

The extension of CBA to take natural resources more fully into account in planning decision-making has focussed on the issues of the choice of an appropriate discount rate; the incorporation of sustainability criteria; and the monetary evaluation of non-marketed costs and benefits. The assumptions of positive time preference and hypothetical compensation and redistribution which lead to the discounting procedure have been widely discussed in relation to natural resources (Price, 1991; Markandya and Pearce, 1991), and as it is recognised that altering the rate may cause more environmental degradation, trade-offs are involved. Further discussion is not entered into here. The feasible incorporation of a sustainability constraint into investment decisions at the portfolio level requires the identification and incorporation of shadow (or environmentally enhancing) projects into plan-making. Weak or strong sustainability constraints can then be placed on the decision, which is discussed below.

Although it has been postulated that for sustainability to be operational, it must do so in the social, political, economic and ecological domains, neo-classical economics provides one of the few operational definitions. The following summarises the exposition of Barbier *et al.* (1990). The usual decision criterion in cost benefit analysis is that the present value of the net benefits of a project (or series or portfolio of projects) is greater than equal to zero for a single project:

$$\sum_{t=0}^{T}(B_t - C_t)/(1+r)^t \geq 0$$

where

T is the time horizon

B_t = benefits in time period t

C_t = costs in time t

r = rate of discount

Over a portfolio of projects (i = 1 ... n), the rule can be relaxed to be that the net present value across the portfolio can be positive. If environmental or resource depletion is recognised as an important constraint to project failure and further environmental disbenefits (E_{it} is the environmental disbenefit of project i in time t), then over a portfolio of projects the cost benefit rule becomes

$$\sum_{it=0}^{nT}(B_{it} - C_{it} - E_{it})/(1+r)^t \geq 0$$

Given this rule, the environmental damage can still be positive over the whole portfolio (the stock of natural capital can be degraded) as the non-environmental benefits can outweigh the environmental disbenefits. Barbier *et al.* (1991) then introduce the concept of shadow (or environmentally compensating) projects with positive environmental benefits of A. It is this shadow project concept which has been identified as the operationalisation of sustainability within policies or programmes of investment. If there is one shadow project, then the decision rule is to maximise total net benefit from a set of normal and shadow projects:

$$\sum_{it=0}^{nT}[(B_{it} - C_{it} - E_{it}) + (B_t - C_t - A_t)]/(1+r)^t \geq 0$$

and sustainability constrains this in the following ways:

$$\sum_t A_t \geq \sum_{it} E_{it} \quad \text{(weak sustainability)}$$

or

$$A_t \geq \sum_i E_i \text{ for each time period} \quad \text{(strong sustainability)}$$

Weak sustainability then constrains investment so that net environmental damage over time is less than zero; and strong sustainability constrains decisions so that net environmental damage is less than zero in every time period (or the net present value of the sum of the environmental benefits from the shadow project has to be greater than the net present value of the sum of environmental disbenefits from the normal projects for weak sustainability; and the sum of the environmental benefits from the shadow project has to be greater than the sum of the environmental disbenefits from the normal projects in all time periods for strong sustainability). Few examples of shadow projects (environmentally enhancing projects to offset the environmental disbenefit of another) exist, but a widely quoted example is that of the Guatemalan Afforestation Project, where carbon emissions from a proposed thermal power station were directly offset through a fund which re-afforested an area in Guatemala, thus sequestrating large amounts of carbon (see Trexler *et al.*, 1989).

The problem still remains of accurately measuring the environmental (and other) benefits and disbenefits; in the acceptance of the concepts of weak and strong prefixes to the intuitively appealing "sustainability"; and in the identification of the portfolio of investment, an area obviously open to much subjectivity. It is to be stressed that this revisionist neo-classical environmental economics approach has been criticised for ignoring non-linear dynamics in natural systems which allows cost benefit calculations to be made over a future time period (see Mearns, 1991).

The Total Economic Value concept, as discussed by Johansson (1990), Barbier (1991), and Pearce and Turner (1990) among others, is a concept which allows the marketed and non-marketed benefits of an environmental resource to be aggregated under the distinctions between direct use values, functional values, option value and existence values:

Total Economic Value = Direct Use + Functional + Option + Existence values

This will now be discussed in relation to an upland area, characterised both by agricultural use and wilderness area, such as that of the Osbourne Dam area described below, and illustrated in Figure 1. Some aspects of direct use values occur within markets, such as the agricultural produce and the marketed recreation occuring here. Other direct use values, such as informal recreation or non-marketed produce such as fuelwood and fish, can be given imputed market values (through time spent in collection at an imputed wage, the opportunity cost of the time spent) or through revealed preference methods for the unpriced recreation. A selection of case studies of the value of agricultural output and functional values, such as soil conservation measured through opportunity cost or replacement costs can be found in Bojö *et al.* (1990).

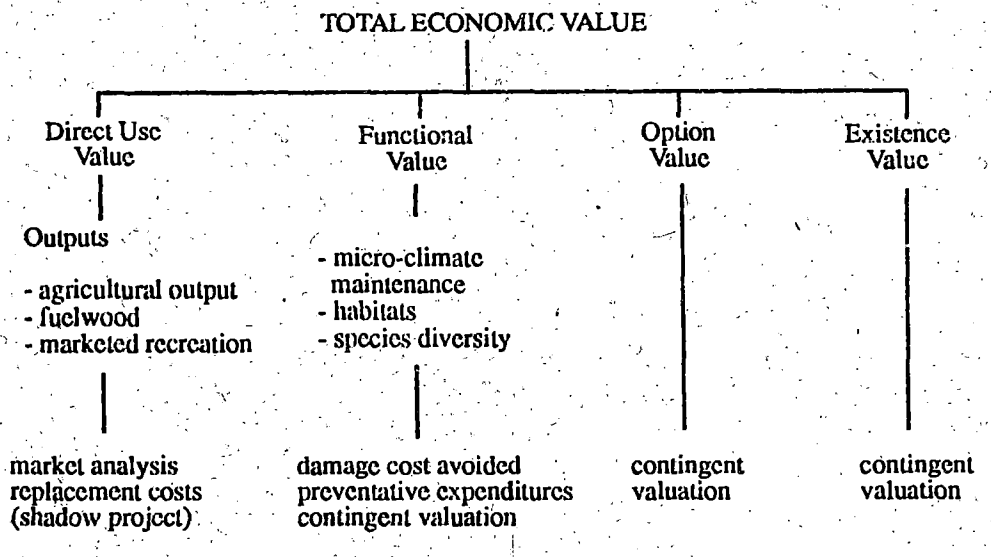
Functional values refer to the services provided by the environment which may not be directly consumed. These are the potential of the environment to act as a sink for pollutants, the role it plays in maintaining a stock of diverse species, or in maintaining micro-climatic stability. Again the value of these services can be elicited through opportunity cost in surrogate markets, or the cost of replicating the resource if a particular aspect is lost through development.

Option and existence values refer to the values accruing to a resource which are additional to direct or even functional values; value which may be held by those distant from the resource. Option value occurs due to the desire to not use or degrade a resource in the present time period because of a risk premium (the desire to have the resource available at some future time), and an irreversibility effect (as time passes more information accumulates as to the value of the resource and a more rational decision can be made) (Johansson, 1990; Fisher and Hanemann, 1990). An overlapping concept is that of existence value, which is the welfare gained from knowledge of existence of a resource due to bequest or ecocentric motives, even without any direct or indirect use being envisaged.

Both of these values can only be feasibly elicited through expressed preference techniques such as the contingent valuation method. Barbier (1991) notes that these values tend to be held only by urban populations who do not have a chance to experience the natural environment which they may value, and that these may be held by urban populations in all countries, developing and developed (who are usually accredited with holding existence values of tropical rainforests or whales for example). Examples of this analysis do exist (see Whittington *et al.* (1990) for instance). However, the feasibility of these studies

critically depend on the inherent set of property rights involved (the implicit assignment of ownership rights which may be contrary to those normally present), and the acceptability of a hypothetical market for the good or service to the population (Cummings *et al.*, 1986). This latter variable will clearly be distinct across cultures and is likely, in the opinion of the authors, to make estimation of option and existence values for the benefits or costs of projects such as the Osbourne Dam through expressed preference unfeasible.

Figure 1 Total Economic Value concept applied to an upland agricultural and wilderness area.



Source: Based on Barbier (1991)

Constraints on using techniques advocated by neo-classical environmental economics in appraising projects involving rural small scale farmers in developing countries, additional to those mentioned above are discussed by Greeley (1991). These are the high dependence of this population on natural resources; full incidence of the pricing of these resources on the subsistence farmer; and the high positive time preference being at odds with development planning with a long time perspective. These factors have led to low take-up rates in development projects supposedly designed with ecological "sustainability" objectives in mind (Greeley, 1991).

Table 2 then illustrates the perceived advantages of the techniques of project appraisal under discussion. The greatest perceived advantage of CBA is the ability to compare costs and benefits occuring in different time periods, and accruing to different individuals on a common social basis. This does tend however to the

concentration on few indicators; the greatest perceived advantage of EA overcomes this through anticipatory planning and the minimisation of the potential environmental impacts at an early stage in project design.

Table 2 Perceived advantages of environmental assessment and extended cost benefit analysis techniques of resource evaluation

Category of impact	Extended Cost-benefit analysis	Environmental Assessment
Environmental	Monetary numeraire for comparison	Quantification of impacts and dynamics of system
Decision-making	Numeraire, analysis of alternative and shadow projects	Minimisation of impacts
Social	Potential option value	Consultation with those affected

Although the techniques for estimating the physical values of the likely environmental impacts may be the same as in an environmental assessment, or even based on the same data sources (eg hydrological models of sedimentation, soil loss models, estimates of physical impacts of industrial pollutants), the extended CBA approach reduces these to a numeraire (ie monetary values); adds a further stage of error to the procedure (economic estimation which may only give lower bound estimates of TEV); and discounts the future which makes assumptions as to time preferences and individual and collective behaviour.

EA however, if not presented in a meaningful way, and not predicting the impacts accurately (as tends to be the case (see Buckley, 1991; Adger and Whitby, 1991)), present information on the impacts without showing the trade-offs between the impacts; without ranking them in order of magnitude and significance. The institutional setting of environmental assessment has also tended to result in alternative projects not being considered, where the concept of shadow projects within a portfolio, or the without project scenario allow this to be simulated to an extent in an extended cost benefit analysis.

Environmental assessment though, has been envisaged as more of a design project tool, with recommendations for modification of the project design; mitigation of expected impacts and consultation with the parties involved and those suffering the social and environmental disbenefits of development activities. Both techniques have been shown to be weak on appraising the social effects of development projects. EA in particular tends to concentrate on natural resource issues and have ignored, for example, the food security position of participants in agricultural projects, based on sustainability objectives of soil

conservation (Greeley, 1991). These methodological aspects are now discussed in relation to a case study environmental impact of a dam development, the Osbourne Dam in the Eastern Highlands of Zimbabwe.

2.2 Environmental impacts of the proposed Osbourne Dam

The proposed dam is to be constructed across the Odzi river to inundate an area of 2900 ha which includes parts of Makoni East, Mutasa South communal areas and Tsonzo small scale commercial areas in the Eastern Highlands of Zimbabwe. The majority of the area is arable land of classes II and III (rainfall 750-1000mm and 650-850mm respectively, resulting in intensive or semi-intensive agriculture). The damming of the Odzi River was first proposed in 1922 to provide water to irrigate commercial farms downstream of the site. The original plans were shelved due to local resistance to the proposal; the commercial farms were subsequently allowed to draw water directly from the river.

The dam proposal was resurrected in 1985 and the government of Zimbabwe has since decided to proceed with the construction, the objectives being to provide water for irrigation to existing schemes and to bring 630 ha under small scale irrigation. In addition, it is envisaged that the dam will provide water to a proposed pulp and paper mill downstream of the dam at Odzi. The project is perceived by central government as an important development of water resources in the Manicaland region for both commercial agriculture and industrial sectors.

The environmental assessment carried out by ICEA, IUCN and the Ministry of Environment and Tourism to appraise this development (ICEA, 1990b) did not have the opportunity to affect project design or implementation as it took place after the decision to proceed had been made by central government. As a result, the assessment had the objectives of ameliorating or minimising environmental damage, and recommending strategies to enhance environmental benefits.

The main potential environmental impacts of the project are then the loss of the agricultural land, with its agricultural production; the displacement of the population and associated costs (which forced the postponement of the original proposals in colonial times); the potential increase in intensity of agriculture and population in the newly irrigated land; and the direct and secondary pollution effects of the diversion of water and the creation of opportunities for industrialisation. These were highlighted by the EA and are listed in Table 3. Column 2 shows how these environmental impacts were quantified in the assessment, where they were quantified, and the third column shows how these impacts could potentially be incorporated into an extended cost-benefit framework.

Table 3 Major identified environmental impacts of the Osbourne Dam

Major Impacts	Environmental impact measurement or description	Economic appraisal and measurement
Bush clearance and loss of habitat	Number of species affected, hectares of particular habitats	Shadow project to replace habitats
Erosion potential	Tonnes of topsoil lost	Loss of agricultural productivity
Inundation of land	Number of hectares, physical description	Agricultural production loss
Eutrophication risk	Concentration of pollutants, probability of impact,time profile	Economic impact on fisheries
Bilharzia/malaria risk	Number of potential cases per head of population	Increased costs to health services
Salination risk	Concentrations,area., affected, time profile	Loss in productivity or costs of reclamation
Displacement and resettlement of people	Number of people community structure	Willingness to accept to compensation, relocation costs
Loss of social/ cultural/ religious values	Consultation with locals	Potential contingent valuation study
Loss of educational and community infrastructure	Miles of road, number of buildings	Replacement costs
Loss of ancestral shrines and land	Consultation with locals	Potential contingent valuation study
Disturbance of social cohesion	Consultation	Potential contingent valuation study
Increased pressure on land and grazing	Human population per unit area, livestock numbers per unit area	Costs of potential erosion in opportunity cost or replacement cost
Improved options for industrial, urban and rural development downstream of dam	Prospective companies involved, potential magnitude of pollution	Expected income increase and multipliers
Tourism potential	Numbers of tourists, likely marketed and non-marketed activities	Expected income and multipliers

Source: Column 1 and 2 - ICEA (1990b).

This table highlights the complementarity of the techniques in aiding decision-making if the timing of the appraisal is appropriate. Initially, there is a need to quantify the physical impacts. Economic analysis of

natural resources relies on the information provided by the experts; ecologists or engineers. After physical impacts have been established there is clearly a need to determine the efficacy of this particular investment in relation to its opportunity cost: would the resources be better allocated elsewhere? The discussion in the previous section highlights potential difficulties in placing a monetary value on every identified impact. The authors lacked time and resources to carry out the economic analysis of this project, the result of which would not necessarily be different to that of the study on which the decision was based. The efficiency of this investment would however, be required to be a *more* efficient allocation of resources when compared to the alternative uses, on which a cost benefit analysis of the single project would not enlighten.

3 Institutions: EA as public policy analysis tool and regulation

3.1 Scope for government action on the environment

The case for environmental policy intervention, from the economic perspective, is based on market failure and government failure arguments - that total social costs of environmental degradation or use are not taken into account in economic decision-making due to the public good nature of some environmental goods; that intragenerational and intergenerational equity issues are ignored. Instruments for environmental policy include persuasion and education, targetted economic instruments and direct command and control regulations. The choice of instrument is dependent on the objectives in terms of enforceability, feasibility, efficiency and equity.

Command and control mechanisms are the dominant form of environmental policy instrument in developed economics, but the application of economic instruments such as carbon taxes and tradeable emission permits for pollutants are becoming more widely known and discussed. The scope for these policies in economies with large amounts of state intervention is discussed in Winpenny (1990). Command and control is the obvious starting point for environmental policy, though the costs in efficiency terms of these are well known, high enforcement and administration costs; lack of incentives for technological innovation; and differences in marginal costs of compliance to those under the regulations. These also represent opportunities for administrative bodies to further their own objective functions and status (as discussed below).

The success of environmental policy depends on the extent to which this is harmonious with other objectives of government policy. Conflict between environmental and other policy goals has been illustrated in relation to the objectives of food security and environmental conservation in Zimbabwe (Bell and Hotchkiss, 1989). In colonial times under the Natural Resources Act, restrictions were placed on cultivation and water use in dambos (depressions at the head of streams which retain moisture). The direct regulatory approach allowed enforceability and measurement. Conflict, especially in the communal areas now exists between the objectives of agricultural production, especially horticultural products, and conservation legislation which has now been modified (Bell and Hotchkiss, 1989). Government policy has

been to strictly enforce the legislation in a cautious way, even with Agritex urging cultivation of the same land. The environmental consequences of distorting agricultural policies or prices may then have to be offset by environmental regulation enforcement, though Bell and Hotchkiss conclude that the case against communal management of dambos leading to degradation is not proven.

Table 4 Existing Environmental Legislation in Zimbabwe

I Natural Resources
1 Natural Resources Act
2 Forest Act
3 Communal Land Forest Product Act
4 Parks and Wildlife Act
5 Trapping of Animals Control Act
6 Mines and Minerals Act

II Pollution and Planning
1 Atmospheric Pollution Prevention Act
2 Fertiliser Farm Feeds and Remedies Act
3 Hazardous Substances and Articles Control Act
4 Regional Town and Country Planning Act
5 Rural District Councils Act

Source: Government of Zimbabwe (1987).

The main environmental regulations in Zimbabwe are listed in Table 4, the main components of which are command and control. Complementary components exist within these regulations such as education and persuasion (Intensive Conservation Areas Committees under the Natural Resources Act) and the creation or strengthening of property rights (Mines and Minerals Act, Parks and Wildlife Act which gives management of the wildlife to set of individuals or organisation). The CAMPFIRE (Communal Areas Management Programme for Indigenous Resources) arrangements under the Parks and Wildlife Act goes further in environmental management by allocating the property rights of wildlife in communal areas to District Councils who set up Wildlife Trusts. The proceeds of culls or safaris then are distributed to district residents or compensate for loss of crops or stock through damage by wildlife. This additional income potentially alleviates constraints leading to environmental degradation; risk averse behaviour and heavy discounting of the future.

The problems of other types of environmental policy, such as the use of taxes and subsidies (which may be more economically efficient by equating marginal abatement costs across all creators of externalities) have been explained in terms of ignorance, mistrust; administrative and practical difficulties (discussed below); and institutional and cultural bias towards direct regulation (Hanley *et al.* 1990). Rees (1988) argues that one of the main barriers to new regulation (or types of policy) is bureaucratic inertia, in that marginal changes (such as the revision of the National Conservation Strategy) are more acceptable than shifts of influence between central government ministries. Environmentalists oppose market based environmental policy and economic evaluation because these explicitly involve selling rights to pollute, or placing a monetary "value" on environmental resources, which is equated with policies leading to some environmental degradation being desirable. For these reasons there tends to be conflicting interests in the

promotion and implementation of environmental assessment legislation, which fundamentally puts environmental assets "beyond price" and enters this into the decision-making process, but gives a greater role to those administering and consulted on the regulations.

In the Zimbabwean case, further, market based environmental policies would be impracticable, where the ethos of multilateral donors is that liberation of markets negates distortions which cause environmental degradation. Perverse price and subsidy incentives do cause environmental degradation (Mahar, 1989), but this does not rule out market intervention to enhance environmental assets which internalise these in economic decisions. These policies have a role to play (Winpenny, 1990).

Environmental assessment regulations would then be supplementary to the existing framework of regulations and has similar characteristics of these command and control instruments. Lessons to be learned in the implementation of EA legislation to supplement existing environmental regulations come from experience in the UK, where this has recently been enforced as part of the land use planning system. Generalisable conclusions follow from the study of Adger and Whitby (1991) on the implementation of EA regulations in the forestry sector. The study concludes that, as a regulation, the implementation has had little effect on the *total* amount of development (afforestation) to date. In the more important aspect of anticipatory planning, the EA regulations also tend to have little impact as those carrying out the assessments are inexperienced in the techniques of assessment. Furthermore, the objectives of both the developers and administrators diverge from those of the regulations themselves, and in the absence of independent arbitration, they therefore tend to be largely ineffective.

3.2 Potential Environmental Assessment legislation

The EA legislation that is to be recommended in Zimbabwe follows models of EA regulation from other regions and hence is expected to incorporate the following project types:

a) large water developments

b) all industrial projects from primary to industrial and service sectors

c) new settlements and urban expansion

d) roads, airfields and pipelines

e) irrigation forestry and plantation agricultural developments.

f) Any of the above categories of project where the site encompasses a protected area

The procedures are to be implemented by the Ministry of Natural Resources who will co-ordinate and scope all proposed project. The environmental statements (the product of the EA process) would be reviewed by the relevant ministry, but the Ministry of Natural Resources would retain the right to stop the particular project if monitoring procedures and mitigation measures are not implemented in the course of the development. This would give a greatly increased role to the natural resources ministry institutionalising potential conflict within ministries of central government.

Proposed EA guidelines are envisaged to take the pollutant emission levels already in the Water Act, public health legislation and other direct environmental legislation as their parameters. Problems in co-ordination of the activities come in the post development monitoring stage, which at present for industrial effluents is not the responsibility of the Ministry of Natural Resources but of the Ministries of Health and of Energy and Water Resources Development.

Many potential environmental impacts are already addressed under existing environmental legislation, but would have extra impetus from the environmental assessment procedures. Is this borne out by experience in other countries which have introduced the legislation? There are certain types of development, such as politically sensitive and defence projects, which will avoid this legislation, but taking the UK as an example, the EA regulations have increased the scope for land use planning in various sectors. In practice the assessments have though been poorly carried out, with little recognition of the significance and magnitude of the predicted impacts. The failures could fundamentally be results of inexperience with the techniques and no allowances for monitoring in the regulatory structure.

4 Conclusions

As indicated, the main constraints to the effective implementation of EA legislation in Zimbabwe are:

1) Inexperience of the techniques on the part of the developers on how to carry out assessments;

2) Lack of co-ordination between the developer and regulator leading to the perception of EA as a costly and time consuming regulation;

3) Lack of incentive for the accurate identification of the impacts: no commitment to monitoring and making the polluter pay.

4) A critical aspect of all the above is the lack of independent arbitration.

Although this is a command and control regulation, there should be elements within it of education and persuasion and the reassignment of property rights through monitoring and making the polluter pay. There are perceived advantages of the use of economic (cost-benefit) and environmental appraisal. Indeed the example of the assessment of the Osbourne Dam highlights complementarity in the techniques. Constraints on the effectiveness of the environmental legislation, additional to the institutional aspects mentioned, will be in the timeliness of the information being provided, and the co-ordination of this towards decision-making which explicitly recognises trade-offs between economic and resource conservation objectives.

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