



## Market-Based Instruments for Ecological Goods and Services

Learning From the Australian Experience

Geneva Rae  
Policy Analyst

August 2007



[www.cwf.ca](http://www.cwf.ca)

© 2007 Canada West Foundation  
ISBN 1-897423-04-2

This report is part of the Canada West Foundation's Land Stewardship Initiative—a two-year research and communications endeavour focused on the role of public policy in facilitating land stewardship in western Canada. Land stewardship is the practice of responsible land use to ensure that natural capital is maintained or enhanced for future generations. Land stewardship policies are actions taken by governments that require, enable or encourage land users to manage land in ways that maintain or enhance natural capital for future generations.

Funding for the Land Stewardship Initiative has been provided by the Agriculture and Food Council of Alberta and the Investment Agriculture Foundation of British Columbia under Agriculture and Agri-Food Canada's Advancing Canadian Agriculture and Agri-Food (ACAAF) program, Alberta-Pacific Forest Industries Inc., Alberta Sustainable Resource Development, AltaLink, the Arthur J.E. Child Foundation, Ducks Unlimited Canada, EnCana Corporation, Shell Canada Limited, Suncor Energy Foundation, and Westcorp Inc. The Canada West Foundation expresses its sincere appreciation for this generous support.

The Ecological Goods and Services for Agriculture Workshop organized by Alberta Agriculture and Food and Alberta Environment was held in Calgary on May 9 and 10, 2007 and provides the basis for much of this report.

This paper was prepared by Canada West Foundation Policy Analyst Geneva Rae. The opinions expressed in this document are those of the author and are not necessarily those of the Canada West Foundation's Board of Directors, advisors, or funders. Permission to use or reproduce this report is granted for personal or classroom use without fee and without formal request provided that it is properly cited. Copies may not be made or distributed for profit or commercial advantage. This report is available for download from the Canada West Foundation website ([www.cwf.ca](http://www.cwf.ca)) at no charge.

## 1. Introduction

In May 2007, Alberta Agriculture and Food, Alberta Environment, and the Canada West Foundation hosted the Ecological Goods and Services for Agriculture Workshop. The workshop brought together stakeholders and public servants to discuss market-based instruments as a means of improving environmental outcomes on agricultural land.

The workshop featured Gary Stoneham, Chief Economist of the State Government of Victoria's Department of Sustainability and Environment. Mr. Stoneham provided detailed information about the use of market-based instruments in Australia.

Drawing on the discussion at the workshop, this report explores the use of market-based instruments to encourage the production of ecological goods and services on agricultural land.

## 2. Ecological Goods and Services

The environment provides natural resources such as wood and crude oil that can be bought and sold in the marketplace. The environment also produces ecological goods and services (EGS) such as purification of air and water and soil generation and renewal that are harder to put a price tag on and manage using market mechanisms. As a result, markets have not been effective at ensuring the provision of ecological goods and services and environmental assets are systematically depreciating in quantity and condition (MA 2005).

## 3. Market-Based Instruments

One way to overcome the failure of markets to adequately account for the value of ecological goods and services is to use public policy to either alter existing market signals or create new ones. According to Australia's National Market-Based Instruments Pilot Programme website, "Market-based instruments (MBIs) are a promising new addition to the existing suite of natural resource management tools. They use trading mechanisms, auctions and price signals to positively influence the behaviour of people managing natural resources and environmental assets. MBIs work by altering market prices; setting a cap or altering quantities of a particular good; improving the way a market works; or creating a market where no market currently exists" ([www.napswq.gov.au/mbi](http://www.napswq.gov.au/mbi)).

When combined with traditional regulatory frameworks, market-based instruments have the potential to achieve positive environmental outcomes at the least cost to the public purse (Bardsley, Chaudhri and Stoneham 2003; Chaudhri 2003; Whitten and Young 2003).

Market-based instruments provide either incentives to produce desired environmental benefits or impose costs on deleterious actions. While not an all-encompassing solution to every environmental issue, MBIs are likely to be effective in encouraging behavioural change (Drummond, Caranci and Tulk 2007).

While market-based instruments are gaining popularity, economic valuation of ecological goods and services is fraught with challenges. How much is clean water worth? How do you define biologically significant habitat? As a result, it is difficult to attach appropriate prices to ecological goods and services and this will remain a key challenge for policy-makers as they seek to take advantage of MBIs. In addition, the public's willingness to pay for ecological goods and services may be weak. There are some difficult trade-offs to be made if the true value of ecological goods and services is to be recognized and linked to MBIs.

#### **4. Market-Based Instruments in Canada**

There are a number of current federal and provincial initiatives intended to increase the supply of ecological goods and services on agricultural land. For example, within the federal Agricultural Policy Framework, the National Farm Stewardship Program provides \$260 million to improve the environmental performance of farm operations.

Another initiative, Agriculture and Agri-Food Canada's Greencover Canada Program, provides \$110 million to assist agricultural producers with grassland-management, protect water quality, reduce greenhouse-gas emissions, and enhance biodiversity and wildlife habitat.

Despite these and other initiatives, the use of market-based instruments to encourage the production of ecological goods and services on agricultural land in Canada is limited and the 2004 OECD environmental performance review noted that Canada could improve its environmental performance by adopting more economic instruments (OECD 2004).

#### **5. Lessons from Australia: Auctioning Conservation**

Private landholders are stewards of a number of resources that provide environmental benefits such as habitat, carbon sequestration and soil stability. However, because land use and resource decisions are primarily driven by economic factors, this needs to be acknowledged and utilized. Hence the appeal of MBIs.

In Australia, auctions have been used to purchase environmental goods from private landowners. Under this system, landowners bid to supply a pre-determined environmental outcome. The tenders are then ranked according to which is the most competitive (i.e., achieves the desired results at the least cost). This process allocates limited resources for the best outcomes at the least cost to the taxpayer.

##### *BushTender: An Australian Native Vegetation Conservation Policy*

BushTender is a voluntary price-based market instrument used to encourage the protection and appropriate management of native vegetation on private land through an auction format.

In the initial stages of tender development, field ecologists work with landowners to provide a preliminary condition assessment of the ecological value or conservation significance of a landowner's natural assets. Attributes are measured in habitat hectares determined by a visual assessment (e.g., number of large old trees, under-storey diversity, size and connectivity to other natural area). A habitat score (determined on a scale from 0 to 1, with 1 being close to pre-European condition) is assigned. For example, relatively untouched land may have a habitat score of 0.9, while heavily developed land or land under cultivation may have a habitat score of 0.2. This visual assessment provides an approximate environmental value.

Next, models are created to determine the effects of land use changes to hydrology, stream flow, carbon capacity and biodiversity. Working with the field ecologists, the landowner decides what management practices are required to improve the landscape and the approximate cost of implementation. The landowner is also provided with the cost distribution of the site in comparison to other tenders. The landowner then asks himself: "How much do I need to be paid to change my land use? What will other landowners charge?" The landowner then creates a tender for submission.

Landowners can choose short-term, medium-term or long-term contracts with the government. A recent survey of BushTender participants demonstrated that, regardless of contract length, many landowners were continuing their conservation practices well beyond the contractual obligations because of demonstrable and financially attractive results. More than 97% of contracts in the program were in complete compliance because landowners can see the resulting physical improvements to their landscapes.

BushTender's opportunities and issues, as identified by Gary Stoneham, are presented in Figure 1.

**Figure 1: Lessons From the Australian Conservation Auction Policy Experience**

**Opportunities**

Flexible for landowners

Easy to adapt to local circumstances

Effective use of public expenditures

Promising in areas of resource conflict

Promising where there are substantial variations in compliance costs and where there are a relatively high number of bidders

Effective when actions and outcomes are homogeneous

More attractive to landowners than regulation

Provides a means to value for public goods in land use decisions

Bidders reveal the true cost of compliance

**Issues**

Time consuming to design and implement

Environmental improvements are difficult to evaluate

More complex than traditional regulatory approaches

Market failure potential due to inadequate information

Potential of market dominance by a few players

Administrative intensity (e.g., contract development, monitoring and assessment of outcomes requirements, public consultation)

Inappropriate design can exacerbate environmental issues

Must ensure that the process is transparent and fair; build trust in the process

## 6. Moving Forward with Market-Based Instruments in Canada

The design process and instrument development for market-based approaches will be unique to each issue, political context, and level of public support; however, Gary Stoneham proposes the following generic guidelines for consideration when applying market-based instruments:

- *Diagnose the problem*: be clear about what issue is going to be addressed.
- *Identify expected outcomes*: the outcome will influence the choice of instrument and must be clearly communicated to landowners.
- *Test, test, test*: pilot projects are an excellent way to implement, evaluate, refine and improve upon a new tool.
- *Design the metrics*: create methods to solve information gaps and provide a standard metric for ecosystem goods and services.
- *Science, not noise*: use credible research and science to inform the design and outcomes. Conduct research as necessary.
- *Strategically deal with insufficient evidence*: if we do not know, this is not a barrier to proceed. Acknowledge gaps and move forward regardless.

Stoneham suggests that governments will need to take an active role in supporting and facilitating pilot projects and their integration within existing environmental and economic policies. Future steps for governments include:

- creating a common understanding among stakeholders as to why ecological goods and services are important;
- working with stakeholders to collaboratively identify environmental objectives;
- facilitating transactions among buyers and sellers;
- using incentives to catalyze awareness and collaboration among the private, public and nonprofit sectors; and
- testing tools for assessment and monitoring of environmental performance.

## **7. Conclusion**

Market-based instruments can offer flexible environmental improvement at the least cost, and encourage behavioural change through positive incentives rather than negative penalties. They offer an upstream approach used to discourage environmentally deleterious activities and can improve the allocation of public resources. Barriers to their effective implementation include a lack of public awareness and the challenges associated with attaching prices to ecological goods and services. However, as evidence from Australia demonstrates, well-designed market-based instruments can improve the portfolio of policy options available in western Canada for environmental protection and natural resource management.

Canada is behind the international curve in the area of market-based instruments for land stewardship and Canadian governments should launch pilot projects to test MBIs in the Canadian context.

## Resources

Australian Government. 2004. "Managing Our Natural Resources: Can Markets Help?" [www.nrm.au](http://www.nrm.au)

Bardsley Peter, Vivek Chaudhri and Gary Stoneham. 2003. "New Directions in Environmental Policy." *Proceedings of the 4th Annual AARES National Symposium*. [www.rirdc.gov.au](http://www.rirdc.gov.au)

Chaudhri, Vivek. 2003. *Market-Like Policy Options*. State of Victoria, Department of Sustainability and Environment, Australia. [www.dse.vic.gov.au](http://www.dse.vic.gov.au).

Costanza et al. 1997. "The Value of the World's Ecosystem Services and Natural Capital." *Nature* Vol. 371.

Daly, Herman and Joshua Farley. 2004. *Ecological Economics: Principles and Applications*.

Drummond, Don, Beata Caranci and David Tulk. 2007. "Market-Based Solutions to Protect the Environment." *TD Economics: Special Report*. [www.td.com](http://www.td.com)

MA (Millennium Ecosystem Assessment). 2005. *Ecosystems and Human Well-Being – A Framework for Assessment*.

OECD (Organization for Economic Cooperation and Development). 2004. *OECD Environmental Performance Reviews: Canada*. [www.oecd.org](http://www.oecd.org).

Stoneham, Gary, Vivek Chaudhri, Arthur Ha and Loris Strappazon. 2002. *Auctions for Conservation Contracts: An Empirical Examination of Victoria's BushTender Trial*. Department of Natural Resources and Environment and Melbourne School of Business.

Whitten, Stuart and Mike Young. 2003. "Market-Based Tools for Environmental Management: Where Do They Fit and Where To Next?" *Proceedings of the 4th Annual AARES National Symposium*. [www.rirdc.gov.au](http://www.rirdc.gov.au)



## About the Canada West Foundation

### Our Vision

A dynamic and prosperous West in a strong Canada.

### Our Mission

A leading source of strategic insight, conducting and communicating non-partisan economic and public policy research of importance to the four western provinces, the territories, and all Canadians.

Canada West Foundation is a registered Canadian charitable organization incorporated under federal charter (#11882 8698 RR 0001).

In 1970, the One Prairie Province Conference was held in Lethbridge, Alberta. Sponsored by the University of Lethbridge and the Lethbridge Herald, the conference received considerable attention from concerned citizens and community leaders. The consensus at the time was that research on the West (including BC and the Canadian North) should be expanded by a new organization. To fill this need, the Canada West Foundation was created under letters patent on December 31, 1970. Since that time, the Canada West Foundation has established itself as one of Canada's premier research institutes. Non-partisan, accessible research and active citizen engagement are hallmarks of the Foundation's past, present and future endeavours. These efforts are rooted in the belief that a strong West makes for a strong Canada.

More information can be found at [www.cwf.ca](http://www.cwf.ca).



---

Head Office:  
#900, 1202 Centre Street SE  
Calgary, Alberta, Canada T2G 5A5  
Telephone: 403.264.9535

BC Office:  
#810, 1050 West Pender Street  
Vancouver, BC V6E 3S7  
Telephone: 604.646.4625

[www.cwf.ca](http://www.cwf.ca)