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FEATURE

GOING BEYOND ENVIRONMENTAL IMPACT ASSESSMENT: ENVIRONMENTAL INPUT TO PLANNING AND DESIGN

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Environmental impact assessment (EIA) has been, and remains for the time being, a very important tool of environmental management – though not always for the reasons one would expect. Major achievements of EIA have been through indirect benefits that have had little recognition to date, particularly the achievements of its stimulative and educative roles. However, EIA is evolving as a planning tool and will continue to do so, and we argue that, in time, we will be able to go beyond EIA as a separate stand alone process. We indicate the requirements for its eventual absorption into project planning and design, and the concomitant need to fully incorporate environmental issues in land use planning to address those matters that cannot be addressed on a project-by-project basis.

Introduction

In recent decades governments have responded to changing community concerns regarding environmental matters and have developed, and are extending, a broad range of tools for use in environmental management. These have included, but are by no means restricted to:

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- planning and development controls based on environmental imperatives;
- conservation reserves and programs;
- environmental education programs;
- beach, soil, and catchment management practices;
- registers of heritage sites and contaminated sites;
- vegetation protection requirements;
- environmental assessments of projects.

Environmental impact assessment (EIA), as one of the tools in this impressive array of environmental management tools, is proving to be particularly enduring. It is well over two decades since the first EIA was conducted under that name, and today EIA has been adopted in most countries and is today being applied to an increasingly wide range of developments. However, we should still expect to see the EIA tool evolve further in the same way that many of the tools in the previous list have continuously developed and evolved to meet new environmental expectations and challenges.

Although the increasing scope of EIA application means that many new professionals in the public and private sector are only now being introduced to EIA for the first time, particularly at the local authority level, it is germane for those with a longer experience to reflect on what EIA has achieved and where we might go with it in the future.

We suggest in this article that EIA has been, and remains for the time being, a very important tool of environmental management, although not always for the reasons that one would first expect. But we also argue that we should steadily be moving "beyond EIA" to incorporate the many valuable perspectives and processes that have evolved as part of the environmental assessment process directly into our project design and land use planning activities. In the longer term, we should be able to dispose of the separate tool that we currently call "EIA."

Achievements of EIA

The "popularity" of EIA results from the continuing expectation of the community, of planning professionals, and of decision-makers that developments will prove to be environmentally benign if they are first subject to a specific inquiry into the biophysical and socioeconomic impacts associated with them. In practice, and for a variety of reasons, these expectations have not always been realized but, at least among the uninitiated, these expectations persist.

As originally conceived, EIA required the preparation of a report to provide advice to decision-makers with respect to the environmental soundness, or otherwise, of a project. In most jurisdictions, the formal legal and administrative requirements for conducting EIA are based on this "passive" model and tend to keep it aloof from direct involvement in the environmental design and management of projects – it operates in a "vacuum" of analysis and evalu-

ation of environmental information. Its end-product is advice only—which decision-makers have the discretion to accept or reject. In other words, the requirement of EIA is that it be done rather than anything be done by it. EIA has had mixed success in this role.

Whereas formally EIA has continued in this role of provider of passive advice, it has, for many years now, been evolving into a more active instrument. Today environmental assessment is often the process by which conditions to reduce adverse environmental effects are developed, which can then be placed on a project at the time of its approval. Even more dynamically, it is the process by which mitigatory design changes are incorporated into a project while it is still being planned. EIA has had somewhat more success in this proactive role, and there are many examples of achieving mitigation of adverse environmental effects of projects either through voluntary design changes or through imposed conditions.

But beyond the mixed bag of achievements EIA has had in these two direct roles, it has also produced major indirect benefits in ways that have had little recognition to date. Specifically, EIA has:

- involved new and beneficial players in the planning and design process including academic disciplines not previously involved in planning activities (e.g., ecologists, anthropologists), nongovernmental organizations, and most importantly, the public;
- encouraged the development of predictive and evaluative models (in the pollution area in particular) to assist with planning;
- stimulated the environmental education of many players in the development process including engineers, planners, surveyors, proponents, lawyers, and perhaps most importantly, decision-makers;
- encouraged a greening of the boardroom—fewer environmentally unsound projects leave the drawing board;
- facilitated the development of environmental policies, guidelines, principles, mission statements, and responsibilities in private enterprise, government instrumentalities, and professional organizations.

Although a micro-examination of individual projects and their EIAs will not reveal these changes, a wider perspective suggests that there has been a measurable improvement in the quality of environmental planning over the years through the improved environmental knowledge base, through the incorporation of new players, through the improved tools available, and through the thought processes of involved parties—all directly attributable to the requirement that EIAs be undertaken in conjunction with development proposals.

We would go so far as to argue that, even if EIA was ineffective in its intended role of advising decision-makers, even if it was quite ineffective in achieving the incorporation of mitigatory measures into projects (which is not true),

its continued existence is more than justified in the immediate future through the educative and stimulative role that it is playing in environmental planning.

Beyond EIA

Despite these achievements, and to some extent because of them, it is timely to consider how we can move beyond EIA as a standalone activity. EIA in its historically fundamental role of providing passive advice to decision-makers is relatively ineffective and certainly inefficient. It tends to be a process of analysis and criticism rather than being creative—EIA tends not to create solutions. It is usually carried out too late and ends too soon. There is a need to move from react and cure to anticipate and prevent.

Further, there are certain principles of environmental planning with which EIA is inherently unable to cope:

- the need to focus on cumulative impacts

Cumulative analysis is a structural inadequacy of the conventional project and site-specific application of the EIA process. Conventional EIA tends to focus on a limited range of projects and activities. Many other development decisions and resource management practices escape any form of assessment, even though their collective impact may be more than any individual large-scale or hazardous activities. Urban development, small scale forestry operations, and most agricultural activities fall into this category.

- the need to encourage community responsibility for environmental management

Empowering communities to assume greater responsibility for assessing, monitoring, and controlling development impacts and becoming involved in negotiated settlements of conflict and, more particularly, establishing long-term visions for their communities is necessary. EIA can only focus community involvement in a reactive manner.

- the need to link policy, planning, and assessment

EIA tends to focus on the mitigation of impacts of proposed activities rather than determining their justification and siting. Coherent environmental management requires consideration of all three.

We can redress these limitations in EIA first by transferring much of the philosophy, the insights and techniques which we currently use in environmental assessments, directly into planning and design activities for projects and programs. Second, we must recognize that this is an insufficient step by itself and must be complemented by the adequate incorporation of environmental matters into all land use planning.

Incorporating Environmental Matters in the Design Process

Incorporating environmental design changes into projects while they are still being planned has occurred through EIA practice, not theory. Often, practitioners and designers have simply found it more expedient and logical to do this rather than waiting until the "EIA Report" was completed – the latter most likely not available until a stage inconveniently late in the project to make design changes.

It is also a pity that these voluntary design changes mostly go unrecorded and unsung. They can generally be discovered only through discussions with the design and assessment teams involved. There are certain to be many useful lessons from these changes and, for proponents at least, there would have to be good public relations value in recording the manner in which they have moved to fit their proposals to the environmental constraints.

How best can this evolutionary process be fostered so that environmental factors will eventually be afforded the same weight and rigor that conventional engineering factors (for example, wind loading on a structure) currently have on design? There are at least four requirements:

- designers will have to be more sensitized and give due weight to the environmental and social constraints on development.
- cooperative structures between environmental specialists and designers are required with information on environmental constraints being apposite and timely, with
- an administrative structure for environmental assessment that encourages, not impedes, the integration of environmental material into design.
- predictive and evaluative environmental tools need to be developed that can be used by designers.

The first of these is already occurring through the processes described earlier as "achievements of EIA" – though by no means universally as yet. The second and third requirements are closely related.

There is increasing experience of contribution and partnership between environmental specialists and the design professions, though still rather patchy to date. In some fields the output from the environmental specialist and the type of information useful for planning and design are well matched, with the design process understood by the environmental specialist and the input of information timely and pertinent. In other fields a common language does not even appear to have been established, and there is little hope yet that the environmental information provided can be usefully translated into design constraints. However, overriding this, the separation of the planning/design activities from the environmental assessment activities is a structural weakness in current EIA procedures, inhibiting effective utilization of the wide range of biophysical and social disciplines brought by EIA into the planning process. Currently, most formal administrative and reporting requirements for

EIA are based on its original role as a stand alone report carried out distinct from, but in parallel with, the project design. This militates against cooperative activity. Administrative systems must be developed that avoid marginalization of environmental professionals from the real planning process and encourage, not discourage, creative interaction between environmental aspects and project design.

This problem has been recognized for quite some time, and the EIA literature, and some current practice, have attempted to preempt this lack of connection between the activities. Regular conferences and meetings between the design teams and the environmental assessment teams, staged reporting of the environmental activities (for example, the use of initial environmental effects reports), and environmental overviews of alternatives followed by more detailed assessment of the chosen alternative are all valuable improvements. The practice of conducting both the design work and the EIA work within the one organization has major advantages in bringing the two processes together, although this is fraught with difficulties in terms of independence and objectivity, or at least public perception of objectivity, of the environmental assessment.

The final requirement is primarily a challenge to the environmental scientists to modify the predictive and evaluative tools that they currently use to make them suitable for application by the designer during the early stages of project development. There is a need to transfer the best of these directly into the planning and design process. In order to do this, environmental scientists will have to come to a greater understanding of the planning and design process so that the tools are designed to give the right type of advice at the right time (see Brown 1992).

It must always be borne in mind that the objective is not how good an EIA we can do, but whether we can design a project right, from an environmental perspective, the first time.

The Environment and Planning

Policies and Goals

To integrate the environment into planning, environmental goals must be incorporated into plans. Achieving environmental goals can not be left to chance. Without environmental goals in plans there is little likelihood that the environmental dimension will be seriously considered in the preparation and administration of a plan. The environment provides resources for economic activities and a sink capacity for the wastes from those activities. This provides a suitable framework to consider the essential goals for environmental planning:

Environmental Resource Goals

- control the intensity of environmental resource use so that production levels are sustainable,

- conserve wildlife habitats and maintain biodiversity,
- encourage efficiency in the use of energy in transport, industry, and residential sectors,
- ensure that development does not occur on land valuable for other purposes, for example agricultural, scenic, or recreational land resources, and
- ensure that new development does not occur on inappropriate land, for example land subject to natural hazards.

Environmental Sink Goals

- ensure that the waste assimilation capacity of water bodies and airsheds can cope with planned growth,
- collect and dispose of solid and liquid wastes without causing long-term contamination of land and water,
- provide for mobility within urban areas but minimize the adverse environmental effects of the intrusion of transport infrastructure and traffic movement on people,
- prevent off-site pollution problems by siting, by pollution controls, by design, or by separation of polluting land uses from pollution-sensitive land uses, and
- protect human health

How many of these goals are incorporated into current plans?

Planning legislation in the past has tended to make only incidental reference to conservation and environmental matters and conservation as a use in its own right is still not well recognized in plans. Such areas not in state environmental tenures were usually shown as non-urban or open space or left blank, meaning they were only waiting to be found a more positive designation.

An important further step forward is to recognize that not only world heritage areas and national parks, but all elements of the natural environment are valuable. Given that planners deal with the bulk of the land, their jurisdiction covers many critical elements.

Despite the possible inadequacy of the legislative base for local planning, currently available planning instruments in most countries are capable of implementing substantial improvements in the achievement of sustainable development. In many jurisdictions in developed countries, local governments have proven that the currently available collection of planning instruments can be very effective if they are applied to the right set of goals and policies. It is therefore not a reasonable defense of poor environmental performance for the planner to blame the tools.

Often there is excessive concern with procedural (legal and administrative issues) in planning and insufficient attention to the substantive content of planning systems and planning objectives. This is not to say that improvements in the integration of planning and impact assessment and the sharpening of the existing tools is not a worthwhile task.

Comprehensive Plans

Environmental impact analysis of specific proposals almost always requires locating them in space and time relative to those components of the environment they may impact. These analyses relate to existing regional plans and assist with the development and improvement of new ones. EIA without planning is totally inadequate in any sphere, whether it be local industrial projects of concern at the local level, major infrastructure projects of concern at the regional level, or very large and potentially hazardous projects or resources developments (e.g., forests) relevant at the national level.

Comprehensive planning and related supporting information is an important means of determining what activities and installations already exist in an area, their size and intensity, the characteristics and locations of environmental constraints and problems, and the scope for accommodating new activities. It is a means by which governments can test whether local implementation of their policies and initiatives is possible and permit a basis for licensing and allowing new activities in an area.

For example in an urban context it is possible to see the numbers, types, locations, and (if mapped) zones of influence of existing industries in an urban area or industrial estate to assess whether the carrying capacity of that locality can accommodate additional industries and of what type, or whether the local environment and its inhabitants are already industrially stressed. Mapping what is already in a given area and comparing these specific sites and their values to those of proposed new developments provides a necessary basis for rational decision-making.

Plans must spell out policies to be enforceable. There is ample evidence that courts will uphold the environmental provisions of properly made local plans and that they will not uphold the capricious actions of councils attempting to use environmental reasons for opposing developments in the absence of such plans and policies.

Local strategic plans can be the flagships of environmental planning. As statements of policy and broad designation of preferred future uses, strategic plans are capable of making great contributions to achieving environmental objectives. The essential feature of the strategic plan is that it can address the future form of development and take account of the cumulative impacts of development on the region's resources and ecosystems. It can set the scale and location of development in a manner not possible with other more detailed plans.

In our own region in Australia, local area development plans are forms of small area or restricted scope strategic statements [see McDonald and Brown (1987) and Brown and McDonald (1990)]. Very progressive environmental planning is being done at the present time in the production of local area development plans where planners have demonstrated that they can effectively address questions such as:

- protection of agricultural land resources
- protection of water supply catchments
- protection of wildlife habitat areas
- management of hazardous geological area
- containment of development in world heritage districts

The advantage of the local area development plan is that it can address detail of development at a scale appropriate for development control. The local development plan can be prepared relatively quickly and the issues addressed specifically enough that complexity is contained.

Zoning Schemes and Provisions

There is a tendency to see zoning schemes as statements of use rights and means of development control and approval, but there is a great variety of steps that local governments can take within their zoning schemes for environmental objectives not appropriately dealt with at the strategic level.

In zoning schemes local governments can determine the specifics of uses set out in general terms in strategic plans. The zoning scheme may determine very explicitly uses permitted and prohibited in the area and the performance criteria for those uses.

A recent survey of the environmental activities of local governments in Canada (McClaren 1992) provided a compendium of examples relevant for environmental planning, including:

- relaxing zoning to allow more home occupations
- increasing suburban densities by density criteria
- parking regulations that minimize the amount of long-term parking to discourage car commuters
- waste management requirements on uses
- environmental guidelines for developments
- minimize impervious surfaces for residential and other uses
- maximise the amount of trees and shrubs
- guidelines and performance criteria that promote energy efficient buildings and subdivisions
- regulations that encourage the development of vacant land

Other more specific environmental applications of zoning schemes include the tree preservation by-laws and habitat conservation zones.

Through the requirements for specific uses in the zoning scheme planners have a strong instrument to control the impact of any particular activity. Requirements on the dimensions, activities, layout, services requirements, waste disposal practices, water management, and natural vegetation management all can be planned in the interests of the environment.

Local governments can use conditional approvals under zoning schemes to

allow greater consideration of local environmental factors in approving rezonings. In the future, zones will probably be based more on objectives and performance criteria rather than blanket specification of permitted and prescribed land uses.

Subdivision Control

This is perhaps the most poorly used tool in the planners tool box and yet one of the most significant in controlling development from an environmental perspective. In approving subdivision plans, the planner sets the framework for the future pattern of settlement, because it is extremely difficult to reverse ill-conceived property layouts once approved.

The size of allotments in both rural and urban areas is the critical parameter in defining the environmental impact of settlement, population densities, habitat destruction, services requirements, and feasible property and road layouts. Inflexible practices allowing and requiring minimum lot sizes rather than designed more sensitively with the environment in mind are undesirable. Natural areas such as watercourses, riparian habitats, and bushland corridors can be conserved at the subdivision stage through more flexible and informed subdivision practices, negotiated subdivision and rezoning, and through group titles. The continued viability of other resources such as agricultural land and extractive materials can be assured.

Due to their relatively small direct impacts and small size, very rarely are subdivisions evaluated by EIA. These are classic examples of small projects with substantial indirect and cumulative impacts—just the kind of impacts that can not readily be handled in EIA processes, but changes that should be controlled by strategic and other plans and by design practices.

Regional and National Planning

Where matters affect areas beyond a single local government boundary, there is need for a planning system coordinated among the national, regional, and local levels. Many environmental issues related to large projects and from local plans themselves are regional, and in some cases continental in nature, and sound decisions can not be made at the local or project levels. From an environmental perspective critical regional issues include:

- transport and energy use
- nature conservation
- waste management
- coastal management
- water quality and water supply

A regional planning perspective means that regional plans in each of these sectoral areas will be required, based on assessment of regional resources, commitments, and opportunities. National or regional government agencies are

usually responsible for these plans, which once prepared, must be integrated with local plans and vice versa.

The relationship between these levels of planning can, potentially, be difficult due to conflicts of interest between different levels of government and even between sectoral agencies at each level. In New South Wales, Australia, for example, the state government is responsible for coordinating and controlling development with impacts of regional and state importance using state environmental planning policies and regional environmental plans in addition to the traditional local (environmental) plan. The Department of Planning prepares state environmental planning policies and sets guidelines for specific issues of importance to the whole state. The policies cover a wide diversity of issues such as rainforest logging, coal mining, housing, multiple occupancy in rural areas, and planning standards for different types of development. Regional environmental plans cover matters of regional significance and give guidance to local councils and developers in the region on issues such as transportation, protection of mineral and agricultural resources, subdivision of land, protection of scenic areas, and tourist development.

Bollens (1992) and Gale (1992) provide excellent reviews of recent U.S. experience with regional environmental planning. There is great diversity and considerable controversy there as to the most appropriate models for issues such as whether planning is to be voluntary or mandatory at the regional level, whether state governments have control over the consistency of community level plans, and what implementation structures will be established.

Conclusions

Our view is that although current EIA processes inherently are not effective or efficient, they have still been either directly or indirectly responsible for many of the major achievements in environmental planning and management. EIA is evolving as a planning tool and will continue to do so. We argue that in time we will go beyond EIA and that the need for it as a stand alone process will disappear. We indicate the long-term requirements for its absorption into project planning and design, and the concomitant need to fully incorporate environmental issues in land use planning to address those matters that cannot be addressed on a project-by-project basis. But we warn that although these are goals already within reach, it is still too early yet to generally abandon EIA, because its important stimulative and educative roles are nowhere near complete.

Issues of ineffectiveness and inefficiency, which are often leveled at EIA, have more to do with current administrative requirements and entrenched practices of EIA than with the fundamental goals and concepts of EIA. Effort would be better directed toward major improvements in the EIA processes than in throwing the baby (good environmental planning and design) out with the bath water (encyclopedic but inefficient EIA reports). Improvements in

EIA can be gained through a more effective scoping stage, required consultations between proponent, designer, and environmental assessor during the design and assessment process, reduced size and more proactive nature of reports, and more critical and action-oriented review procedures.

The way forward for planning from an environmental perspective is quite clear. Recent global advances in understanding the relationship between environment and development provide appropriate frameworks for modernizing planning system objectives and plans themselves. Environmental resources and sink goals and the protection of biodiversity must be integrated into planning legislation from the name of the legislation, to its stated purposes, through to the specification of planning processes and guidance given on the use of planning instruments. This would not only provide a statutory basis for effective environmental planning but would heighten awareness and commitment of actors at all levels in the planning system: the courts, state agencies, local government, and the community.

At the same time we need improvements in plans themselves by ensuring that strategic plans, development plans, and development controls are soundly based on sustainable environmental principles, and that these principles also apply to subdivision and other controls. State and regional environmental policies are required to guide action at the local level. Most, if not all of this, can be and is being achieved within present legislative requirements.

EIA has really only been necessary because planning has largely failed the community in terms of the latter's environmental concerns. It is time for planning to demonstrate that it can take the initiative again.

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