Public benefits, private benefits, and the choice of policy tool for land-use change: Summary

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This article provides a simple framework for choosing environmental policy instruments, in the context of environmental managers wishing to influence the management of private lands to generate benefits for conservation of the environment or natural resources. The framework is embedded within the SIF3 decision-tree framework and INFFER. It is based on levels of public and private net benefits of changing land management, and a set of simple rules. It provides a powerful tool for targeting environmental investments to high-payoff projects, and for selecting policy mechanisms that are most likely to be cost effective.

Many government programs around the world have been created to attempt to encourage changes in land management on privately owned lands, in order to enhance environmental conservation or natural resource management. These programs use a range of mechanisms to encourage change, including education, awareness raising, technology transfer, research and development, regulation, subsidies and other economic instruments. In practice, the choice among these possible policy mechanisms is often not very sophisticated. Programs tend to rely primarily on a small number of mechanisms, sometimes as few as one.

In this paper I present a simple framework to guide the choice between policy mechanisms, based on the levels of public and private net benefits that are likely to result from the land-use change. The policy mechanisms are in five categories: (a) positive incentives (financial or regulatory instruments to encourage change) (b) negative incentives (financial or regulatory instruments to inhibit change), (c) extension (technology transfer, education, communication, demonstrations, support for community network), (d) technology change (development of improved land management options, such as through strategic R&D, participatory R&D with landholders, provision of infrastructure to support a new management option.), and (e) no action.

The choice among these tools depends on the levels of public net benefits and private net benefits from the land-use changes being proposed. 'Private net benefits' refer to benefits minus costs accruing to the private land manager as a result of the proposed changes in land management. 'Public net benefits' means benefits minus costs accruing to everyone other than the private land manager. Defining them in these ways is helpful because the private net benefit dimension provides insight into the behaviour of the landholder, while the public net benefit dimension relates to the effects on everyone else that flow from the landholder's behaviour.

The starting point for the framework is the recognition that environmental managers can invest in a range of projects involving changes in land management or land use on private land, and that the available options vary widely in the levels of public and private net benefits they generate, potentially including negative net benefits.

The aim is to identify which policy mechanisms are likely to be suitable for each potential project. To select policy mechanisms, the following set of rules is proposed, leading to Figure 1.

1. Do not use positive incentives for land-use change unless public net benefits of change are positive.
2. Do not use positive incentives if landholders would adopt land-use changes without those incentives.
3. Do not use positive incentives if private net costs outweigh public net benefits.
4. Do not use extension unless the change being advocated would generate positive private net benefits. In other words, the practice should be sufficiently attractive to landholders for it to be 'adoptable' once the extension program ceases.
5. Do not use extension where a change would generate negative net public benefits. (Rules 4 and 5 are referring to cases where extension is used as the main tool to achieve land-use change. Extension could also be used to support any of the other policy mechanisms, playing a supporting role, rather than being the main tool.)
6. If private net benefits are negative (but not too negative), consider technology development to create improved (environmentally beneficial) land management options that can be made adoptable (with or without positive incentives).

7. If private net benefits outweigh public net costs, the land-use changes could be accepted if they occur, implying no action, or they could be penalised at an appropriate level, but not prohibited.
8. If public net costs outweigh private net benefits, use negative incentives.
9. If public net benefits and private net benefits are both negative, no action is necessary. Adverse practices are unlikely to be adopted.
10. In all cases, the suggested action needs to be weighed up against a strategy of no action.

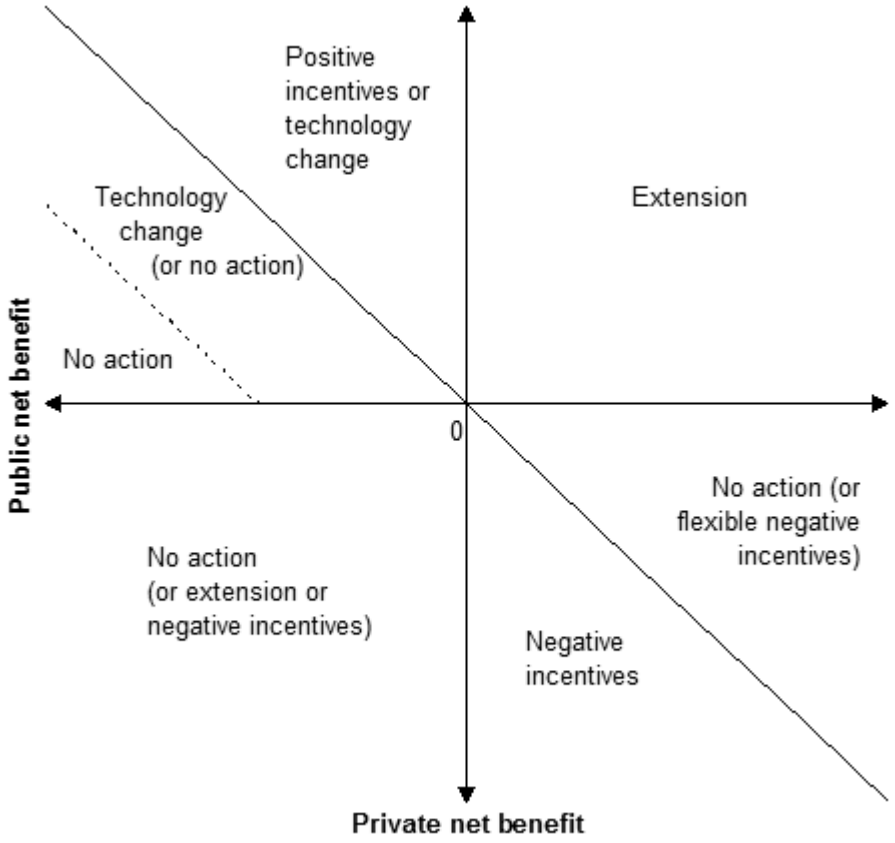

Figure 1. Recommended efficient policy mechanisms based on a simple set of rules.

Now, for any given project, you estimate the levels of public net benefits and private net benefits from the project, relative to current practice (which is represented by the zero-zero point in the centre), and plot the result on the graph. Depending on the location of the project on the graph, the appropriate policy response is indicated.

This is quite a simple framework, but it is a good start. It significantly narrows down the range of policy tools that environmental managers should be considering depending on public and private net benefits in a particular situation. We can make it more sophisticated in various ways, including by allowing for time lags until adoption, learning costs involved in land-use change, the fact that extension reduces but does not eliminate lags to adoption, the transaction costs of extension, and through requiring higher levels of selectivity (a higher benefit:cost ratio) than just covering costs. Figure 2 allows for these complexities, and requires a benefit:cost ratio of at least 2.0.

In broad terms, the framework indicates the use of:

- positive incentives if the public net benefits of land-use change are high, and the private net benefits are not too negative;
- extension if the public net benefits of land-use change are high, and the private net benefits are moderate;
- no action if private net benefits are positive and public net benefits are not sufficiently high;
- no action if private net benefits are greater than public net costs;
- negative incentives if private net benefits are less than public net costs;
- no action if public net benefits and private net benefits are both negative;
- technology development if private net benefits are low-to-moderately negative and public net benefits are

positive.

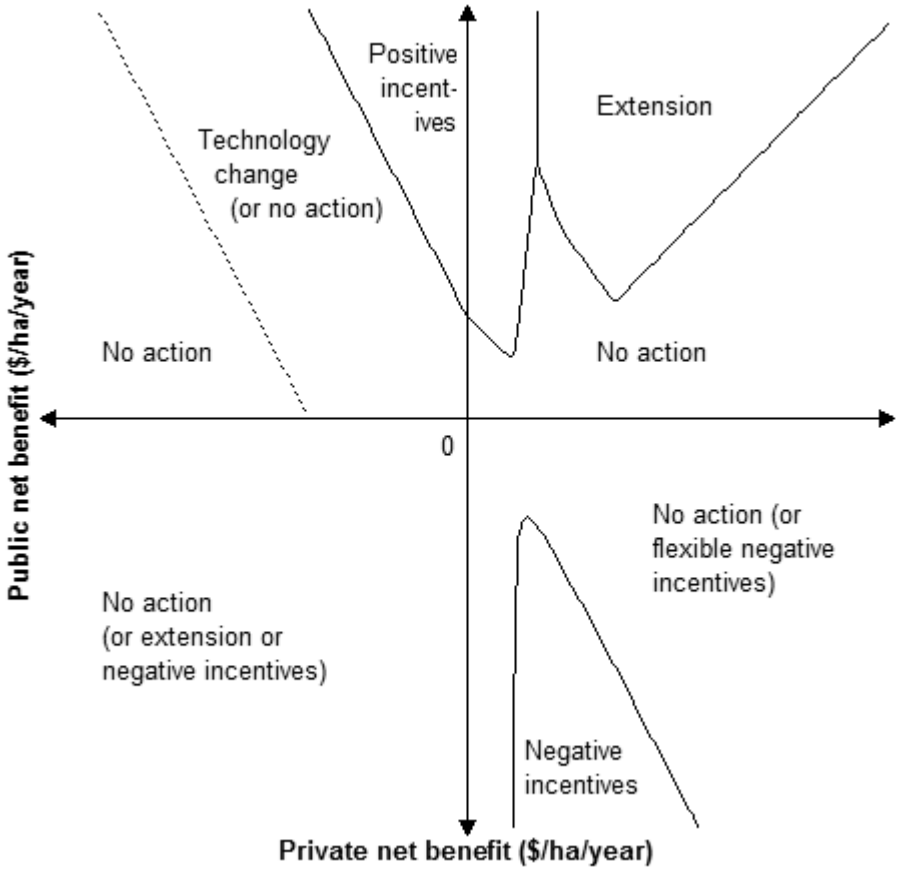

Figure 2. Efficient policy mechanisms for encouraging land use on private land, refined according to account for lags to adoption, learning costs, the fact that extension reduces but does not eliminate lags to adoption, the transaction costs of extension, and assuming that managers require BCR > 2. A much smaller number of projects would qualify for incentives or extension in this more targeted approach, relative to Figure 1.

The framework highlights the importance of targeting funds in environmental programs to selected areas, based on the levels of public and private net benefits. Currently, environmental managers do pay some attention to the level of public benefits when selecting their investments, but in my experience few pay adequate attention to the level of private net benefits, which, perhaps surprisingly, turns out to be even more important as a driver of policy decisions.

It is worth noting that the rules underlying the framework are based on an objective of efficiency (biggest environmental benefit per dollar spent). In practice, governments often also pursue other objectives, ranging from perceived equity to raw political motives. I hope that by improving the understanding of what an efficient policy would look like, this framework can make it easier for that objective to be pursued.

Citation: Pannell, D.J. (2008). Public benefits, private benefits, and policy intervention for land-use change for environmental benefits, *Land Economics* 84(2): 225-240.

Latest version of full paper: Use this as the standard version of the basic framework. It is basically the same as the original journal article, but has been updated a bit in relation to technology change. Pannell, D.J. (2008). Public: private benefits framework version 3, INFFER Working Paper 0805, University of Western Australia. Full paper (140K)

Public: private benefits framework web page.

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