Value for Money in Environmental Policy and Environmental Economics

David J. Pannell

Centre for Environmental Economics and Policy,
School of Agricultural and Resource Economics,
The University of Western Australia,
Crawley, WA 6009, Australia

E-mail address: david.pannell@uwa.edu.au
Web page: www.davidpannell.net

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David J Pannell

Centre for Environmental Economics and Policy, University of Western Australia

David.Pannell@uwa.edu.au, www. DavidPannell.net

Abstract

Requirements that environmental programs must meet in order to deliver value for money are identified, illustrated and discussed. It is argued that environmental managers and policy makers should carefully consider the extent to which potential policies and investments deliver environmental outcomes, not just outputs and activities. Processes for ranking potential environmental investments need to consider a sufficient set of information to properly evaluate benefits and costs. That information must be in a rigorous way. Many ranking systems in practical use do not meet these requirements. Environmental projects of different scales and intensities can vary greatly in the value for money that they offer, so different versions of a project should be evaluated and compared. The effectiveness of a program or project can be sensitive to the policy mechanism(s) used, so these too should be compared and evaluated for each potential project. Programs should be designed in a way that provides incentives for environmental managers to develop and pursue projects that provide high value for money, rather than creating barriers to that outcome. In some cases environmental economists could increase the value for money from investments in their research and analysis by avoiding the over-concentration of effort into a subset of the many types of information needed to make sound management and policy decisions. There are several reasons to expect that relatively less detailed or sophisticated information may provide greater value for money: diminishing marginal benefits from sophistication and detail, increasing marginal costs of sophistication and detail, and the limited capacities of potential users of this information. There is significant potential to improve the value for money generated by public investments in environmental projects and in environmental economics, although there are significant challenges in each case.

Introduction

The concept of “value for money” is closely related to economists’ concept of economic efficiency, but is more readily understood by the general public. As with efficiency, it carries the connotation that both benefits and costs matter when evaluating the desirability of an investment or purchase. I will be assuming that value for money is synonymous with the Benefit: Cost Ratio (BCR) of an investment.

Value for money is important in environmental programs for several reasons. As with most areas of public expenditure, funding for environmental projects is scarce. The political process never allocates enough funding to support all of the environmental projects and initiatives that some people would like. For example, a national program in Australia to mitigate land salinization had a budget of A$1.4 billion over seven years (Anonymous, 2000), whereas an independent analysis indicated that the budget required to deal comprehensively with the salinity problem would be A$65 billion (Virtual Consulting Group and Griffin NRM, 2000). Of course, it doesn't follow that dealing comprehensively with such a problem would be sensible. Some, and perhaps many, of the available investments would not provide value for money.

Contributing to the scarcity of funding is the fact that effective environmental management can be expensive. In my experience, the real cost of achieving major outcomes is often substantially greater than funding programs allow for. For example, the Gippsland Lakes in the Australian state of Victoria had an official target of reducing nutrient inflows by 40%, for which a budget of around A$2 million per year was available. However, a detailed analysis of the least cost of achieving the target determined that it would have a present value of around A$1 billion over 25 years (Roberts et al., 2012).

Another reason for focusing on value for money is heterogeneity. The BCR from an environmental investment depends on a range of variables (see below), and the values of those variables vary substantially for different projects, of different scales, in different locations, at different times. To illustrate, Figure 1, taken from Fuller et al. (2010), shows the estimated benefits and costs of 7000 potential environmental investments in Australia. Each point represents a particular reserve area, to which resources may or may not be allocated to protect the environmental assets it contains. The figure serves to illustrate several key points.

Firstly, the range of benefits and costs among the projects is enormous (note that the axes are in log scale). Secondly, as a result, there is a huge range of BCRs, from approximately zero to very large. Thirdly, the BCRs of the best projects are dramatically higher than other projects. For this data set, the average BCR of the best 5% of projects (shown as triangles) is 330 times greater than for the median project. For the best 10%, the ratio is 200 times.

Clearly, if a program faced with these 7000 potential projects fails to fund the best ones, the opportunity cost for the environment could be extremely large. It would be worth putting resources, time and effort into evaluating the projects to identify the best ones.

This leads us to the first question that will be addressed in this paper. What is required for public environmental programs to deliver value for money? Good prioritisation of projects is one important part of the answer, and this will be considered in detail. But it is not the whole answer. There are other equally important issues, some of which tend to be neglected by environmental economists.

The second somewhat-related question is, what can economists do to increase the chance that investment in environmental economics analysis provides value for money? The discussion of this issue will encompass issues such as transaction costs, diminishing marginal benefits from more information, equalising marginal benefits per dollar from different areas of information input, and recognition of the existing knowledge and limitations of potential users of economic analysis.

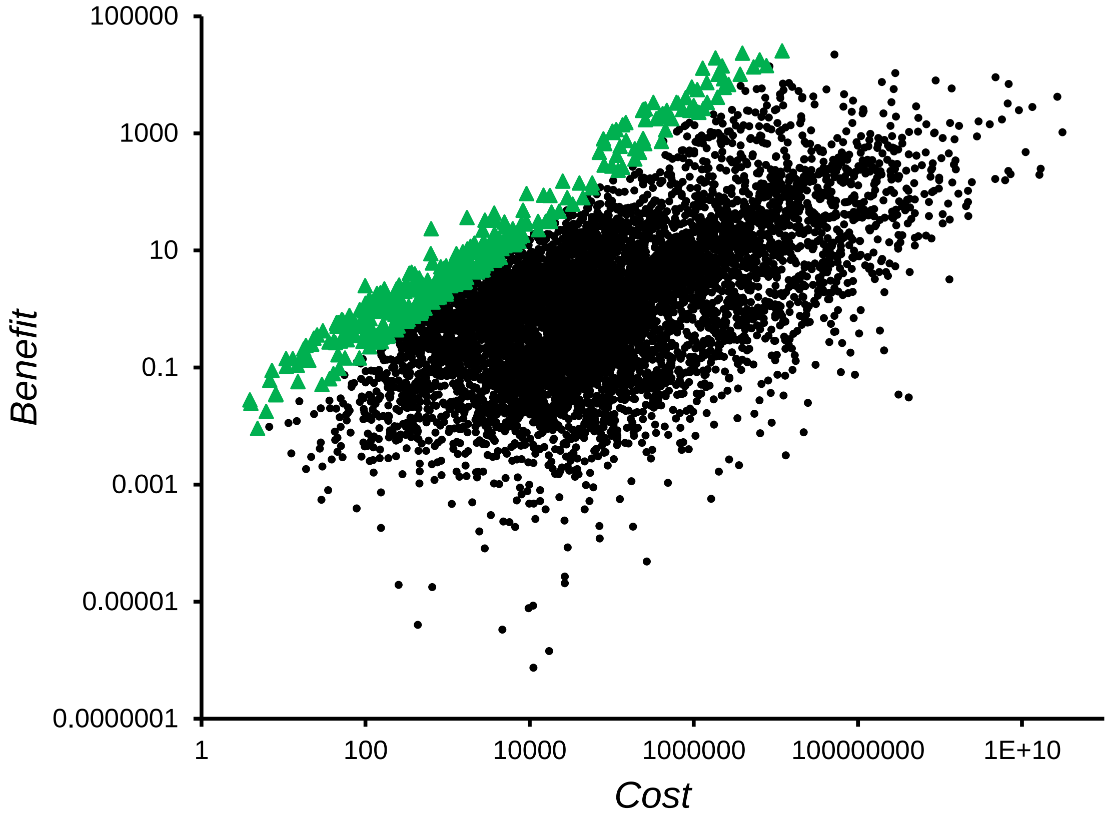

Figure 1. Benefits and costs for acquiring and managing 6990 protected areas in Australia, with benefits measured as the contribution to conserving native vegetation types relative to their rarity. The 5% with the highest BCRs are shown as triangles (Source: Fuller et al., 2010).

The paper is a synthesis of experience and research on these topics over the past 15 years, together with evidence, theory and insights from a variety of sources. The next section addresses the requirements for environmental investments to provide value for money. The section after that turns the focus on environmental economics and ways that it can provide better value for money. The final section summarises key conclusions.

Value for money of environmental investments

There are a number of different things that environmental managers can do to improve the value for money from their investments. This section briefly discusses some key strategies and best practices. The first set of issues relates to decision making about environmental projects, including their individual design and prioritisation across projects.

A focus on environmental outcomes

It may seem obvious to state that environmental managers should consider the extent to which investments achieve highly valued environmental outcomes, but it is remarkable how often this does not happen. For example, in agri-environmental programs, it is very common for programs to invest in the promotion of what are perceived to be environmentally favourable practices, with faith that these practices will benefit the environment, but no real knowledge of the extent or value of those benefits.

To illustrate, consider the Environmental Stewardship program, which is administered by DEFRA and delivered by Natural England[1]. This program offers stewardship payments to landholders. Actions that potentially qualify for payments under the Entry-Level scheme include: permanent grassland with very low inputs, legume- and herb-rich swards, and uncropped cultivated areas for ground-nesting birds. Almost 200 specific "priority options" like these are listed for the Entry-Level scheme. To evaluate whether investments in such actions provide value for money, a necessary step is to quantify the extent to which outcomes are achieved. The Environmental Stewardship program indicates which category of environmental benefits is intended to be served by each of the actions (e.g. water voles, dragonflies, newts, toads, bats, dormice, brown hare, soil erosion and runoff). The question, though, is how large are the gains? How many additional bats would there be? In the case of soil erosion and runoff, the beneficial outcome is likely to be off-site – for example, a watercourse. To what extent would the condition of the watercourse be improved?

Although the need for this information seems elementary, my experience of asking questions like these of environmental managers in various countries is discouraging. The two most common responses are (a) a frank admission that they have no idea and (b) an adverse reaction to the questions being asked at all – the effrontery! I don't have the experience of asking such questions of managers of the Environmental Stewardship program, but I'm confident that I would receive one or both of those reactions. And yet without this information, there is no chance of determining which investments offer the best value for money. As Figure 1 indicates, we may miss opportunities to invest in projects that are hundreds of times more valuable.

Of course, there is an obvious reason why program managers are unable to answer these questions: they are extremely difficult to answer. Spatial and temporal heterogeneity is high, and scientific evidence on these matters is very limited, in part because environmental scientists tend not to research these questions. Nevertheless, as I will argue below, approximate information (e.g. based on expert opinion) would be far better than no information. In the medium term, if managers started to ask these questions and commissioned research into them, the scientific uncertainty would fall.

Decisions based on relevant information

I singled out information about environmental benefits as an essential, but often-neglected, requirement to evaluate value for money from environmental investments. In fact, the required information consists of two parts.

[1] http://www.naturalengland.org.uk/ourwork/farming/funding/es/default.aspx (accessed 20 Feb 2013)

(a) Environmental condition in the absence of the investment. It should not be assumed that the environment necessarily remains static in the absence of further management.
(b) Environmental condition in the presence of the investment. The benefit of the investment is the difference between (a) and (b).

Beyond that, there are also various other pieces of information that are also required.

(c) Environmental values. How important or valuable to the community are the predicted environmental benefits? This is a focus of research for many environmental economists.
(d) Project risks. What is the probability that the project, if funded, will achieve its targets? Risks can include that the management actions do not work as expected, that there is community or political resistance to the project, that long-term funding required to maintain the benefits is not obtained, and that the organisation implementing the project does not have sufficient skills and capacities to do so successfully.
(e) Adoption/compliance. Of the private citizens who would need to respond to the project in particular ways (e.g. by adopting new land management practices) in order to deliver the desired benefits, what proportion will actually adopt the new practices? (Not all projects require private adoption/compliance).
(f) Time lags. Once the investment is made, how long will it take before benefits are realised? Lags can occur for several reasons: it takes time for the new management actions to take effect (e.g. trees take time to grow); the project is preventing an anticipated problem that would not have occurred until some time in the future; or people take time to adopt the new practices.
(g) Costs. Decision makers need to consider costs to the environmental management organisation, to other cooperating organisations, and potentially to private citizens who are required to comply. Both short-term and long-term costs are relevant, short-term being those incurred during the initial project phase (typically three to five years) and long-term costs being those required subsequently to maintain the benefits. Where private citizens are involved, costs to the environmental program will depend on the opportunity costs to the private citizens.

In my view, these pieces of information constitute a core set required to evaluate and prioritise environmental projects. It is essential to consider all of them to obtain accurate project evaluations or rankings. Experiments with leaving variables out of the analysis show that it greatly reduces the environmental values that can be achieved from a portfolio of projects (Pannell, 2009). Even if there is high uncertainty about a variable, it is much better to include it than not.

In cases where environmental managers use quantitative analysis to rank proposed project, it is common for elements of this essential set to be omitted. Commonly, such processes do consider variable (a), a subset of (d), and a subset of (g) – the short-term costs. Commonly they omit, or treat very weakly, (b), (c), aspects of (d), (e), (f) and the long-term aspect of (g).

Decisions based on sound metrics

If information is collected on each of the above essential variables, the next challenge for managers is to combine the information in a way that provides an accurate indication of the value for money of each project. In principle, this is straightforward – the information should be used to calculate a

BCR for each project. The logic and theory required to do this is clear and easy to understand (e.g. Pannell et al., 2013b).

In practice, however, environmental managers usually use metrics that deviate dramatically from the logic and theory of a BCR, with highly adverse consequences for the decision process. The most commonly used metric is one in which the variables are weighted and added up, as popularised in multi-criteria analysis. While this approach can have merit in certain situations, it is often applied uncritically and inappropriately, resulting in an inability to identify the projects that offer high value for money.

To illustrate, Figure 2 (reproduced from Pannell et al., 2013b) shows a comparison of the rankings of 100 simulated projects using BCRs and a weighted additive metric. The rank of each project was determined for each formula, with low ranks being superior. Weights were chosen to maximise the correlation between the two metrics. The two approaches use exactly the same data; the difference is solely in the formula used to process the data.

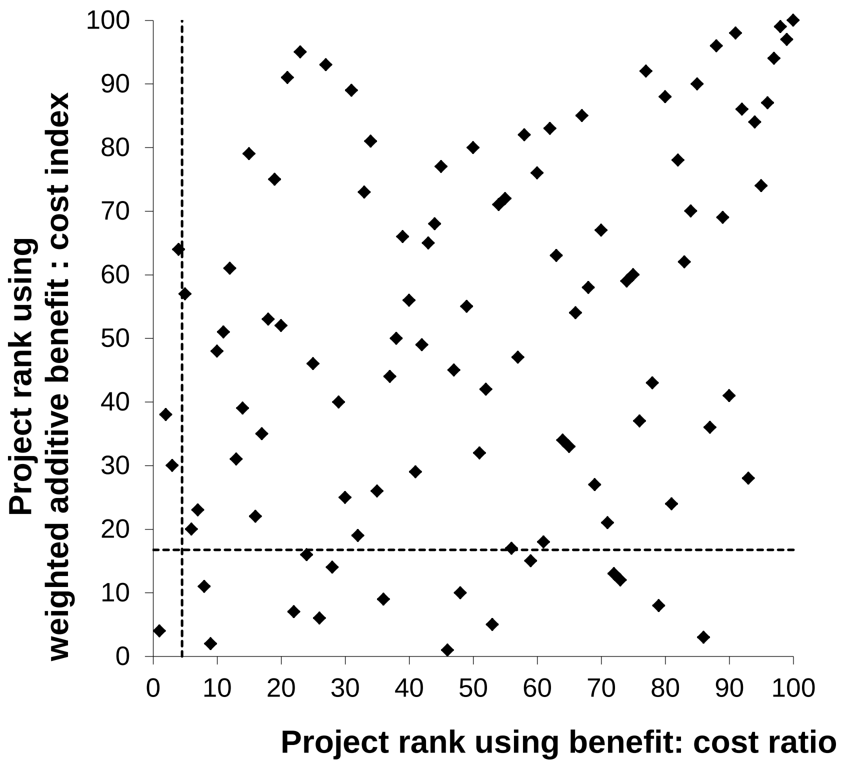

Figure 2. Figure 2. Comparison of project rankings from two different formulae: a benefit: cost ratio and a weighted additive benefit: cost index. (Source: Pannell et al., 2013b)

There is strikingly little correlation between the results of the two formulae. The r^2 for this example is only 0.7%. The dashed lines show the cut-off points for projects if resources are sufficient to fund 5% of project proposals (realistic for some Australian programs). Of the 16 projects that would be chosen using a weighted additive metric (in the bottom section of the graph), only one is actually in the superior set of projects (in the left section). On average, over repeated simulations, the loss of environmental values from use of the inferior metric was over 50%. Notably, this performance is not greatly better than an entirely random selection of projects, which resulted in 74% loss of environmental values.

The choice of metric used to rank projects is much more important than realised by many environmental managers. Under most existing approaches, projects that would provide the best value for money are not being identified. It would be trivially easy to address this mistake.

Comparing scales of intervention

Typically, project proponents develop only one version of an environmental project, involving changes over a particular scale or level of intensity. However, the BCR can be very sensitive to scale or intensity of a project. The optimal scale of intervention should be explored to maximise the value for money from an investment.

For example, there are many environmental investments around the world that aim to improve the water quality in water bodies by reducing in-flows of sediment and nutrients. The BCR is likely to vary substantially depending on the target levels of reduction, be it 10%, 50%, 90% or whatever.

On the cost side, in my experience, most environmental managers are unaware of the inevitability of increasing marginal costs. Figure 3 shows an example of estimated total costs of various nutrient reduction targets for the Gippsland Lakes in Australia. The shape of the curve – completely unremarkable to economists – was surprising to the environmental managers we were advising.

On the benefit side, environmental managers are often aware that there may be a threshold level of intervention required before benefits increase substantially (implying increasing marginal benefits over a range) but seem much less aware of the high likelihood of diminishing marginal benefits. This may occur due to decreasing marginal utility, as commonly observed in non-market valuation studies (e.g. Bateman et al., 2005), or due to physical characteristics of the environment. Sieber et al. (2010) provide an example of the latter. Reductions in nutrient flows into German rivers were studied for different widths of riparian vegetation. The reduction in risk was found to be 61% for a riparian buffer strip of 3 m width, 94 % for 30 m strips and 96 % for 50 strips. In other words, the marginal reduction in risk was of the order of 20% per metre width for a 3m buffer strip, 1% per metre for a 30 m strip and 0.1% per metre for a 50 m strip.

Consideration of market failure

Economists use the concept of market failure as a criterion to evaluate whether the benefits of a public intervention are likely to exceed the costs. While there are recognised limitations of market failure as a guide to action (Dahlman, 1979; Pasour, 1993), it remains a useful general test. In particular, consideration of additionality can help managers avoid some projects that offer poor value for money. Essentially, the question is, to what extent would people voluntarily adopt the required practices in the absence of financial support or regulatory coercion? If the private benefits to those people are sufficient, it may be that provision of information may be sufficient. Examples could include zero tillage in North America (Fulton 2010; Horowitz et al., 2010) or application of lime to treat acid soils in Australia (Li et al., 2010), each of which is financially attractive to farmers in the right circumstances. Provision of financial support to most adopters of these practices would have an opportunity cost, in terms of reduces investment in other worthwhile programs, while generating little or no benefits beyond what would have occurred anyway.

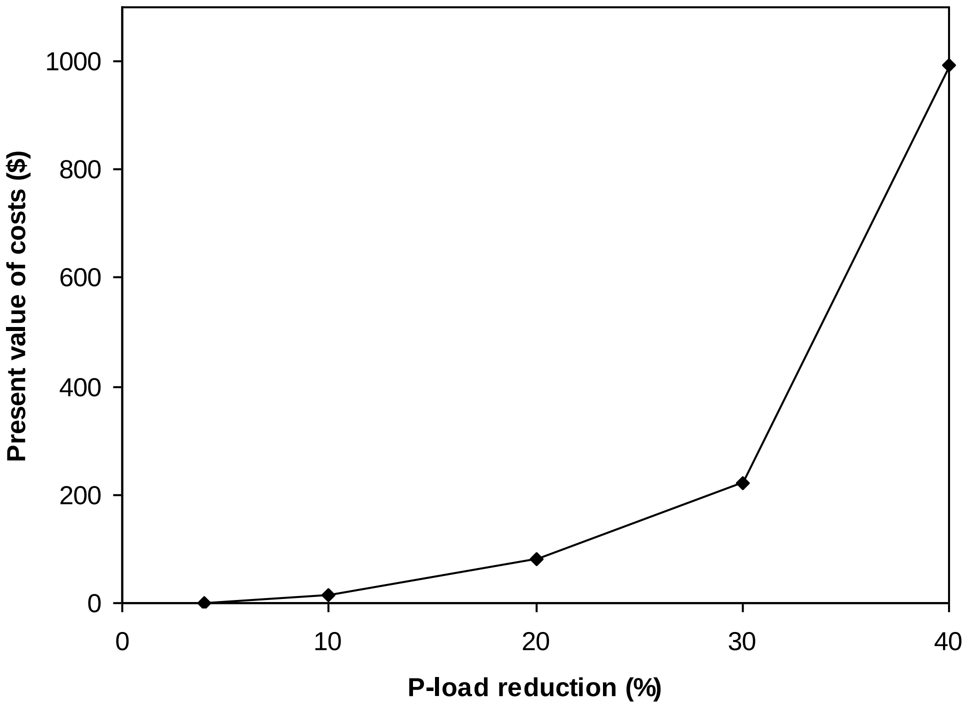

Figure 3. Costs of achieving different levels of reduction of phosphorus (P) in-flows to the Gippsland Lakes (present value over 25 years using 5% real discount rate). (Source: Roberts et al., 2012)

In some earlier environmental programs in Australia, policy makers took this concept too far, ruling out projects that generated even small levels of private benefits, not sufficient to outweigh the private costs. For some of these projects, a small level of financial assistance may have been sufficient to make the required difference for adoption. These investments are likely to have been amongst those that offered the best value for money to the program, but they were excluded.

Sound mechanism choice

Closely related to the issue of market failure is the question of which policy mechanism(s) should be used to encourage changes in behaviour or business management to benefit the environment. This too seems to be a much neglected issue in environmental programs. Typically, a mechanism is chosen without careful consideration of its appropriateness. A common cause of failure in Australian agri-environmental programs has been over-reliance on extension approaches (education, training, awareness raising, etc.) in the often-forlorn hope that it will result in voluntary behaviour change despite high private costs. This is perhaps an understandable consequence of low levels of funding –

much too low to compensate farmers for their opportunity costs. Rather than target the available resources to a small number of excellent projects, managers tend to spread the available resources across a large number of mediocre projects, but then projects can only afford approaches that are cheap per landholder, like extension. Conversely, in a well-funded program, one might hypothesise that the opposite problem would sometimes occur: use of expensive payments when extension would have been more efficient.

Observing this phenomenon, I developed a simple framework for identifying the appropriate broad category of policy mechanism for projects that aim to address an externality problem (Figure 4). The framework indicates which mechanism type is appropriate, depending on the levels of public net benefits and private net benefits arising from the investment (Pannell, 2008). It is based on simple enough logic to be readily understood by non-economists, and I have found it to be a valuable tool for helping environmental managers to think critically about these issues. See Pannell (2008) or http://dpannell.fnas.uwa.edu.au/ppf.htm for more information.

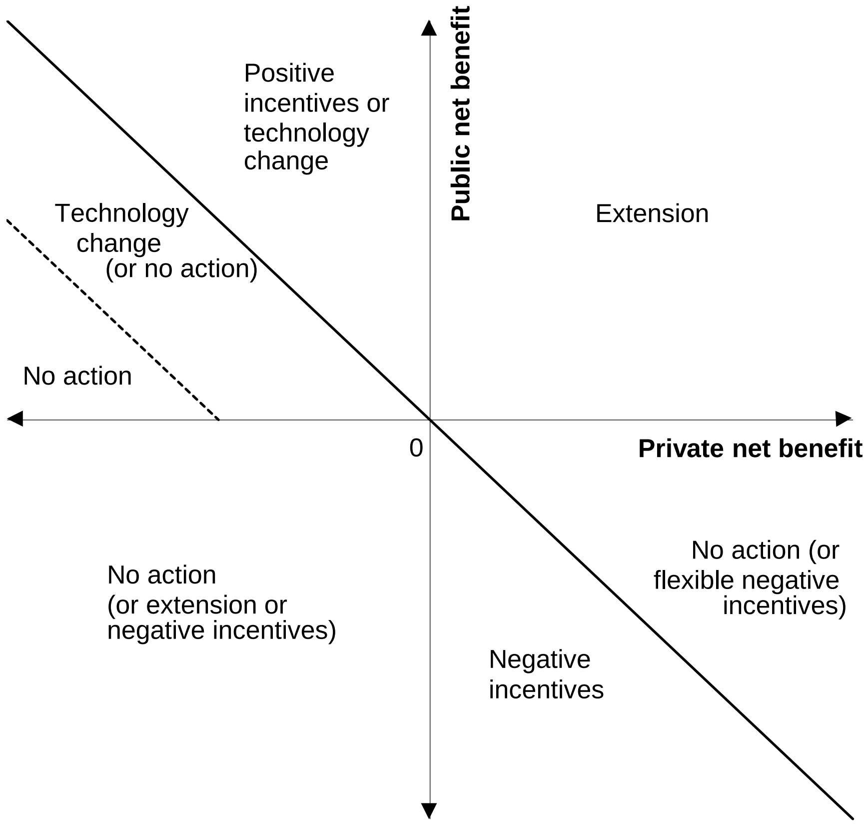

Figure 4. Simple version of the Public: Private Benefits Framework for identifying appropriate policy mechanisms for investments to address externality problems. (Source: Pannell, 2008)

Most of the issues raised to this point would be considered core business by environmental economists. This is less true of the following four issues, even though they too are important for providing value for money from public investments in the environment.

Reviewing investment proposals for quality assurance

Independent of the quality of potential projects, the quality of project proposals is highly variable. There is a clear tendency for project proposals to over-state the benefits and under-state the costs of their projects. In part, this is likely to reflect strategic behaviour by internal advocates or external proponents. However, it likely also reflects the 'planning fallacy' (Kahneman, 2011), a well-documented tendency for excessive optimism about projects when they are developed by a team.

To avoid the tendency to fund those projects that have been exaggerated the most, programs need assurance that the assumptions and claims made in proposals are realistic and reasonable. There are various ways that this might be achieved, but all must involve critical scrutiny of proposals by people with sufficient expertise to identify problems.

Apart from exaggeration, another frequent problem is poor specification of the project goal or target. The SMART acronym provides a useful checklist for how targets should be specified. They should be Specific, Measureable, Achievable, Relevant and Time-Bound. The S, M and T criteria are essential to allow project performance to be monitored and evaluated after it has been implemented. The A and R criteria are about whether the project has been properly evaluated prior to funding. In a recent assessment of a large number of targets set by regional environmental management bodies in Australia, we found that very few met all three of the S, M and T criteria and, in my judgement, none met all five criteria (Park et al., 2013).

Related to the setting of appropriate targets is the question of project logic. I frequently see project proposals that lack internal logic and consistency. They specify a goal, but it would not be achieved by the proposed on-ground changes, or the proposed project activities would not result in the desired on-ground changes, or the budget is not sufficient to fund the proposed project activities, or all three. These projects may superficially appear satisfactory based on a qualitative description of the project logic, but the real test is whether they are sound in a quantitative sense.

Monitoring and learning

In my experience, there is always great uncertainty about much of the information required to evaluate and prioritise environmental projects. It is impossible to fill all knowledge gaps prior to project implementation, so it is important to implement projects in a way that facilitates learning. This can then feed into a process of adaptive management, where project implementation is adjusted through time to reflect learning, or into evaluation and prioritisation of future projects. Unfortunately, there are many programs and projects that perform weakly in this respect.

At the program level, there are various balances to be struck in funding different types of projects. I will highlight two of them.

Appropriate incentives for environmental managers

Finally, programs need to be designed in a way that incentivises environmental managers to embrace the sorts of practices and tools outlined above. Very often, this is not the case. One institutional factor that tend to lead managers away from best practice has already been mentioned above: a focus on funding of activities without properly considering the resulting outcomes.

Additional institutional factors that tend to incentivise managers in wrong direction include: rushed time frames for program development due to a failure to anticipate that new program designs will be needed once the current program ends; requirements that funding be spent within fixed time frames, enforced by the confiscation of unspent funds; a lack of emphasis on funding research to fill severe knowledge gaps that hamper project design and program decision making; and lack of learning from past successes and failures, resulting in a failure to improve the performance of programs over time. A political factor that often seeps into public environmental agencies is concerns about public opinion or equity, resulting in funding of projects that are perceived to be popular but have little environmental merit.

I hope this brief outline of some key requirements for environmental programs to deliver value for money may be used as a checklist by managers wishing to improve the performance of their programs. In the next section I shift the focus onto environmental economists and ask how our own activities can deliver the greatest value for money.

Value for money of environmental economics

It is clear from the foregoing discussion that environmental economics has great potential to contribute to environmental programs in ways that increase their value for money. Nevertheless, economists should not be free from the same sort of critical scrutiny. The fact that there are so many severe problems in so many environmental programs reveals that we currently fall far short of the potential in this regard. There are various reasons for this, some outside our control, but others not.

Indeed, in some cases a charge of hypocrisy levelled against environmental economists would not be unreasonable. We tend to be free with our advice to other people about how they should apply economic principles to maximise social net benefits. However, we are much less inclined to apply the same principles to our own activities. Observation of the behaviour and outputs of economists reveals that our failure to practice what we preach is often a significant problem, reducing the value for money from investments in environmental economics research and analysis. Here I discuss three issues, two of which are of this type, and one of which is about our understanding of users of our information products.

Optimising the portfolio of environmental economics analysis

We can conceive of a policy agency as a consumer of environmental economics products, and recognise that there are many different products on offer. For example, the agency might choose to consume information about non-market values, market values, human behaviour, risk, uncertainty, environmental production functions (relationships between management and environmental outcomes), discount rates, time lags, costs curves, transaction costs, policy mechanism choice, mechanism design, metric design (how to combine quantitative information to rank decision options), and so on. Then, from standard textbook microeconomics (Nicholson, 1989; Wonnacott and Wonnacott, 1990) we know that the optimal strategy for the agency is to equate

$$\frac{MU_1}{P_1} = \frac{MU_2}{P_2} = \cdots = \frac{MU_i}{P_i} \tag{1}$$

where MU_i is the marginal utility to the agency from consuming product *i*, and P_i is the purchase price per unit of product *i*. This insight could encourage us not to concentrate our intellectual resources into the production of too few information products, but instead to ensure that we produce enough of each product to provide an optimal consumption bundle. In adjusting this balance, we would favour products that are currently under-consumed (and so would have relatively high marginal benefits) and products that are relatively cheap to produce.

While environmental economists do work on all of the information products listed, my judgement is that we fail to satisfy Equation (1). Some information products are well-supplied, in the sense that there are many units produced (e.g. non-market values, discount rates), others much less so (e.g. transaction costs, cost curves, environmental production functions, human behaviour, metric design). Furthermore, one of the relatively well-supplied products (non-market values) is among the most expensive, while at least one of the (arguably) under-supplied products (metric design) is very cheap.

This outcome is not surprising, since most of the decisions made by researchers about the supply of different information products are not linked to consumption decisions by agencies or other potential consumers. Instead most decisions about supply of environmental economics information products are influenced by factors other than how well our supply matches the consumption bundle that would be optimal for managers and policy makers. There are various reasons for this, including that our products are, to some extent, public goods, and that the criteria for academic success include factors that bear no relation to the usefulness of our products. However, we could if we chose to, endeavour to pursue the optimal-bundle goal despite incentives that might lead us away from it, resulting in more value for money from the investment in environmental economics.

Environmental agencies might contribute by being more discerning purchasers of our products. Currently, they often tend to buy products that are already relatively well supplied, perhaps because these are more visible, or are being marketed by more salesmen.

Optimising the depth and sophistication of information

Switching from consumer economics to a production-economics analogy, any of the information products discussed above could be considered as an input to the production of policy and management decisions. A farmer may choose from many different rates of fertilizer for a crop. Using a simple production-economics model, we could determine the fertilizer rate that maximises profit, and we would find that the optimal fertilizer rate is not that which maximises crop yield. Similarly, we might seek to optimise the depth and sophistication of environmental economics information that is provided as an input to decision making. As before, the optimum would not be at the point where the decisions are most nearly perfect, because of the cost of increasing depth and sophistication.

This analogy is based on an assumption that there are diminishing marginal benefits from additional information. I provided an illustration of this in Pannell (2006) (from unpublished research by Michael O'Connell, Andrew Bathgate and Nicole Glenn, 1999), shown here in Table 1. The table shows a large reduction in marginal benefits as the precision of decision analysis increases (as optimal soil liming rates are analysed at finer scales). The results suggest that the marginal benefits of going from moderate precision to high precision would be close to zero.

Table 1. Incremental benefits (A$/ha/year) of increasing the information intensity of decisions about lime application to treat soil acidity

Zone	Soil type	Change from very low to low precision	Change from low to moderate precision
Low rainfall	Deep sand	14	4
	Clay	8	2
Medium rainfall	Deep sand	35	3
	Clay	19	2
High rainfall	Deep sand	7	3
	Clay	21	0

Furthermore, we would often expect increasing marginal costs for improvements in information. Approximate information can be obtained cheaply (e.g. by relying on expert opinions), but increasingly accurate and detailed information would require increasingly expensive research, with perfect information likely to be infinitely expensive. The more strongly increasing are the marginal costs, the lower the optimal information quality.

An additional consideration is that the shape of the production function for improved decisions depends on the capacity of the decision maker. Environmental decision makers without economics training often find it very difficult to understand and make use of economic information unless it is very clear and simple. Indeed, my observation is that, in many cases, the gross value (before costs are deducted) of environmental economics information decreases with increases in depth and sophistication beyond a certain point. For many of these decision makers, a level of depth and sophistication that most environmental economists consider low would be far too high. In part this may be viewed as a problem of transaction costs (Pannell et al., 2013a) – it would take the decision makers a long time to develop a sufficient understanding of the information, its implications and how to use it, and they judge that the costs of devoting this time would outweigh the benefits.

Given these observations, there are likely to be benefits from increasing the production of information that is simple, easy to understand and whose use is obvious, relative to the more complex information that is typically produced by environmental economists. One might also expect that the cost of producing simpler information would be lower, further enhancing value for money, but it is not necessarily so. I have found that providing information to environmental managers that is simple enough to be usable without overly compromising the rigour of the analysis is a difficult challenge, requiring experimentation, creativity and communication with intended users.

Recognising the needs and limitations of users

This section expands on the observation that environmental managers and policy makers have limitations in their capacity to make productive use of environmental economics information. In a study of regional environmental management bodies in Australia, Seymour et al. (2008) found that most had no expertise in economics. More generally, in government environmental agencies, most people in positions of influence are not economists, and some hold negative attitudes towards economics.

This has implications for who economists who aspire to have a positive influence in these organisations. I have been part of a team that responded to these observations by developing the Investment Framework for Environmental Resources (INFFER) (Pannell et al., 2012, 2013a, 2013b), a package of tools including a simplified Benefit: Cost Analysis, the Public: Private Benefits Framework for selecting policy mechanisms (outlined earlier), and systems for checking the logical consistency of projects. To encourage uptake and effective use of INFFER, we provide presentations to environmental agencies and organisation, deliver training programs, provide one-to-one support to users, and provide examples, documentation and help files at various levels of detail (see www.inffer.org, accessed 8 March 2013).

Even with this substantial effort, achieving uptake and high-quality use of the tools remains difficult. There are various reasons for this, including that the current cultures of the organisations and the mindsets of the individuals involved are often very far from the sort of structured, systematic, rigorous approach that we are advocating to deliver the best value for money. We have been able to observe changes in culture/mindset in a small number of cases, but it has been slow and, for some participants, difficult.

We have had to strike a difficult balance between meeting the existing perceived needs of environmental managers and policy makers, and trying to change their perceptions. On the one hand, potential users of information are more likely to use it if meets their existing perceived needs and fits existing decision processes. On the other hand, we found that people in environmental organisations were often satisfied with their existing decision processes despite there being (in our judgment) serious weaknesses in those processes.

Providing environmental economics information to managers and policy makers in a way that is influential also requires effective communication. In Pannell (2004) I provide insights into that issue derived from a survey of policy advisors and policy makers.

Conclusion

Insights from environmental economics have great potential to improve the value for money from public investments in protection and enhancement of the environment. In many programs, this potential is largely unmet.

A number of practices that could be adopted by environmental managers and policy makers to enhance value for money have been identified and discussed. A central point is that decisions should be based on the extent to which an investment will deliver environmental outcomes. In some programs, particularly agri-environmental programs, it is common for resources to be used to support adoption of practices that are thought to be beneficial for the environment, but with little or no consideration of the quantum of environmental benefits that will result. Potential environmental projects vary enormously in their value for money, even if they involve similar on-ground actions, because of spatial heterogeneity in values, threats, feasibility, and compliance. Dramatic improvements in value for money may be achieved by targeting resources to those projects that will make the biggest difference per dollar invested. This can be facilitated by an approach that starts by asking what environmental outcomes we would like to achieve and determines the best way to achieve those outcomes, rather than by identifying the set of possible actions and promoting them widely.

When investment options are being prioritised, it is crucial to consider a comprehensive set of information that determines benefits and costs, including: environmental condition in the absence of the investment; environmental condition in the presence of the investment; the value or significance of those differences in condition; project risks; adoption/compliance; time lags and a full set of costs, both short-term and long-term. It is equally important to combine this information in a theoretically sound metric for ranking investments – one that accurately reflects the value for money of the investment. While simple to do, this is very often not done, with highly adverse consequences for the environment.

Especially for large environmental investments, value for money can be improved by evaluating a range of possible projects addressing the same environmental assets, prior to funds being committed. Typically, a single project for a particular environmental asset of local problem is developed and evaluated. Whether this project corresponds to the scale, intensity or management strategy that provides the best value for money is largely a matter of luck, in the absence of analyses to compare different versions of the project.

In a comparable way, programs often adopt a particular policy mechanism and require all funded projects to employ that mechanism. Especially in the case of programs that aim to address environmental externalities, the category of policy mechanism should be project-specific, depending on the public and private net benefits that would be generated.

Beyond economic analysis, a number of aspects of the process and institutional design are important influences on value for money. These include the process used to review the accuracy of information provided in project proposals, monitoring investments in a way that promotes learning, acting on the learning that occurs, and designing programs such that they provide incentives for environmental managers to enhance the value for money from public funds that they spend. Program designers should endeavour to avoid creation of incentives that conflict with this aim.

Environmental economists can also adopt various practices to attempt to maximise the value for money from public resources spent on economic analysis. Some relate to the direct application of economic principles to decision making about environmental economics. For example, we can enhance value for money by avoiding over-investment in some aspects of environmental economics at the expense of others. Incentives created by the academic reward system make this difficult, but environmental agencies could assist by investing in types of data and analysis that are otherwise neglected.

Recognising that most environmental managers and policy makers are not economists, uptake and application of economic ideas could be enhanced by stronger efforts to provide information in a way that is simple and compelling, and by providing practical advice and support on ways to use the information. There is, of course, a difficult balance to be struck between simplifying economics approaches so that they are accessible and avoid excessive transaction costs, and retaining rigour and accuracy. Considering the usual practices of many environmental economists, my judgement is that it would be valuable for us to provide more information towards the simpler end of this spectrum.

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