

Generating income from ecosystem services: It's a brave new world for landholders around the world

Opportunities for landholders in the Northern Gulf region?

DISCUSSION PAPER

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Context

This paper has been prepared for the community of the Northern Gulf region in Queensland and other stakeholders concerned with the state of the natural environment and natural resource management.

Its intention is to inform discussion of the concepts of ecosystem services, land stewardship and related matters, and to enable reflection of the relevance and applicability of these concepts in the context of the Northern Gulf region.

Such a discussion is timely as Australia is increasingly open to the notion of providing payments to landholders for the provision of environmental outcomes or ecosystem services. Natural resource management programmes under the next phase of the Natural Heritage Trust (NHT3) will specifically include stewardship arrangement and market-based instruments as investment avenues (Natural Resource Management Ministerial Council, 2006).

However, markets for ecosystem services are also opening up in the private domain, with greenhouse producing industries increasingly keen to off-set their emissions through purchasing carbon sequestration services from landholders.

In-principle approval has been provided to explore—and implement—economic opportunities for landholders from the delivery of ecosystem services in the Northern Gulf region. This document provides foundations for a more in-depth discussion to help shape the parameters of such a research project.

The document provides a description of the concept of 'payments for ecosystem services' and lists a series of examples, from around the world, to illustrate how it has been implemented.

The document provides key definitions and descriptions of relevant terminology—it is critical that a discussion is underpinned by a common understanding of relevant terms and concepts.

Introduction

Paying landholders for producing environmental goods and services other than agricultural commodities is not a new concept—and there are many names for it.

The generic term for such transactions is payments for environmental services (PES). However, different countries have adopted different policy labels, including stewardship payments (Australia), green payments (USA), or agri-environmental schemes (Europe).

Examples of how ecosystem services generate income for landholders

There are four areas in particular, where PES have been prevalent: in the areas of water quality protection, biodiversity conservation, landscape protection/countryside management and carbon sequestration.

The following examples illustrate various schemes where landholders derive income from providing ecosystem services.

Water Quality

USA: New York City Council has been paying farmers in their drinking water supply catchment since 1997 to ensure potable water quality for the city's population—thus eliminating the requirement for a multi-billion-dollar water treatment facility to be built. New York entered into a partnership (the New York City Watershed Agreement) to carry out a locally developed and administered series of voluntary programs which promote and support environmentally-protective farming practices. These programs include acquisition of land and easements, implementation of new regulations affecting activities in the watershed, and more than two dozen watershed protection and partnership programs.
(<http://www.nysefc.org/home/index.asp?page=19>)

Ecuador, Colombia: Landowners are being paid under the 'Making Nature Count' program to protect cloud forest and high-altitude alpine grasslands to secure their functioning in producing plentiful amounts of good quality water for users downstream.

(http://www.cifor.cgiar.org/pes/_ref/projects/ecuador.htm)

Nature conservation and restoration

NSW: Little Broadwater (Clarence River): Wetland Rehabilitation restored natural tidal flow to approximately 100 ha of former fish habitat by opening floodgates to a former estuarine wetland known as Little Broadwater Swamp. Affected landholders receive stewardship payments to cease grazing and to garner support for the reintroduction of tidal flow onto the wetland. Administered by Wetland Care Australia.
(http://www.clarence.nsw.gov.au/content/uploads/Little_Broadwater_brochure.pdf)

USA: Farmers in Jamestown, Rhode Island, are being paid by local residents to delay haying their fields until after birds have completed nesting. The program is specifically directed at protecting the habitat for bobolinks, a grassland-nesting bird.
(<http://www.sciencedaily.com/releases/2007/06/070627113826.htm>)

Victoria: Landholders across the Wimmera and south-west Victoria are helping save the red tailed black cockatoo—they are paid to help regenerate the birds' natural habitat. The bird is threatened with extinction because of a loss of woodlands, and it is estimated only 1,000 of the cockatoos are left.

Countryside management

Switzerland: Farmers receive direct payments for maintaining the traditional features and mosaics of the agricultural landscape—which are desired by the Swiss population and international tourists—using traditional (ecological) production methods, such as high-country grazing during summer months.
(<http://www.blw.admin.ch/themen/00006/index.html?lang=de>)

England: Countryside Stewardship is the UK government's main scheme for the wider countryside, aiming, through the payment of grants, to improve the natural beauty and diversity of the countryside, enhance, restore and re-create targeted landscapes, their wildlife habitats and historical features, and to improve opportunities for public access.
(<http://www.defra.gov.uk/erdp/schemes/css/default.htm#2>)

Sequestering Carbon

Australia: The Landcare CarbonSMART project provides a broker for the sequestration of carbon, whereby farmers and landholders can earn money by planting and maintaining vegetation for biodiversity—over a 30-year period. Individuals and businesses can buy carbon credits from CarbonSMART.

(<http://www.carbonsmart.com.au/Default.aspx>)

Australia: An initiative has commenced on the Arnhem Land plateau, where traditional owners and scientists have developed new fire management approaches. These have generated significant private enterprise investment in fire management for greenhouse gas emission abatement. The project won a 2007 Eureka award.

http://savanna.ntu.edu.au/news/topical_savannas109.html

Combined or bundled products

Australia: The Liverpool Plains Land Management Committee is trialling an incentives scheme, which funds land management actions on the basis of combined environmental benefits across the domains of water quality, soil salinity and biodiversity. <http://www.environment.gov.au/biodiversity/publications/incentives-forum/pubs/day2/david-walker.pdf>

Australia: Far North Queensland NRM, trading as 'Terrain', has commenced one of Australia's first regional carbon pooling initiatives by "brokering far north Queensland biocarbon", which combines biodiversity outcomes with carbon sequestration.

<http://www.terrain.org.au/media-releases/carbon-to-cash-conversion.html>

Principles of payments for ecosystem services

Wunder (2005) defines PES as a voluntary transaction where a well-defined environmental service is being 'bought' by at least one buyer from at least one provider if—and only if—the provider indeed provides the environmental service.

The five underlying principles thus include:

1. PES are based on a voluntary, negotiated contract between suppliers of environmental services (landholders) and a buyer. Landholders are not compelled to engage in contractual arrangements. Rather, they have a choice to provide the environmental service or not to provide it. In Victoria, many landholders—though not all—would be attracted to PES (Cocklin et al., 2003).
2. The environmental service that is being exchanged in the transaction must be well-defined. If it is not directly measurable—as is the case with most environmental outcomes—surrogate measures are required that are directly linked to the provision of the service. For example, biodiversity may not be directly measurable but scrub diversity and density can be quantified.
3. To have a market, there needs to be at least one buyer. The buyer can be a government—on behalf of a community or society—or a private entity or non-government organisation. There are often brokers or intermediaries involved in functioning environmental services markets.
4. To have a market, there also needs to be at least one supplier/provider. In most cases, there will be many providers to effect a desired environmental outcome.
5. To ensure the effectiveness of the scheme, payments are made conditional on the supplier meeting the service delivery specifications.

Importantly, the notion of PES recognises that the delivery of ecosystem services tends to generate opportunity costs for farmers where providing improved environmental outcomes conflicts with production goals.

What are ecosystem services?

Environmental stewardship is about sustaining ecosystem function. An ecosystem is a natural unit consisting of all plants, animals and micro organisms in an area functioning together with all the non living physical factors of the environment. The conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfil human life.

Ecosystems perform processes, which support natural cycles (eg water, carbon, oxygen, and nitrogen) and energy flows so that they continue to provide an environment that supports life, including human life.

Ecosystem services are “the conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfil human life” (Daly, 1997).

The principal categories of ecosystem services encompass (De Groot et al., 2002):

- inputs to production
- regeneration of ecosystems
- stabilisation of soils, climates, weather
- protection of people from the sun's harmful ultraviolet rays
- assimilation of wastes
- amenity
- options for the future

These categories can be broken down into a diversity of individual services, *inter alia*, (expanded from: ESA, 2000):

- moderate weather extremes and their impacts
- disperse seeds
- mitigate drought and floods
- protect people from the sun's harmful ultraviolet rays
- cycle and move nutrients
- protect stream and river channels and coastal shores from erosion
- detoxify and decompose wastes
- control agricultural pests
- maintain biodiversity
- generate and preserve soils and renew their fertility
- contribute to climate stability
- purify the air and water
- regulate disease carrying organisms
- pollinate crops and natural vegetation
- enable recreational activities

Natural capital—another helpful concept

The ability of ecosystems to provide ecosystem services—but also goods such as water, food, fibre and timber—can be conceptualised as natural capital.

Natural capital thus encapsulates the life-supporting capacity of ecosystems—and ecosystem services constitute the ‘steady flow of interest’ which humanity derives from natural capital (Ehrlich and Ehrlich, 2004). Many human activities disrupt, impair, re-engineer or destroy ecosystems, including (ESA, 2000):

- runoff of pesticides, fertilizers, and animal wastes
- pollution of land, water, and air resources
- introduction of non-native species
- over-harvesting of fisheries
- destruction of wetlands
- erosion of soils
- deforestation
- urban sprawl

Ehrlich and Ehrlich (2004:p.44) warn that “losses and depletion of natural capital [...] are ubiquitous and largely ignored”. There are many reasons why people degrade ecosystems or let degradation happen, including ignorance of benefits and market failure. Market failure describes the condition where the allocation of goods and services by a market is not efficient.

There are different reasons for market failure, the most important in this context being the presence of externalities. Externalities are side effects—benefits or costs, which result from the production process or an economic transaction but are borne or received by parties not directly involved in the production or transaction. This means that markets do not reflect the full benefits and costs of production. In the case of environmental degradation, damage to natural capital is not treated as a cost. In the case of environmental regeneration, the value to natural capital is not treated as a benefit.

In the past, much emphasis has been on negative externalities, i.e. the unpriced costs associated with environmental degradation. The notion of ecosystem services, however, provides a conceptual opportunity to view positive externalities, i.e. the currently unpriced benefits associated with

environmental stewardship. Increasing demand for environmental services can generate opportunities for such benefits to be valued and remunerated—through markets—private as well as government-induced.

Environmental/land stewardship

The delivery of ecosystem services goes beyond the notion environmental stewardship. "Stewardship is the responsible use (including conservation) of natural resources in a way that takes full and balanced account of the interests of society, future generations, and other species, as well as of private needs, and accepts significant answerability to society" (Worrell & Appelby 2000:p.263)

The Canadian Land Stewardship Resource Centre provides four principles that define land stewardship:

- (1) Caring for the system as a whole—understanding the fundamental roles and values of natural systems, building up biological fertility in the soil, incorporating an understanding of the ecological cycles on the landscape (water, energy, nutrients) and how land-use practices can either benefit, be in harmony, or have a negative impact on these cycles, other landusers, flora and fauna.
- (2) Resource conservation—maximizing efficiency and striving to reduce the one-time consumption of renewable and non-renewable resources; aiming for long-term optimization versus short-term maximization of production.
- (3) Maintaining, building and enhancing stability in Nature—maintain and encourage natural biological diversity and complexity; maintaining natural areas and functions on the land (a.k.a. wildlife habitat conservation).
- (4) Cultural values and ethics—caring for the health of the land for future generations and long-term economic stability; the link between civilization, urbanization, and the land-base and ecosystems that are vital to survival; the intrinsic value and right to exist of all life on Earth.

Stewardship is an ethic—however, what constitutes stewardship is open to interpretation and increasingly minimum standards of stewardship are being defined by governments as environmental duty of care.

Environmental duty of care represents the responsibility that landholders, amongst others, have towards the natural resources and ecosystems—in return for the privilege to utilise the natural capital in the agricultural production process. It is a concept that is borne out of the philosophy of ecologically sustainable development. Increasingly, it is formalised in common and statutory law.

Payments for ecosystem services typically recognise conservation, regeneration, recycling and restoration activities by landholders, which go beyond their duty of care.

Relevance to the Northern Gulf region

The increasing scarcity of wilderness, natural habitats, biodiversity and other aspects of natural capital drives a surge in the worth of these goods. The incidence of PES schemes bears evidence of this. Programs started to emerge in the later 1980s in Europe, and have spread globally from there. In Australia, environmental payment schemes are most prevalent in Victoria, the state with arguably the highest scarcity of remaining original habitats and indigenous biodiversity.

The need for relative scarcity poses a challenge for the Northern Gulf region, where natural capital is abundant. Wunder (2005: p.5) warns that not everybody who provides an environmental service can expect payment "since services that are neither highly valuable and/or not threatened are unlikely to find buyers."

However, in the abundance also lies a market chance in that buyers aiming to protect existing but threatened services may need to anticipate emerging threats and future rises in opportunity costs. If they delay purchasing services until after changes have occurred, stocks of natural capital will be low and ecosystem services scarce, and services may already have been (irreversibly) lost (Wunder 2005).

The Northern Gulf may also possess attributes that position it uniquely in the provision of certain environmental services. Bio-security may be but one such niche.

Across the Australian rangelands, including the tropical savannas, a transition has been happening from production objectives to what Holmes (2002) calls 'post-productivist' landscapes. Payments for ecosystem services form part of the income mix that sustains such 'multifunctional' landscapes.

The challenge for regions such as the Northern Gulf is to recognise the environmental services they provide and be proactive in harnessing associated market and income opportunities.

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