AUSTRALIAN AGRICULTURAL ECONOMICS SOCIETY

37th Annual Conference

University of Sydney

9th - 11th February, 1993

ECONOMICS AND SUSTAINABILITY: A CRITIQUE OF THE ESD WORKING GROUP REPORTS

Geoff Edwards

La Trobe University

Bundoora Vic 3083

Phone 03 479 1111

ECONOMICS AND SUSTAINABILITY:
A CRITIQUE OF THE ESD WORKING GROUP REPORTS

In August 1990 Prime Minister Hawke announced the setting up of Working Groups to prepare reports on ecologically sustainable development. The Working Groups were asked "to provide advice to Government on future policy directions, and to develop practical proposals for implementing them, in the context of the Government's general budgetary constraints and existing policies and programs which impinge on the subject areas" (R.J.L. Hawke, 1990).

The Prime Minister asked that the Working Groups be guided in particular "by four fundamental goal to which the government is firmly committed, viz:

- the improvement of individual and community well-being and welfare by following a path of economic progress that does not impair the welfare of future generations;
- the provision of equity within and between generations;
- recognition of the global dimension; and
- the protection of biological diversity and the maintenance of ecological processes and systems."

The Prime Minister indicated some additional requirements/constraints which influenced the approach taken by the Working Groups and the form of their recommendations. These were:

- a reporting date of 31 October 1991.
- recognising certain principles in the Government's 1990 Discussion Paper on ESD. Important among these were: improving the resilience of natural resource systems; dealing cautiously with risk and irreversibility; and integrating environmental and social considerations into economic decision-making.
- recognising that the approach taken in the Treasury's 1990 paper, *Economic and Regulatory Measures for Ecologically Sustainable Development*, was endorsed by

the Government. The Treasury emphasised the need to target the variable of concern and supported the use of market measures for achieving environmental objectives wherever possible.

- consulting widely.
- seeking consensus in the recommendations made to the Government by the Working Groups. However, the Prime Minister also said "I do not wish to have recommendations that cater to the lowest common denominator of views of working group members and that do little to progress a move towards ecologically sustainable development".

Nine Working Groups were established. Three chairpersons were appointed, with each having responsibility for three Working Groups. The Working Groups on Agriculture, Fisheries and Forest Use were chaired by Dr. Roy Green, Director of the Institute of Natural Resources and Environment in CSIRO. Dr. Stuart Harris, Professor of International Relations at the Australian National University, chaired the Working Groups on Energy Production, Manufacturing and Mining. The Working Groups on Energy Use, Tourism and Transport were chaired by Dr. David Throsby, a Professor of Economics at Macquarie University.

In addition to the nine sector reports, the Working Group Chairs produced reports on *Intersectoral Issues* and on *Greenhouse*. The executive summaries of the sector reports were reproduced in a separate volume (*Executive Summaries*).

The task of assessing the eleven ESD reports, even in overview fashion, is a daunting one. I have found the job made more manageable by bearing in mind throughout certain propositions. These propositions help to maintain perspective in looking at the large body of material in the ESD reports. After the discussion of the opening propositions, the paper contains ... sections. First there is a consideration of the meaning of ESD in the Working Group reports. Second, the treatment of some key principles in the reports is discussed. These principles are: intergenerational equity; intragenerational equity; dealing cautiously with risk;

and global issues. Third, an overview is provided of recommendations in the reports. Some concluding observations are then offered.

SOME OPENING PROPOSITIONS

1. From a global view — or from the perspective of a Martian — it is sustainability in ROW that is important. Approximately 99.5 per cent of world population and a slightly smaller share of GDP is located in or generated in ROW. Australia's tiny share in world population and output is likely to fall in coming decades. It is not much of a simplification to equate global sustainability with sustainability outside Australia.

2. Australia cannot expect to exert more than a negligible impact on the sustainability of economic-environment systems in ROW. Australia's smallness in the world economy means that it has little or no influence on the pattern of relative prices in ROW. Without dismissing the possibility of Australian inventions such as the Sarich engine being significant internationally, overall Australia will have little impact on the the technologies used in ROW in future. Similarly, because Australia accounts for only 1-2 per cent of anthroponorphically-caused greenhouse gases, its actions concerning emissions of these will for practical purposes have zero effect on the climate experienced by ROW. Taking another tack, if Australia were to so misuse its soil and water resources that agriculture had to be abandoned, there *would* be impacts on ROW. The price of wool would rise strongly and some other commodities slightly as ROW changed from a net importer to a net exporter of the items. However, sustainability of economic-environment systems for the 99 per cent of human-kind living in ROW would not be threatened.

3. Developments in ROW have a big effect on the sustainability of economic-environment systems in Australia. These effects impact on Australia through world prices for tradeable commodities, changes in the openness of markets, changes in international factor movements, advances in knowledge, and technological developments. Some overseas developments relevant to ESD in Australia occur as growth and change cause shifts in ROW demand or supply, as when rising incomes in Asia lift the demand for beef and iron ore, or

productivity increases in ROW agriculture put downward pressure on world food prices. Other developments arise from policy changes in ROW. Some policy changes in ROW affect Australia's international terms of trade, or its access to ROW markets. Other policy changes that impact on Australia represent ROW efforts to achieve environmental objectives; examples are mandatory improvements in fuel efficiency in motor vehicles and restrictions on pesticide use in agriculture. These and other developments in the giant ROW sector affect relative prices and the distribution of income and wealth in the dwarf sector Australia. They also influence the state of the environment in Australia, and the distribution of environmental goods and bads across groups of Australians. The distributional effects in Australia of developments in ROW, which my be regarded as either favourable or unfavourable, may themselves, be a determinant of the state of ESD in Australia. What happens in ROW in the next ten or fifty years may well be more important than developments originating in Australia in determining this country's progress towards ESD in the period concerned. Indeed, if ESD is not achieved in ROW, it may be impossible to achieve it in Australia. In the particular case of global climate change a stronger statement can be made. If advances in knowledge show that it is important to reduce emissions of greenhouse gases to avoid or slow global warming, Australia will depend almost totally on ROW for action to improve its climate.

4. *Australia can enhance its own progress towards ESD by removing failures in its economic-environment systems.* It can do this by introducing policies that improve the working of economic-environment systems. One way of describing this is to say that it means improving policies in two areas: policies for the *economy* and policies for the *environment*. This approach has the major disadvantage of implying that the economy and the environment are unconnected systems. Such an approach is inconsistent with a longstanding tradition in economics of viewing natural resources -- often aggregated under the heading "land" -- as a factor of production in economic activities. To put the problem another way, is a policy of taxing or regulating an economic activity to internalise an environmental externality an economic policy or an environmental policy? If there is a clearcut answer to this question it is not apparent to me. The need to answer the question, and to distinguish between economic and

environmental policies, is removed if we think in terms of an economic-environment system rather than the economy *and* the environment. Adopting this approach has the consequence that the confusing distinction between *economic* efficiency and efficient use of *environmental resources* found in many discussions of environmental issues — including the ESD Working Group reports — is avoided. Instead, the more conceptually appealing and more useful approach of thinking of the efficiency of resource use in the single economy-environment system can be followed. There is an alternative way around the problem of two systems and two notions of efficiency. That is to define the economy to include the environment, or vice versa. While that approach has the advantage of facilitating shorthand expression, it involves the problem of deciding which system — environment or economy — is to be subsumed in the other.

The policies that can be used to increase the efficiency of the economic-environment system in Australia include: price policies, regulatory policies, and policies concerning research, availability of information, education and attitudinal changes. Like developments in ROW that impact on Australia, policies introduced in Australia for ESD will affect relative prices and the distribution of income. With income distribution being regarded as important, and even as a component of ESD, Australia has a choice of how to deal with income distribution effects of its actions to improve efficiency of the economic-environment system. It can allow distributional effects to influence the choice of situations in which it intervenes in the economic-environment system to increase efficiency, and the choice of policy measure. Alternatively, it can treat the resource efficiency and distributional objectives as separate. This approach would mean using the policy measure that is best for dealing with any particular source of economic-environment inefficiency, and addressing distributional objectives separately, say by income tax cum social welfare policies.

The reader may find useful a few remarks on the thrust of the ESD reports in relation to the four propositions outlined above. First the terms of reference of the Working Groups necessitated that the focus of their reports is on moving towards ESD in Australia, not in ROW which is crucial for global sustainability. The question raised by Wills (1992) and others about

whether sustainability is meaningful at a level other than the global one is not considered. There is, however, considerable attention in the sector reports and *International Issues* — and especially in *Greenhouse* — to action by Australia in the name of protecting the global commons. It is acknowledged though not emphasised in the reports that Australia has very little influence on these global issues. Much, but not all, of the substantial space devoted to global warming is concerned with how Australia could best participate in any international agreement to reduce emissions of greenhouse gases. The reports are concerned with assessing what Australia can do to enhance ESD. The question of the *relative contributions* of Australian initiatives and developments in ROW to the sustainability of economic-environment systems in Australia is not addressed, though it is recognised in places that prices and technologies in ROW will be major determinants of domestic ESD. A major theme of the reports is better integration of economic and environmental decision making. This can be interpreted as improving the working of economic-environment systems. This thrust of the ESD reports is consistent with mainstream economics thinking that decision makers need to face all the costs of their actions, including environmental costs, to achieve efficient resource use. The existence of uncertainty about the workings of ecological systems and about their interactions with economic systems is seen as a major difficulty in achieving the conditions for efficient functioning of economic environment systems. The Working Groups are concerned about adverse effects on already disadvantaged groups of action taken to protect the environment. Some reports argue that members of these groups should be compensated, while others suggest that distributional consequences are a constraint on Australia's capacity to pursue environmental improvement. Equity effects arising in Australia because of action in ROW to enhance ESD receive no attention in the reports, though they may be more important than effects resulting from policy initiatives in Australia.

THE MEANING OF ECOLOGICALLY SUSTAINABLE DEVELOPMENT

The perspective on sustainability in the ESD reports is an Australian one. The focus is on what Australia can do to make its own economic-environment systems more sustainable, though some attention is paid to ways in which Australia can make a marginal contribution to sustainability in ROW. From a global perspective sustainability in the huge ROW sector swamps sustainability in Australia as an issue. An important question is to what extent can sustainability of economic-environment systems in Australia be considered independently of the sustainability of such systems in the vast ROW sector to which the Australian economy is closely connected? This question is not addressed head-on in the reports, though instances are noted where the potential for sustainable development in Australia depends on what happens overseas.

Intersectoral Issues, prepared by the three Working Group Chairs contained a brief discussion of definitional matters. Two "definitions" were mentioned there. One was the widely cited definition provided in the Brundtland Report: "... development that meets the needs of the present without compromising the ability of future generations to meet their own needs". The second definition (sic), was said to be "slightly more precise" and came from Mrs. Thatcher "no generation has a freehold on the earth. All we have is a life tenancy - with a full repairing lease" (p.1). The Working Group Chairs chose not to offer a definition of ESD of their own. In support of that decision they said:

> "A morals campaigner, once asked to define pornography, said he could not do so, but he would know it when he saw it. ESD is a little like that, although in its case we would be more likely to know it by its absence, that is when we became aware of an unsustainable situation or when environmental damage became evident" (p.1).

Use was also made of analogies with some of the higher things in our society:

> "In general, ESD can in many respects only provide a starting point, from which rule-of-thumb decision criteria and what we have termed social guidelines can be developed.

Moreover, in many cases, what constitutes sustainable development in a specific context can often be determined only in that context. Although this sounds administratively as well as intellectually untidy, we should keep in mind that other vital but ill-defined concepts such as democracy, human rights and occupational safety remain powerful policy influences despite their untidiness" (p.2).

The members of the Working Groups were conscious of the fact that all definitions of ESD involve a high level of abstraction, and that their charter from Mr. Hawke required them to produce practical guidance for the Government. With the large amount of work to be done in a short time, perhaps they thought it would not be cost effective to devote substantial resources to specifying precisely what ESD meant.

Not surprisingly, perhaps, the Working Group Chairs were more expansive on the meaning of the "development" component of ESD then they were on the interpretation of "ecologically sustainable".

"We know that ESD involves both economic (including social) development and ecological sustainability. Defining economic development provides less ambiguity in principle than ecological sustainability. ... Development includes material well-being but also non-material well-being, satisfaction and quality-of-life elements. Intrinsic to these considerations is the quality of the environment, the evidence being that in Australia, as in most countries, environmental conditions are an increasingly important contributor to quality of life. The social aspects of economic development encompass economic stability and security (including freedom from want) and social equity (including equality of opportunity). These go well beyond what we normally mean by economic growth, although without economic growth, other economic and social objectives will be difficult to achieve" (p.2).

In the nine sector reports, also, little effort was made to clarify the meaning of ESD. Perhaps the Working Groups chaired by Roy Green tried hardest. Each of their reports contained the following sentences:

> "In general terms ecologically sustainable development is seen as the way we use, conserve and enhance the community resources so that our total quality of life both now and in the future, is secured. In practical terms this means developing an economy that constantly seeks to improve its efficiency and productivity." (*Agriculture p.5, Fisheries p.6, Forest Use p.4*).

The first, poorly expressed, sentence provides little help to those trying to understand the meaning of ESD. The second sentence concerns the *conditions* for achieving ESD, rather than the definition of it.

The Working Groups made little effort to explore alternative interpretations of ESD. Tisdell (1991, p.210), for example, notes five possible sustainability objectives: sustaining intergenerational economic welfare of humans; ensuring survival of the human species for as long as possible; seeking resilience in production and economic systems and/or stationarity of their attributes, ensuring sustainability of community; and sustaining biodiversity. The Working Groups accepted as a set of general principles or objectives for ESD certain *desiderata* specified by Mr. Hawke in establishing them:

- improving material and non-material well-being;
- intergenerational equity;
- intragenerational equity;
- maintaining biodiversity and ecological systems;
- dealing cautiously with risk and uncertainty; and
- recognising the global dimension.

While the Groups said in a number of places that it was desirable whenever possible to make changes which advanced progress on one or more objective without reducing it on others, they had little to say about how to make tradeoffs in the common situation where these are unavoidable. The Working Groups would agree with Veeman (1989) that sustainable development has a growth component, a distributional component and an environmental

component. But when having more of one component has a cost in terms of less of another, they have little to say for the guidance of policymakers.

PRINCIPLES OF ESD

Intergenerational equity

The Working Group Chairs accepted in *Intersectoral Issues* that a society should pass on to future generations no less than it inherited. They pointed out that judgements are necessary in assessing whether previous generations did this, as they are in deciding what rules the present generation needs to follow in order to bequeath as much to the next generation as it received from the previous one.

The Working Group Chairs viewed two questions as fundamental in thinking about intergenerational equity in a practical way: the relationship between human-produced and natural capital, and the discount rate applied to future benefits and costs.

The discussion of intergenerational equity in *Intersectoral Issues* does not indicate the perspective within which either intergenerational equity or maintaining the stock of natural capital is to be considered. Is intergenerational equity to be interpreted at the global level, the Australian level or something else? The same question applies to the concept of a non-decreasing natural capital.

In some of the sector reports it is recognised that Australia can exert only a negligible influence on intergenerational equity in ROW and that the main focus should be on the distribution of income between generations of Australians. However, accepting that the focus is to be on Australia, the sector reports also contain some dubious arguments concerning intergenerational issues. It is said that "the mining sector has special characteristics in its relationship to ESD, because of the nature of non-renewable resources" (*Mining*, p.xviii). This statement was not elaborated upon. The general tenor of the argument in *Mining* is one of

optimism about the responses of exploration, substitution and recycling to scarcity-induced price rises. The perspective in these assessments is clearly an international one: it is predominantly overseas developments which will determine movements in relative prices and responses to those price movements. At the Australian level, *Mining* reported "views differ, however, on how reliant Australia should be on the exploitation of natural resources, some [Working Group] members seeing these as a bridge to the future" (p.78). It was recognised that the capturing by governments of resource rents from exploiting minerals, and the use of these rents in ways that benefit future generations, can contribute to intergenerational equity and ESD. If Australia chooses to slow the exploitation of its mineral resources for the benefit of future generations, current Australians are made worse off and there is a risk that future Australians will lose also, both because of the lower current investment induced by a lower level of incomes and because of the possibility that market developments will render conserved resources less valuable. This consideration is not discussed in *Mining*.

The mining sector is assigned specific requirements for achieving intergenerational equity. "To meet intergenerational equity objectives, an ecologically sustainable mining sector would ensure that appropriate consideration was given to balancing the discovery of new deposits, depletion rates for potentially scarce resources and the introduction of technologies for recycling and substitution, with the needs of the future as well as the present generation" (*Mining*, p.79). The context here — global or Australian? — is again not explicit. It is surely not reasonable to expect the Australian mining sector to balance domestic exploitation with international developments in recycling and substitution, or to balance the needs of present and future generations of Australians.

Although there is some vagueness about the wording, *Transport* seems to argue (p.53) that Australia's current use of fossil fuels may be inconsistent with intergenerational equity and hence ESD because it diminishes the fuel options available in the future. This argument rests on the view that Australia's future consumption possibilities for particular items such as fossil fuels depend on its own resource endowments of the items rather than on trading opportunities. Surely the reality is that, regardless of the current rate of use of oil in Australia, future

Australians will be able to obtain any amount of oil they wish, provided they pay the world price and whatever taxes are imposed by Australian governments. Moreover, given the smallness of Australian consumption in a global context, its current fuel use will for practical purposes have no effect on the world price at which future Australians can buy fossil fuels. It may be true that a higher use of *domestic* oil by Australians now reduces the amount of domestic oil available for future Australians, but it is not clear that that should be a matter of concern on intergenerational equity grounds. If oil is produced in the ROW in future, Australians will be able to buy it at the going world price. If oil is not being produced in the ROW it will be because technological and other market developments have rendered its use unattractive. In that case, Australia's oil will not be worth extracting from the ground either — unless, perhaps, Australia has ceased to be integrated closely with the ROW economy, and opted for a policy of self-sufficiency.

Transport sees Australian fuel use causing intergenerational inequity through another source, a changed global climate. However, with Australia being effectively a global *climate taker* — that is, unable to influence world climate through its output of greenhouse gases — Australia's own production of greenhouse gases is not relevant to equity between different generations of Australians (or to intergenerational equity in ROW). This is not to deny that there may be sound reasons for Australia to participate in international agreements to reduce emissions of greenhouse gases and, less clearly, to take such action unilaterally. But these reasons are related to factors such as international goodwill rather than advancing intergenerational equity.

In discussing – briefly – the argument advanced by Pearce *et al* (1989) and others that the natural capital stock should be at least maintained, the Working Group Chairs wrote:

> "... most economists would argue that there is some substitutability between human-produced capital and natural capital in satisfying human wants. Nevertheless, the problems associated with the measurement of both human-produced and natural capital are large, as are the potential risks and uncertainties relating to natural capital,

These considerations suggest that an objective of conserving existing stocks of natural capital would seem to be as good a practical guide as any other and better than most. This is particularly relevant to questions concerning the ozone layer and global climate change. In these cases the very long time-frames involved, and the need to compare uncertain costs in the relatively near future against much more uncertain benefits over generations, mean that discounted rates of return are not very useful criteria for decision making. Nor do they provide accurate ways of evaluating questions of irreversibility, in which the balance has to be established between the benefits to this generation against the costs which are incurred by all future generations" (p.14).

The existence of fundamental problems in defining and measuring natural capital was acknowledged by the Working Group Chairs. The problems are indeed formidable. How is the quantity of a multi-attribute resource such as soil to be measured? How are resources of soil, water, forests, fisheries, energy and other mineral resources to be combined to give an overall measure of stock of natural capital? How are projected resource discoveries to be treated? What allowance is to be made for technological change which increases the efficiency with which natural resources are converted to goods and services? These and other very difficult problems exist in conceptualising and applying the non-decreasing natural capital rule at *any* level — world, national or regional.

The Chairs did not discuss the particular problems of giving meaning to the constancy of natural capital rule in seeking unilaterally to formulate requirements for ESD in Australia. Did they envisage the rule being applied at the Australian level? Or was their attraction to it at a higher level? The answer is unclear.

It has already been suggested that the case for Australia to conserve an exhaustible tradeable resource such as oil — beyond the level of conservation resulting from pricing levels that reflect world values of oil and external costs involved in its use — is weak. The implication is that a constant natural capital rule for resources such as oil is not sensible for Australia.

Does the non-decreasing natural capital rule make more sense for Australia in the case of renewable tradeable resources such as forest products and fish? Or resources usually treated as non-tradeable, such as soil and ground water? Perhaps it does, but the case is not made in the Working Groups reports.

The Working Group on Agriculture said that "intergenerational equity requires that the present generation passes on to the next generation a stock of human-made *and* natural capital no less than that inherited by our generation" (*Agriculture*, p.58, emphasis added). This seems to represent support for non-decreasing *total* capital for succesive generations, and implicit rejection of the maintenance of natural capital approach favoured by the Working Group Chairs in *Intersectoral Issues*. Elsewhere in *Agriculture* it was accepted that "the idea of stable natural capital requires further refinement before it can be used as a guide for sustainable agricultural development" (p.91).

The rate at which future costs and benefits are discounted can have an important influence on the way future citizens are affected by current decisions. Future effects through such potential nasties as holes in the ozone layer, as well as through the overall rate of investment, are both influenced by the discount rate used in the current evaluation of projects and policies.

The Working Group Chairs advanced two lines of thinking on using the discount rate as an instrument to advance intergenerational equity. On the one hand they "... accept that as a general rule alterations to discount rates are not by themselves appropriate ways to serve the interests of future generations. ... there are practical difficulties in governments adopting discount rates for project appraisal that are markedly lower than market rates. In simple terms these difficulties relate to the costs to government of investing funds yielding returns that are apparently lower than could be earned elsewhere, or that are lower than the costs of raising those funds" (p.16). Here the Chairs side with mainstream economics rather than the conservationists who support the use of low or zero discount rates.

The Chairs proceeded, however, to advance an argument which carries the opposite policy implication to the argument outlined above. Seemingly influenced by a paper prepared for an ESD Workshop by John Quiggin (Quiggin 1991), the Chairs argued that the costs of using discount rates markedly lower than market rates would have to be borne by society "... if the principle of intergenerational equity is to be served ..." (p.16). This argument was reflected in the following recommendation:

> "in public decision making, including in the appraisal of large investment projects, greater weight be given to intergenerational issues, including the use of discount rates more reflective of the social rate of time preference" (p 16).

The other recommendation concerning intergenerational equity was that appraisals of large public and private projects, including environmental impact assessments, should include a statement of intergenerational implications.

Intragenerational equity

The Working Group Chairs recognised that intragenerational equity had a national and an international dimension. Their focus, understandably in view of their charter and of Australia's small country status, was predominantly on the former. No attempt was made to define equity. The Chairs appeared, however, to see the following contributing to greater equity: reductions in the dispersion of measured incomes; increased availability of social goods (especially health, education, housing and transport for the disadvantaged); and a fair sharing of the costs of environmental degradation and of the costs of protecting the environment. Markets which functioned well were seen by the Chairs as effective creators of wealth, but very poor distributors of wealth. The approach widely supported in mainstream economics of treating equity separately from resource allocation -- through the use of a progressive tax system, for example -- was seen as inadequate because it has not prevented a widening gap between rich and poor in Australia.

For intragenerational equity to play its role fully as a fundamental principle of ESD, the Working Group Chairs saw two important requirements of economic policy.

> "The first is that the lessening of economic inequality will have to be seen as a primary goal of economic policy rather than as a secondary or separate process. In other words, redistributive measures will need to become more closely integrated with policies aimed at improvement in economic efficiency and structural reform" (p.20).

There was no discussion of how this might be achieved, or of the extent of the income redistribution considered appropriate for ESD. The second requirement is that in evaluating policies aimed at other aspects of ESD, explicit account be paid to equity.

The argument advanced in *Intersectoral Issues* on intragenerational equity is found also in most of the sector reports. Thus, *Manufacturing* says:

> "Distributional changes will result from the application of the full social value discipline to environmental resources. One inevitable outcome will be that some who have enjoyed free use of the resources will be required to pay for them. Those already disadvantaged within the existing social and economic system may be disproportionately affected. Just what means should be used to offset any adverse impacts on social equity, whilst important, is not an issue that we have addressed in detail. Nevertheless, there is a strong case for some offsetting action to avoid sustainable development worsening the existing distribution of material and non-material income." (*Manufacturing*, p.3).

A similar statement appears in *Energy Production*, while *Agriculture* sees a need for social equity measures "to ensure the equitable distribution of the costs and benefits of moving towards ESD" (p.9).

The failure to say more about the scope and nature of desirable policies for equity in moving towards ESD is a significant limitation of the Working Group reports. By implication,

the minimum income schemes which form the central part of Australia's social security system are inadequate for providing the equity judged necessary by the Groups. Is it envisaged that these schemes be modified? Or is a process of compensating deserving losers from individual ESD measures preferred? In view of well known difficulties with each of these approaches, it is unfortunate that the Working Groups did not offer more guidance on how to achieve equity in moving towards ESD.

There is another fundamental question to be raised concerning the treatment of equity in the Working Group reports. This is the absence of any consideration of what Australian governments should do about undesired effects on equity arising in Australia as a result of ESD-enhancing developments in ROW. One example is an increase in the price of tradeable food commodities in Australia because major ROW countries place restrictions on the use of cost-reducing chemical pesticides, or on the use of fragile land for cropping. Another example is increases in prices of motor vehicles due to mandated design changes on environmental grounds. Should the Australian government compensate those Australians -- especially if they are already disadvantaged -- who lose from these developments in ROW?

The question is really broader than indicated above. Since *any* development in ROW -- including changes in productivity and the pattern of demand -- that impacts on incomes in Australia is relevant to Australia's ESD performance, does intragenerational equity in Australia require the compensation of losers , or certain groups of losers -- from *any* overseas cause?

In seeking to answer this question, "in-principle" considerations and practical considerations are both relevant. There are different arguments of principle that can be advanced and their policy implications are not all the same.

One argument is that since Australian consumers are harmed as much by a given increase in price of food or cars due to ROW policies as one due to Australian policies, there should be no distinction between the two in eligibility for compensation. This argument could be bolstered in various ways. In the case of Australia's export commodities, Australia would gain *overall* from ROW policies that pushed world prices up; in principle, therefore, the

capacity to compensate losers exists. Another consideration is that since world sustainability depends on what happens in ROW rather than on what happens in Australia, Australians whose priority is the health of the economic-environment system *globally* might see a case for compensating some domestic losers from sustainability-enhancing policies in ROW. Admittedly, there are limits to what small Australia could do in this respect, especially if giant ROW was striding rapidly towards sustainability via policies that raised the prices of tradeable items. Perhaps some Australians would see this constraint on Australia being eased if it were to tax those Australian firms — food producers and car manufacturers in the above examples — that gained from the moves to sustainability in ROW.

A different in-principle argument is that Australia does not have responsibility for ROW policies, and should not commit itself to compensating Australian losers from those policies. It may be noted, however, that minimum income schemes which are adjusted by movements in consumer prices *do* increase assistance to recipients in response to price increases originating in ROW as well as increases generated within Australia.

As far as practical considerations are concerned, there are two main points. First, it is difficult to devise and operate a system of compensating losers from efficiency-enhancing developments in particular markets to which there are not major objections. This consideration may not be any weightier in the case of compensating for developments in ROW than it is for compensating for policy changes in Australia. Second, it is hard to *exclude* price movements due to overseas developments when using consumer price indexes to adjust minimum incomes provided through the social welfare system.

While *Agriculture*, *Manufacturing* and *Energy Production* supported compensation for disadvantaged current losers from policies that enhanced ESD, *Energy Use* appeared to see adverse equity effects as a *constraint* in adopting pricing policies that improved the efficiency of economic-environment systems.

> "While in general terms ..... the beneficiaries of energy use should pay the full costs of the consequences of that use, it will always be necessary to consider limits to the

operation of this principle based on ability to pay for the energy required to sustain an acceptable minimum standard of living and by the capacity and opportunities of various groups to change their consumption behaviour" (*Energy Use*, pp.42-3).

This report says that increasing the price of energy will be regressive while "... policies designed to increase the efficiency of energy-using appliances and pass on the lower operating costs to consumers are likely to have social equity benefits as well as environmental advantages" (*Energy Use*, p.43). The nature of the sacrifice in efficiency of Australia's economic-environment system necessitated by avoiding policies with regressive effects was not considered. The Working Group Chairs recommended that in undertaking studies of energy pricing and economic instruments, as proposed by the Energy Use and Transport Groups, attention be directed to equity effects and ways of dealing with them.

Dealing cautiously with risk

Under this heading the Working Group Chairs discuss uncertainty, irreversibilities and non-substitutability. These phenomena feature prominently in concerns about the environment. "... dealing with uncertainty about limits is the fundamental issue" [in the sustainability debate] (Costanza 1989, p.5).

Uncertainty occurs on both the supply and demand side.

> "Technological and scientific uncertainties may result in the premature use of technologies damaging to the natural environment or public health; and demand uncertainties affect our assessment of the future values of environmental resources. ... a particular area of concern is the uncertainty that arises from the limited scientific understanding of how natural environments and ecological systems function, including the way in which they support economic systems. Given this, we face considerable uncertainty about what would be the consequences of running down natural capital" (p.38).

In each of the nine sector reports improvements in knowledge were seen as crucial for developing more sustainable approaches to resource management. Consider the three reports on sectors based on renewable natural resources. In *Agriculture* it was said: "Agricultural systems are complicated and not well understood and we need to find out more about them so that they can be managed in accordance with ecologically sustainable development principles' (*Agriculture*, p.xviii). ESD for fisheries was seen as requiring ecosystem management, "... with fishing activity becoming a subset in overall management of the aquatic resource. ... these systems are complex and our understanding of them is relatively rudimentary' (*Fisheries*, p.xvii). Forest systems are complex also, "... and both the available information base and our understanding of it are far from complete" (*Forest Use*, p.xvii).

Advances in knowledge which reduce uncertainty and enhance the sustainability of Australia's economic-environment systems may occur domestically or in ROW. In some cases Australia may be able to rely totally on ROW for research and technology which result in more environment-friendly production systems. This is so for much research and technological development in manufacturing: if the environmental priorities are reducing the pollution of air and water, progress overseas is directly applicable in Australia.

The poor understanding of agricultural, fisheries and forest systems acknowledged by the Working Groups relates largely to *specifically Australian* ecosystems and their interaction with the production systems. Improvements in understanding in this area, which are seen as vital for progress towards ESD, will depend mainly on Australia's own research endeavours. The idea that Australia is more dependent on its own research for sustainability of its renewable natural resource based industries than it is for sustainability in other areas such as transport, manufacturing and perhaps mining and energy production does not emerge from the Working Group reports.

Conservationists may not welcome some of what the Chairs have to say on irreversibilities. "There are degrees of such irreversibilities. An ozone layer may repair itself over perhaps, fifty to one hundred years; tropical forests may, again over the very long term,

be capable of regenerating; and degraded land can ultimately, even with great difficulty, be restored" (*Intersectoral Issues*, p.38). In Australia, the issue of irreversibility is said to be most noteworthy in the context of habitat protection and species preservation.

Species preservation shares with the prevention of climate change the characteristic of being an international public good. The existence of a species unique to Australia generates existence and option values in ROW as well as in Australia. With almost all of global population and income accounted for by ROW, it is plausible that the value to ROW of saving an Australian species swamps its value to Australians. This consideration raises some important issues which were not explored in the Working Group reports. One issue concerns the international cooperation needed to achieve an efficient global allocation of resources to protecting species. For example, are substantial payments from large economies to countries with large areas of tropical rainforest — in which most of the world's plant and animal species are to be found — indicated? Another issue is perhaps even more fundamental. The fact that species preservation involves international public goods is one reason for questioning whether it is meaningful to consider ESD from the point of view of a single country.

The Chairs accepted that uncertainty about the future value of natural resources caused ambiguity in the concept of substitutability of natural capital. But they could see no valid human-made substitute for a lost species or for the ozone layer, the global climate or non-degraded land. If this means that *no* increase in structures, equipment and know-how could compensate for a marginal deterioration in land quality or a marginal change in global climate, it is not a tenable proposition. Why should unlimited sacrifices be made to prevent a small undesired change in the condition of land or in climate when no society, however rich, accepts the "no tradeoffs" notion as a guide in allocating resources to save human lives? It should be emphasised that future generations, as well as the present one, will have less human-made capital if no trading off of natural capital for human-made capital is accepted now.

In the presence of uncertainty, irreversibilities and non-substitutability the Chairs saw two general objectives as helpful in achieving beneficial economic development. The first was

accepting the need to deal cautiously with risk. The second was to build this caution into the decision-making process. To keep in meeting the second objective the Chairs proposed setting up an Office of Ecologically Sustainable Development. The functions of this Office would include coordinating work on developing decision-making and reporting processes for dealing cautiously with risk. It would include also commissioning work "...to develop the information and analytical methods for dealing more effectively with risk and uncertainty in decision making at all levels of government" (*Intersectoral Issues*, p.44).

The Chairs stressed that:

> "... improved decision-making generally, including that which will follow from microeconomic reform, will itself contribute to a more efficient integration of economic and environmental issues in policy management. Thus, appropriate pricing of Australia's natural resources would in itself reduce pressures on Australia's environmental resources and improve their management in a way that would minimise long-term risk and reduce uncertainty about their long-term sustainability" (*Intersectoral Issues*, p.43).

Global Issues

It is accepted by the Working Groups that international trade, by increasing the efficiency with which resources are used, contributes to the achievement of ESD. For this "to be completely true, however, social costs, including those arising from the use of environmental resources, need to be fully incorporated into the market prices of traded goods" (*Intersectoral Issues*, p.54). The internalisation of environmental costs is needed *internationally* if the potential gains from trade between countries are to be realised. The Working Group Chairs therefore recommended that Australia continue to urge in international forums the removal of subsidies and impediments to free competition in foreign markets which are inconsistent with ESD principles. In making this recommendation the Chairs emphasised the importance of international trade to ESD globally, and the greater capacity of Australia to achieve ESD if its export sector is strong.

The remaining comments in this section are directed to some arguments in the Working Group reports about the relationship between ecological sustainability and international competitiveness and about global warming.

In several reports it is stated that, notwithstanding the importance of international competitiveness, this should not be achieved at the expense of the environment. Thus *Manufacturing* says: "ultimately, however, that [international] competitiveness has to be sustainable and cannot be based upon an environmental subsidy' (p.7). The need for developing national and international approaches to prevent departures from free trade being imposed in the name of environmental protection was emphasised in *Manufacturing* and in *International Issues*. The squeaky clean user pays approach to the environment noted above was not in evidence throughout the Working Group reports. While *Transport* accepted that taxes and charges were generally efficient means of ensuring that the full cost of using resources were met, it advanced an intriguing qualification to this view: "when such charges are imposed on the input side, then may be a loss of competitiveness of Australian industry, unless similar taxes are imposed by other countries" (*Transport*, p.122). Thinking about the implication of this statement for Australia may be facilitated by recalling that there is less pressure on industry to act to protect the environment in Australia than there is overseas (*Manufacturing*, p.7). In the context of reducing the risk of global warming *Energy Production* suggested that "... should the Commonwealth Government see the need to proceed with more substantial insurance action, it may wish to consider exempting trade competing sectors from that action pending development of an appropriate international response strategy ..." (p.147). The Working Group does note that this approach would represent a subsidy -- as well as being hard to administer.

In November 1990 Prime Minister Hawke added to the task of the ESD Working Groups by asking them to report on options for achieving the Government's interim planning target of reducing greenhouse emissions 20 per cent below their 1988 level by 2005. Consequently, global warming considerations receive significant attention in each of the sector

reports and in *Intersectoral Issues*. In *Energy Production* and *Energy Use* reducing Australia's emissions of greenhouse gases is a major concern. The *Greenhouse Report* draws together the options recognised in the sector reports for reducing greenhouse emissions and assesses some of their effects.

There are acknowledgements in the reports that developments in global climate — though subject to much uncertainty — will be influenced very little by Australia's actions. However, this reality is not highlighted. Some statements concerning Australia's global significance involve much understatement. For example: "in our own region, the global significance of any Australian greenhouse reduction policies may well be overshadowed by forecast energy and industrial developments in Asian countries" (*Energy Use*, p.108).

It is recognised that for Australia "the most immediate socio-economic impact of the enhanced greenhouse effect is likely to come from response measures rather than the climate change itself (*Greenhouse Report*, p.xvii). In another instance of understatement the *Greenhouse Report* says "the impacts of the actions of other countries are potentially at least as significant as those resulting from domestic policies" *Greenhouse Report*, p.xvii).

Consistently with Australia's small country status, the Working Groups recommended that priority be given 'no regrets' actions that reduced greenhouse emissions and were worthwhile — or at least not disadvantageous — on other grounds. These measures include removing subsidised energy prices, providing information, and undertaking research. The risk that the no regrets approach could bias the efforts of policy advisors and researchers away from worthwhile activities which confer no reductions in greenhouse emissions — or which increase them — is not mentioned. No regrets measures would not be sufficient to allow Australia to meet its emissions reduction target.

Some of the Working Groups accepted that the risks associated with greenhouse warranted limited *insurance* action in addition to the no regrets measures. *Energy Production* suggested that the case for insurance was based more on risks for Australia arising from other countries' responses to the greenhouse threat — which could impact on Australia's trade,

especially in coal — than on the risks posed by climate change itself. "In the end, recommended insurance measures were largely limited to further research and analysis, to reduce uncertainty about climate change itself and the impacts of response measures in Australia and other countries, and research, development, demonstration and commercialisation of the technologies necessary for emissions abatement" (*Greenhouse Report*, p.xxiii).

The Working Groups accepted that energy prices needed to rise to achieve ESD — and Australia's emission reduction targets. However, because higher energy prices would have net adverse economic effects — violating the Government's conditions for unilateral reductions in emissions — the Groups recommended against unilateral introduction of a carbon tax or other price-increasing measures. Representatives of the Australian Conservation Foundation on the Energy Production Working Group dissented from this recommendation.

AN OVERVIEW OF RECOMMENDATIONS

The nine sector reports contain 405 recommendations, or more than 500 if sub-recommendations are included. There are additional recommendations in *Intersectoral Issues*, some of which have already been mentioned.

The great bulk of the recommendations can be viewed as attempts to improve the working of the economic-environment system. Most of them are intended to address problems arising from information deficiencies, externalities, myopia in decision-making, and government-induced distortions. In terms of the nature of the recommended policy instruments, again there is little that cannot be categorised under such traditional headings as research, information and education, price-based measures, regulation, and administrative reform. There is, however, some emphasis on inculcating a sustainability ethos in decision-makers in the household and production sectors.

The acknowledgement of doubts about the ecological sustainability of present approaches to resource use in *Agriculture, Fisheries and Forest Use* was noted earlier. It is not surprising, therefore, that many of the recommendations in these three reports on renewable

natural resource are directed to improving understanding of biophysical relationships and of social valuations of the various outputs of the resource systems. A package of measures intended to enhance long-term productivity by improving information accounted for more than half of the costs of recommendations made in *Agriculture*. The package emphasised group approaches (such as the land care program) to agricultural resource and business management and integrated whole-farm and catchment-based planning. Research into agricultural chemicals and pest management were viewed as priority areas for research. The reports on *Fisheries* and *Forest Use* were not so specific about research needs as *Agriculture*, but both supported greater emphasis on research providing the knowledge needed for sustainable resource management in those sectors. In addition, many recommendations concerning planning and management processes in the three reports were intended to ensure that better information was produced and made available to decision makers.

Arresting the recent fall in energy research, especially renewable energy research, was seen as a priority in *Energy Production*.

Better integration of economic and environmental considerations in decision making was a theme running through all the reports. This meant ensuring that environmental costs were systematically considered in decisions.

Consistently with the approach of the Treasury (1990) — accepted by the Government — most of the reports expressed in-principle preference for market approaches to using environmental resources better, rather than regulatory ones. This preference was expressed most strongly in *Agriculture*: "...while regulation has its place, it is considered to be, in general, a 'last resort'" (*Executive Summaries*, p.2). More economic pricing of water to farmers and full transferability of water entitlements — including transferability between irrigation and other (recreation and urban) users and between states — were significant market measures recommended in *Agriculture*. A majority of the Agriculture Working Group supported setting targets for reducing the use of certain classes of chemicals, but there was disagreement on whether the targets should be indicative or mandatory, hence using the market

approach of taxing chemical use to achieve the reduction -- as in some other countries -- was not recommended. *Forest Use* recommended a competitive open market-based system of transferable wood harvesting rights and application of the 'user-pays' principle to all commercial and non-commercial users of forests wherever feasible.

Acceptance of the virtues of the market approach was not so evident in *Fisheries*. There much scope was assigned to management authorities -- influenced by and answerable to advisory committees on which all significant groups using the resource were represented. The management authorities would prepare strategic management plans and "...establish the appropriate mix of input and output control mechanisms to meet the sustainability indicators contained in the management plan" (*Executive Summaries*, p.97). It *was* said, however, that the mechanisms established should let market signals influence users of the resource. It was also recommended that fisheries management authorities be empowered to bring civil litigation against interests that damage the fishery habitat or breach the management plan.

In both *Energy Production* (p....) and *Manufacturing* (p....) it was said: "To the extent that environmental values can be incorporated into the price system, a dynamic flexible incentive mechanism is available to influence decision making....". It was accepted, however, that regulatory measures will sometimes need to be used. The argument why this is so, advanced in both *Energy Production* and *Manufacturing*, is puzzling. "...in many instances we do not have the data to reflect adequately the environmental costs ..'. But the absence of the data needed to set an appropriate price on an environmental resource will often pose the same problems for achieving efficiency via regulation as in achieving it through market-based approaches. What is meant, presumably, is that the resource price needed to achieve a pre-determined environmental effect using the market approach is unknown, while the effect however efficient or inefficient it is -- can be secured via regulation.

Removing inefficiencies in pricing electricity and natural gas is an important priority in *Energy Production*. Many of these inefficiencies are conventional ones, unrelated to considerations of pricing environmental impacts. However, the use of market measures to

improve the use made of environmental resources occupies a prominent part in this report, as it does in *Mining* and *Manufacturing*. The latter reports pointed out that although Australia is a signatory to the OECD recommendations on the "polluter pays" principle, its use is not well developed in Australia. In *Energy Production* it was argued that the polluter pays principle did not go far enough, and that containing pollution within ecologically sustainable limits required that "the prices for goods and services should also reflect the social, environmental and health costs of associated pollution" (p.138). Despite difficulties in applying it – such as evaluating the costs of long-term low level pollution on health and on the environment – this extended polluter pays approach was seen as the preferred guideline in pricing the environment.

The first recommendation in *Mining* was for an increase in research into "market-based options to facilitate integrated decision making within the sector" (*Executive Summaries*, p.191). Security bonds, tradable pollution rights, penalties and fines and ways of valuing non-marketed environmental resources were listed as examples. Similar recommendations for research into market measures for improving the working of economic-environment systems were made in *Energy Production* and *Manufacturing*.

In *Energy Use* and *Transport*, pricing and regulatory measures are both seen as important in achieving progress towards sustainability. "Pricing of fuel is far the most direct way of achieving behavioural change towards ESD objectives through vehicle use..." (*Transport*, p.135). Road pricing is seen as impractical at present. A Commonwealth study into "how best to incorporate the full economic, social and environmental costs into energy prices in Australian transport" (p.135) is recommended. In addition, raising sales tax on fuel-inefficient vehicles and lowering it on fuel-efficient ones was supported to further affect incentives concerning type of vehicle to own. The first recommendation in *Energy Use* was similarly directed to reflecting all costs of energy use in energy prices. Examination of financial incentives to owner-occupied householders to upgrade their energy efficiency was recommended. It seems to be implied (p.80) that householders are at present passing over possibilities to make long-term savings in energy costs. The case for using subsidies rather than information programs to rectify any market failure in this area was not made. Market

measures were not so prominent in *Tourism*. However, roles were seen for park use fees, damage-related penalties for non-compliance with environmental regulations, and performance bonds as a condition of development where a risk of unacceptable environmental damage existed.

Among the regulatory measures supported in *Transport* were lower vehicle emission limits, labelling of vehicles to indicate fuel efficiency and mandatory inclusion of this information in advertising, priority for transit traffic and high occupancy vehicles, and consideration of compulsory car and van pooling. *Energy Use* contained recommendations concerning mandatory energy labelling of appliances for the residential, commercial and industrial sectors and coordination of energy rating schemes for residential and other buildings. Labelling of appliances to indicate their energy use was supported also in *Manufacturing*, as was establishing standards of minimum energy efficiency for a range of items from white goods to motor vehicles.

Government-created distortions were identified as important causes of threats to ESD in several reports. Water pricing and tax concessions for land clearing (no longer present) are example from *Agriculture*. *Forest Use* referred to inefficient approaches to pricing wood, impediments to private forestry and unnecessary restrictions on the use of timber.

A number of government policies distorting resource use in a way harmful to ESD were identified in *Energy Use* and *Transport*. These included: tax measures (for example incentives to firms to provide employees with motor vehicles); legal provisions (such as the impediments to private motorists charging those whom they transport); and planning and development regulations. The absence of a capital gains tax on the family home was seen as one of the factors encouraging a pattern of urban land use that is not ecologically sustainable.

All reports saw a need for improvements in education at all levels on resource management for ecologically sustainable development. In *Forest Use* and *Agriculture* the need for teachers to show balance in dealing with production from the sector's resources and with conservation was expressed. Teachers were not helped in achieving this balance by the

disgraceful environmental resource kit prepared by the Federal Environment Minister's department in conjunction with World Environment Day, and distributed to all Australian schools in mid-1992, before being officially withdrawn (Edwards and Uren 1992).

FINAL OBSERVATIONS

In this paper some questions have been raised which may help in putting the Working Group reports in context and in evaluating them. Among these questions are: to what extent is progress towards ESD in Australia determined outside Australia? what constraints does a small trading country face in pursuing ESD? and what is the role of market measures and of regulatory policies? An initial attempt to examine the reports against the backdrop of these questions has been presented.

Readers of the ESD Working Group reports find an operational definition of tourism – all travel more than forty kilometres from the normal place of residence, except commuting to and from the usual place of work – but not of ESD. However, ESD is interpreted in the reports to be as much about economic growth and development as about protecting the environment. Those who see low or zero economic growth as a requirement for ESD will find no support for their position in the Working Group reports. Indeed, economic growth, by expanding the choices open to Australians, is seen as enhancing the opportunities to achieve environmental – and other – objectives more fully. Nevertheless, the potential for Australia to expand the preferred options available to its citizens will not be realised unless values for the environment are fully reflected in decision making throughout society.

Despite the new and imprecise term "ecologically sustainable development", there is little in the broad approach of the Working Group reports which sits uncomfortably with mainstream economic principles. After all, the need to incorporate external effects in prices has been the conventional wisdom since Pigou (1932). To be sure, in Australia, as elsewhere, policymakers have often paid little regard to environmental externalities. This has been due in larger part to uncertainties about the size of such effects and to community values than to their exclusion from the economic paradigm. Many of the recommendations of the Working Groups

call for research by economists and others which will facilitate sound decisions on the pricing of natural resources in a range of situations.

Some writers (for example, Wills 1992) have criticised the ESD process for not being sufficiently systems oriented and for being too imprecise about criteria for evaluating performance in achieving sustainability. In their defence, the Working Groups can point to: limitations in knowledge; their terms of reference, including the requirement to provide practical advice to the Government; and their reporting deadline.

The costings of the recommendations made in *Agriculture*, *Fisheries* and *Forest Use* — less than $300 million over five years — while incomplete, would generally be regarded as a low price for a guarantee of ecological sustainability. But life is not like that! There are no guarantees of this type. Uncertainty is a major characteristic confronting those who seek to offer strategies for moving towards ESD. Advances in knowledge — which many recommendations in the Working Group reports are directed to achieving — will change assessments of how consistent present and alternative management regimes are with ecological sustainability and with ESD.

REFERENCES

Commonwealth of Australia (1990). *Ecologically Sustainable Development - A Commonwealth Discussion Paper*, AGPS, Canberra.

Costanza, R. (1989), "What is ecological economics?" *Ecological Economics*, 1(1), 1-7.

Ecologically Sustainable Development Working Groups (1991). *Final Report - Executive Summaries*. AGPS, Canberra.

Ecologically Sustainable Development Working Groups (1991). *Final Report - Agriculture*. AGPS, Canberra.

Ecologically Sustainable Development Working Groups (1991). *Final Report - Energy Production*. AGPS, Canberra.

Ecologically Sustainable Development Working Groups (1991). *Final Report - Energy Use*. AGPS, Canberra.

Ecologically Sustainable Development Working Groups (1991). *Final Report - Fisheries*. AGPS, Canberra.

Ecologically Sustainable Development Working Groups (1991). *Final Report - Forest Use*. AGPS, Canberra.

Ecologically Sustainable Development Working Groups (1991). *Final Report - Manufacturing*. AGPS, Canberra

Ecologically Sustainable Development Working Groups (1991). *Final Report - Mining*. AGPS, Canberra.

Ecologically Sustainable Development Working Groups (1991). *Final Report - Tourism*. AGPS, Canberra.

Ecologically Sustainable Development Working Groups (1991). *Final Report - Transport*. AGPS, Canberra.

Ecologically Sustainable Development Working Group Chairs (1992). *Intersectoral Issues Report*. AGPS, Canberra.

Ecologically Sustainable Development Working Group Chairs (1992). *Greenhouse Report*. AGPS, Canberra.

Edwards, G. and Uren, N. (1992), "Government in the Classroom? The World Environment Day Kit," *Policy*, Summer (forthcoming).

Pigou, A.C. (1932). *Economics of Welfare*.

Quiggin, J. (1991). Discount rates, future generations and sustainability, Paper to ESD Intersectoral Issues First Technical Workshop, Canberra, May 1991.

Tisdell, C. (1991), *Economics of Environmental Conservation*, Elsevier, Amsterdam.

Treasury (1990). Economic and regulatory measures for ecologically sustainable development strategies. *The Economic Roundup*, June 1990.

Veeman, T.S. (1989), "Sustainable development: its economic meaning and policy implications," *Canadian Journal of Agricultural Economics*, 37(4), 875-86.

Wills, I. (1992). Integrating the economy and the environment: has the ecologically sustainable development process helped? *Policy*, (Spring).