Debt-for-conservation swaps – a possible financial incentive for on-farm biodiversity conservation?

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Paper presented at the 50th Annual Conference of the
Australian Agricultural and Resource Economics Society
Sydney 7-10 February 2006

Abstract

Debt-for-nature swaps have been successfully applied in an international context to achieve nature conservation objectives in developing countries. The swap involves alleviating a country's external debt burden in exchange for that country investing the equivalent amount of resources into specified nature conservation programs or activities. This paper explores to what extent the concept might be applicable and relevant in a domestic setting – by alleviating farm debt in return for on-farm conservation activities. The case for relevance of the instrument is argued on the basis of empirical data from a grazing region in northern Australia. Stakeholders and participants are identified for debt-for-conservation swaps and details for instrument design discussed. Preliminary results from a grazier survey and lessons from a similar incentive in the USA support a critique of the incentive instrument against a range of policy criteria.

Keywords

Financial incentives, biodiversity conservation, farm debt, debt-for-nature swaps, on-farm conservation, policy design; policy assessment

1. Introduction

Biodiversity is the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems (Convention on Biological Diversity, 1992). Biodiversity generates a suite of use and non-use values for humanity, both private and public (eg. Mountford and Keppler, 1999; Rolfe, 2002).

In Australia, federal and state government rely heavily on on-farm conservation of biodiversity to meet international and domestic commitments for biodiversity protection (Sinden, 2004). The biodiversity of tropical savannas is particularly poorly represented in the national reserve system. The Burdekin Dry Tropics rangelands typify this situation, with key vegetation and habitat types considered to be inadequately represented in National Parks and other conservation areas (Roth et al, 2002). The Brigalow Belt bioregion takes in a large proportion of the Burdekin rangelands and has only approximately 2.2% reserved in protected areas (Sattler and Williams, 1999).

Yet there is growing demand for biodiversity conservation, as manifest in the various natural resource management plans across the tropical savannas, which all stipulate medium and long term targets for regional-scale biodiversity outcomes. The vast majority of land across the tropical savannas is being grazed for cattle production. It would therefore appear that graziers are – and need to be – major providers of biodiversity conservation in those landscapes.

There are a suite of policy types and incentive instruments available – conceptually and applied – to support on-farm biodiversity conservation. This paper investigates the potential efficacy of a 'new' conservation incentive. Debt-for-nature swaps have been successfully applied in an international context for two decades (Section 2). As part of the swap, a developing country is relieved of a specified amount of foreign debt in exchange for a specified commitment to and investment in nature conservation.

Debt is also a growing issue across the tropical savanna landscapes, where property prices and land values have risen sharply over recent years, which has been a major driver for increased farm debt (Section 3). The requirement to finance debt is a contributing factor for grazing intensification, which has detrimental biodiversity outcomes. This situation provides the backdrop for the question of whether or not debt-for-conservation swaps are a suitable incentive for on-farm biodiversity conservation.

The paper develops the concept of debt-for-conservation swaps in a domestic context, with specific focus on on-farm biodiversity conservation in Australia's tropical savannas (Section 4). It goes on assess the concept against a suite of policy criteria (Section 5), using preliminary data from a grazier survey in the Bowen-Broken-Bogie catchments within the Burdekin rangelands. The papers ends by drawing conclusions as to the instrument's efficacy.

2. Debt-for-conservation swaps

2.1. Concept and terminology

A debt-for-conservation swap is an economic incentive instrument intended to break the cycle of increasing debt and environmental degradation. The concept is based on the premise that countries or enterprises with high levels of debt are likely to exploit natural resources at above-long-term-optimal levels in order to meet short-term debt servicing obligations and remain solvent. Having identified debt as the cause of environmental degradation, the notion is to reduce debt and thereby enhance financial viability while at the same time securing environmental outcomes through contracts that stipulate swap conditions in terms of environmental actions.

The terminology concerning “debt-for-conservation swaps” is confusing in-so-far as the instrument is also commonly referred to as "debt-for-nature swaps” or “debt-for-environment swaps”. In the absence of a terminological delineation in the literature, the authors conceive all three as special category of debt swaps in that they explicitly pursue environmental goals in exchange for debt relief. [1] The above terms can be seen as nested, with debt-for-conservation swaps being the biodiversity-preservation focused sub-set of debt-for-nature swaps, which consider fauna, flora and landscape conservation more broadly. These, in turn, can be seen as a subset within debt-for-environment swaps, which concern themselves with the human surroundings more generally. The concept and methodology of debt-for-environment swaps has been developed in an international context.

2.2. International context and application of debt-for-nature swaps

Many developing countries have large international debts and debt servicing absorbs a significant to majority proportion of total budget expenditure. The large scale of debt contributes significantly to environmental degradation and the deterioration of the natural resource base, including deforestation and desertification (Mateo, 1993). Debt-for-nature swaps – as they are predominantly referred to in the international context – are a mechanism aimed at providing funds for natural conservation programs in developing countries while simultaneously reducing their international debt.

A debt-swap transaction normally involves a minimum of three parties – a debtor country, an investor and an international lender. The investor/donor, typically a conservation non-government organisation, purchases the debt from the international lender/creditor, typically a commercial bank or multilateral institution. The investor then negotiates with the debtor country to exchange the debt for a commitment by that country to use the equivalent amount of local currency for an agreed purpose (UNDP, 2003). In the case of debt-for-nature swaps the revenue is directed towards nature conservation programs or projects.

The incentive for the swap lies in the ability of the investor to purchase the debt at less than face value from the creditor and redeem it in the debtor country in local currency at face value – in exchange for the cancellation of the foreign debt (UNDP 2003). The ‘discount’ is a result of the creditor’s low expectations for repayment by the debtor country and/or desire to improve liquidity and/or desire to reduce credit exposure. The proceeds of the swap, the difference between purchase and redemption

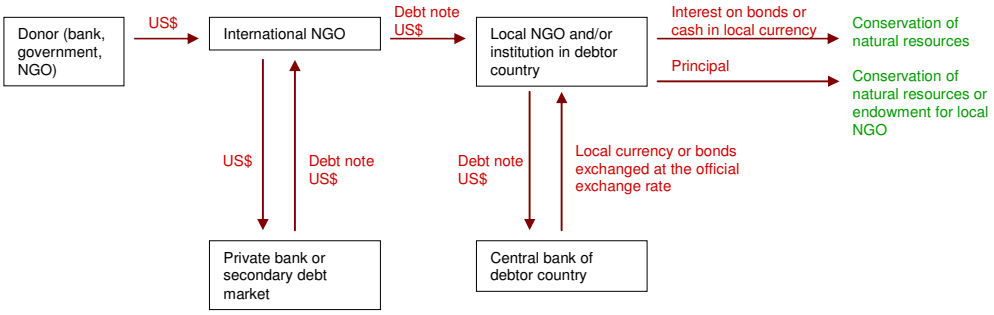
[1] “debt-for-development swap” is a similar swap concept but pursues different objectives

price, is invested in environmental programs or projects. The proceeds generated by a debt-for-nature swaps are often administered by local conservation or environmental trust funds (rather than government), which disburse grants to specific projects and ensure accountable, transparent and decentralized management (FAO 2005). Swap conditions tend to be complementary to existing policies and legislation to maximise compliance.

The principal mechanism of the swap is illustrated in Figure 1. However, its implementation varies on a case-by-case basis, depending on country, donor, lender and conservation objective.

Figure 1: Illustration of principal mechanism of a debt-for-nature swap

(Adapted from Philp, 1992)



Over the past two decades an estimated 30 countries have participated in debt-for-nature swaps and in excess of US$ 1 billion in funding for the environment have been generated (UNDP 2003). The WWF Centre for Conservation Finance (2003) estimates that between 1987 and 2003 a total of US$ 168 million of face value of commercial debt has been purchased for under US$ 46 million, generating almost US$ 113 million in conservation funds. Among the countries with the highest debt relief were Costa Rica (US$ 80 million), the Philippines (US$ 30 million), Bolivia (US$ 12 million) and Madagascar (US$ 12 million). For example, in 1994 Conservation International purchased a face value debt of Madagascar of US$ 3.2 million for a purchase price of US$ 1.5 million, which generated the equivalent of US$ 1.7 million in Malagary francs to be expended on conservation projects in Madagascar.

2.3. Review of international debt-for-nature swaps

In analysing completed debt-for-nature swaps, Deacon and Murphy (1994) find that swaps are more likely in countries that are tropical, have a relatively high density of threatened species, and have experienced more rapid deforestation. Participating countries also tend to have democratic institutions, such as elected government, and are relatively stable politically. Their debt burdens are high relative to repayment capacity, which might indicate that they attach a premium to reducing debt in order to regain access to credit markets.

Philp (1992) lists a series of factors that contribute to the market for Developing debt, including those contributing to the sale of debt, those affecting (secondary) market debt discount and those influencing the 'value' of the debt (Table 1). The benefits that the debtor country and investor achieve are further summarised in Table 2.

Table 1: Factors influencing the market for developing country debt

(Adapted from Philp, 1992)

Factors which influence banks/creditors to sell Developing debt
• Desire to remove non-performing loans from books
• Desire to recoup the debt's fair market price, the proceeds of which can be re-invested elsewhere
• Desire to reduce debt exposure, ie. avoid providing further loans to the debtor country to ensure existing debt commitments are serviced
• Desire to minimise administration cost of debt, which can outweigh potential financial benefits of holding the debt
Factors affecting debt 'discount'
• Estimated ability of debtor country to replay the loan
• Estimated debtor country's capacity to pay (debt: export ratio)
• Disagreement over rescheduling debt
• Creditor's need for liquidity/cash
Factors affecting 'value' of the debt
• Cost of the debt on the secondary market
• Proportion at which the debtor government will convert the debt into local currency or bonds
• Exchange rate of converting debt into local currency

Table 2: Benefits of debt-for-nature swaps

(Adapted from Mateo, 1993)

Benefits for debtor country
• Reduce level of external debt
• Encourage international aid by broadening investment opportunities
• Improving balance of payment situation by replacing foreign currency liability with local currency liability
• Facilitate domestic flow of funds to a sector that is generally neglected (environment)
• Strengthen government institutions and private organisations involved in the environmental conservation
• Facilitate the funding of medium and long term projects, with the issuing of deferred maturity bonds
Benefits for international investor/donor
• Achieve biodiversity conservation
• Enhance bargaining power if the debt is negotiated on the secondary market at a significant discount
• Multiply value of the donated amount in local currency
• Enhance international agency/debtor country coordination without affection national sovereignty
• Generate spin-off benefits and social wellbeing by helping to reduce debt servicing pressures and uncertainty

While the suite of debt-for-nature swap applications suggests that it is a successful concept, it has been criticised for a number of reasons. Mateo (1993) notes possible impacts on the debtor country's management of money supply, and securities market and interest rates, among others. Philp (1992) raises philosophical problems with the instrument and argues that debt-for-conservation swaps do not address the fundamental causes of Developing problems while *"reducing the political and moral pressure for more meaningful solutions"* (p.56). She raises principal questions as to the legitimacy of Developing debt and equates the promotion of debt-for-conservation swaps to a perpetuation of western interests in previous colonies and a possible encroachment on sovereign nations. However, Deacon and Murphy (1994) note in an analysis of some 21 debt-for-nature swap contracts that these swaps generally *"enhance the delineation and enforcement of existing nominal property rights that*

are held by the host government" (p.9) and note that swaps seldom transfer ownership of land or resources. Examples are of debt-for-nature funding going towards biodiversity surveying, additional resourcing of national park services, and the expansion of the national park estate of countries. Deacon and Murphy (1994) further point out that projects are avoided which may be contrary to government self-interest and that the ability of donors to coerce agreed nature conservation programs and projects is extremely limited, specifically if the investor is a non-government organisation. Finally, in terms of outcomes they also note that the amount of money involved in debt-for-nature swaps – while growing – is insignificant in relation to developing nations' debt.

3. The relationship between farm debt and on-farm biodiversity in Australia's tropical savannas

The question is whether the concept of debt-for-nature swaps is relevant for an Australian domestic context, with emphasis on the situation of north Australia's tropical savannas, and more specifically the rangelands of the Burdekin Dry Tropics region.

3.1. Production – conservation trade-offs in grazing systems in the tropical savannas

The tropical savannas are extensively used for grazing. Most land is pastoral leasehold and leases are mostly large – often hundreds of square kilometres – and livestock densities are low by western agricultural standards, reflecting the generally low fertility of these rangelands. Despite the comparatively low production intensity, the threats to on-farm biodiversity from grazing are multiple. They include clearing of native vegetation, habitat fragmentation, altered fire regimes, spread of exotic fauna and flora and climate change and various aspects associated with the intensification of grazing systems (MLA 2005, Bortolussi et al, 1999; DEST, 1996), which is causing a general decline in landscape function (Sangha et al, 2005; Ritchie, 2005; Woinarski and Ash, 2002; Ludwig et al, 1999; Landsberg et al, 1997). The failure of graziers to de-stock early or to a sufficient extent exacerbates a decline in resource condition (McKeon et al, 2004).

Greiner and Lankester (2006) provide a literature review on the biodiversity effects of grazing intensification in the tropical savannas. Intensification measures have included the establishment of Brahman (*Bos indicus*) breeds of cattle, introduction of exotic grass species, sub-divisional fencing, provision of additional stock watering points and the widespread provision of nutrient supplements for cattle. There has also been widespread adoption of improved grasses and legumes, rumen modifiers and hormonal growth promotants. These measures have enhanced productivity by increasing the ability of cattle to harvest grass and convert grass to meat and have evened out utilisation across the paddocks of a property. However, Stokes et al (2004) suggest that no equivalent improvements have been made in the productivity of the primary renewable resource. They also observe that grazing intensification has been accompanied by the fragmentation of landscapes and conclude that these changes are major drivers of habitat modifications, leading to the decline of native species and loss of genetic diversity. While tree clearing has been principally addressed in

Queensland through the 2005 Vegetation Management Legislation, other intensification options in the savannas abound within tree clearing constraints.

3.2. Impact of farm debt on biodiversity conservation

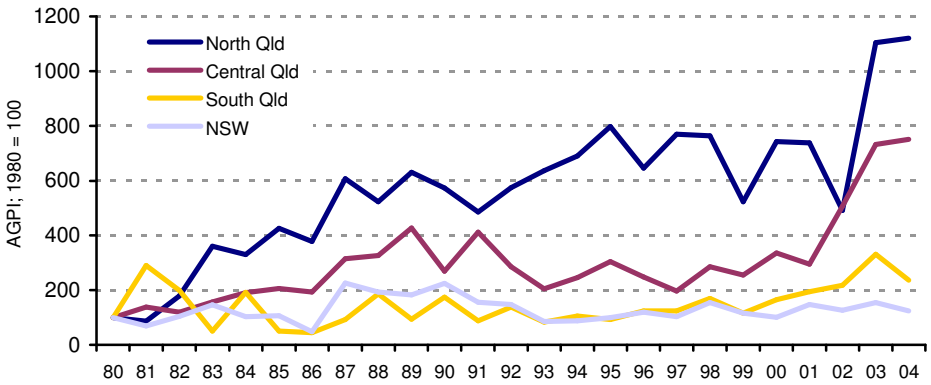
Economic considerations are the key drivers of intensification, including the ability of grazing properties to provide an income for the owner family, to service financial commitments and to generate competitive returns on investment. Farm debt is thus an indirect driver for intensification, requiring graziers to generate sufficient income to cover interest payments and principal repayments – through good years and bad. The need for fixed payments can prevent early and adequate de-stocking in drought years and motivates short-term maximisation of production.

Land values and farm debt in the tropical savannas

There has been an exceptional increase of land values in the tropical savanna landscapes. Land values specifically in north and central Queensland have seen an unprecedented rise in recent years, with average annual growth from 2000 to 2004 of 22.6% (Figure 2). The HTW/RMP Australian Grazing Property Index shows that over the past 25 years the strongest growth in grazing property values occurred in North Queensland, which recorded an average real growth rate of 10.6% pa between 1980 and 2004 (RMP, 2005). Recently, land sale values have been realised of up to $27,100 per sq km (bare of livestock, plant and equipment) for Strathalbyn station in the Burdekin region (Herron 2005).

Figure 2: Property prices as measured in the HTW/RMP Australian Grazing Property Index (real terms)

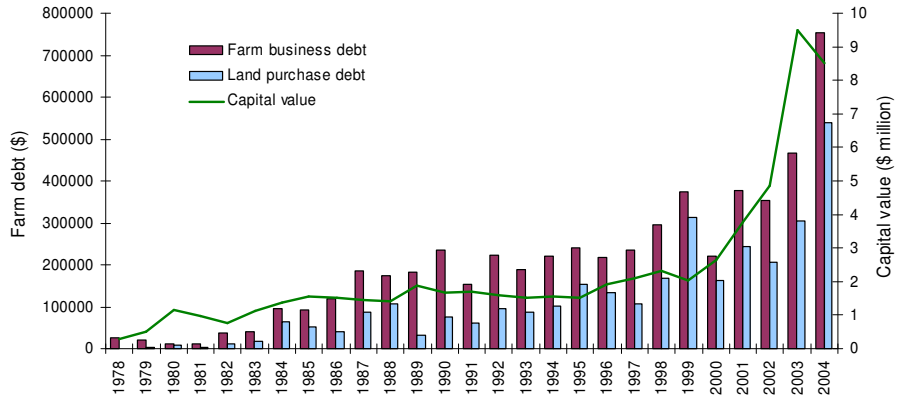
Source: Herron (2005), RMP (2005);
The index is for grazing properties >2000 hectares



Increasing land purchase prices have been reflected in both land valuations and farm debt levels. There has been a notable acceleration of the mean level of farm debt – largely driven by land purchase debt – between 2000 and 2004 (Figure 3). However, debt increase has been in line with capital value increase so equity has been maintained at levels of about 90%. Mean farm debt for beef properties in northern central Queensland now exceeds $750,000 while mean capital value is around $9 million. The increase in debt in the cattle industry reflects *'cattle industry confidence'* (Moore Stephens 2004).

Figure 3: Farm capital value and debt for beef producers in central north Queensland and Atherton Tablelands

Source: Compiled from ABARE data (2005) www.abareconomics.com/ame/mla/mla.asp
Values normalised to 2004



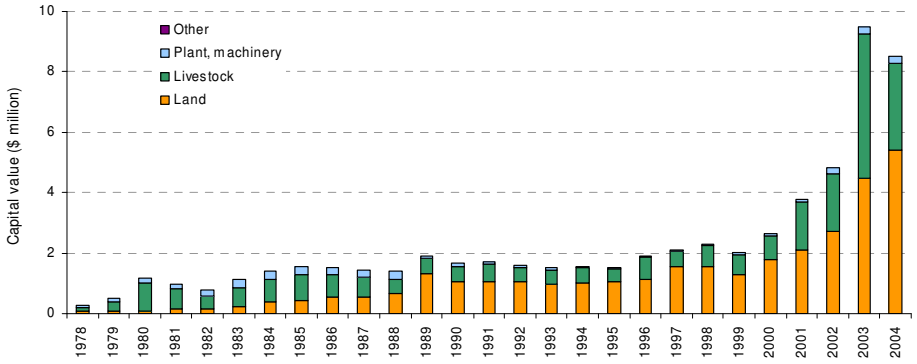
The principal sources of debt are purchase of new farm (60%) and farm improvement (29%) (Moore Stephens:p.80).

Rural debt in the beef industry in Queensland has increased by 83% between 2001-2003 (Moore Stephens 2004). The Central North (ABARE Region 313) accounted for 28% of total debt increase in Queensland in that period of time. Debt of the beef industry rose by $247 million in the Central North, one of two tropical savanna regions in Queensland. The ratio of regional gross value of production to debt has shortened to 0.69, with a gross value of production of $318 million and industry debt of $461 million.

In the Central North, the capital value per hectare of land (with stock) has increased from less than $9 in 1978 (in 2004 $ values) to just under $200 in 2003 and 2004. The majority of capital gain has been from increases in land valuation, with livestock values having been particularly high in 2003 (Figure 4).

Figure 4: Value of capital for beef properties in central northern Queensland and Atherton Tablelands

(Compiled from data by ABARE/MLA, 2005; values in 2004 Australian dollars)



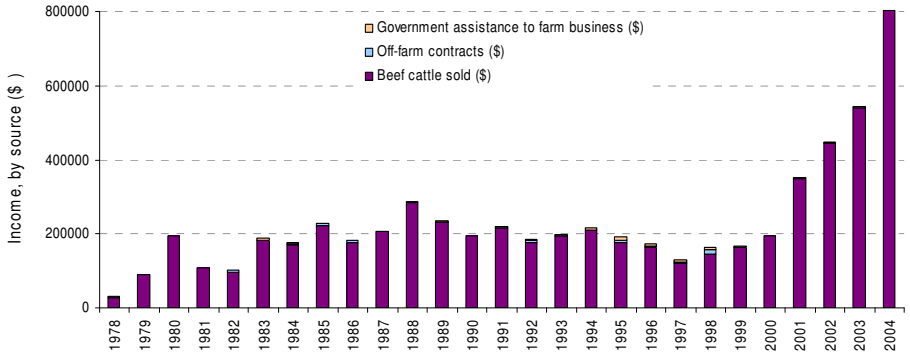
An analysis by Carr and Honnef (2005) reveals a functional relationship between cattle prices and Queensland grazing property prices. Specifically, for every rise in cattle prices by 10 c/kg, land prices tend to follow with an increase of on average $15/ha over the ensuing six month.

Farm incomes of beef properties

The increase in capital value has mirrored incomes of grazing properties, which have achieved record levels in 2004 (Figure 5) and quadrupled since 2000. Graziers have been able to achieve this through a combination of increasing herd size – while maintaining turn-off at around 30% of herd size – and favourable beef prices.

Figure 5: Farm income for beef properties in central northern Queensland and Atherton Tablelands

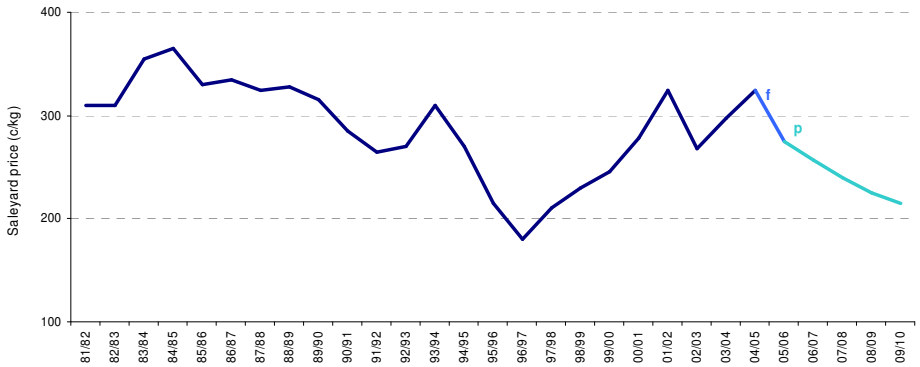
(Compiled from data by ABARE/MLA, 2005; values in 2004 Australian dollars)



In fact, while nominal cattle prices have risen sharply over the past eight years, this increase – in real terms – has brought cattle prices back to 1980s levels (Figure 6).

Figure 6: Beef price 1981/82 – 2004/05; projections until 2009/20

Source: ABARE (2005a); MLA (2005), citing ABARE data.
Note: Basis is dressed weight equivalent; price (real) in 2004-05 Australian dollars; **f** ABARE forecast; **p** ABARE projection



Long-term trends reveal that while nominal beef cattle prices rose on average by 3.3 per cent a year between 1977-78 and 2002-03, prices for inputs rose more rapidly, at

4.8 per cent a year (MLA 2005). This resulted in a decline of the industry's terms of trade of on average 1.4 per cent a year. Currently, terms of trade are equivalent to 1980s levels as a result of the high beef prices, while productivity is about 25 per cent higher.

Warnings about the resulting increased volatility in the beef industry have been sounded for some time. Honnef and Katter (2003) warn that *"the Queensland cattle industry is in a period of buoyancy verging on over heating"* (p.5) and state as contributing factors a positive market outlook, low interest rates and high commodity prices. They stress that graziers who have taken advantage of this situation and increased their debt have consequently increased their exposure to risk and identify commodity fluctuations, increased interest rates and environmental conditions as key risk factors.

Potential financial pressures on graziers with high levels of debt can thus come from two sources. Firstly, high debt requires high levels of net income to pay interest and repay principal. Anything that reduces income and/or increases interest thus threatens financial viability. Secondly, debt is financiers' capital. Bank lending into agribusiness has increased while capital values have increased and equity has not been an issue. Downward pressure on capital values would see equity decline with resulting pressure from lenders to recover debt.

Any negative change in the beef market and environmental conditions that have underpinned the beef industry to boom over recent years could put pressure on farm incomes and cause financial hardship for farms with high levels of debt a fall in capital value. Land managers who seek to realise competitive returns on investment will require higher profits. Higher profits may have to come from higher receipts as further cost rationalisation seems unlikely. Second, some people have bought into the industry in recent years or expanded their holdings and therefore carry high debt. There is an ongoing need to service that debt.

Honnef and Katter (2003) think that increases in property values have *"virtually nullified any increase in cattle values"* (p.6) and they conclude that *"on a purely economic basis further investment in this industry is not feasible relative to other investment options with lower risk and higher returns"*. They attribute part of the property price boom to lifestyle motivations. However, another possible motivator is speculation on ongoing capital value increase. *"The risk is that grazing land values will reach a level that renders a property purchase unfeasible. This may result in participants being unable to service debts or maintain a profitable enterprise"* (Herron 2005).

In terms of on-farm adjustment, there are two principal ways of increasing receipts/income: intensifying the current production systems or diversifying into enterprises with higher land-use efficiencies (eg cropping). Both have the aforementioned negative implications for on-farm biodiversity.

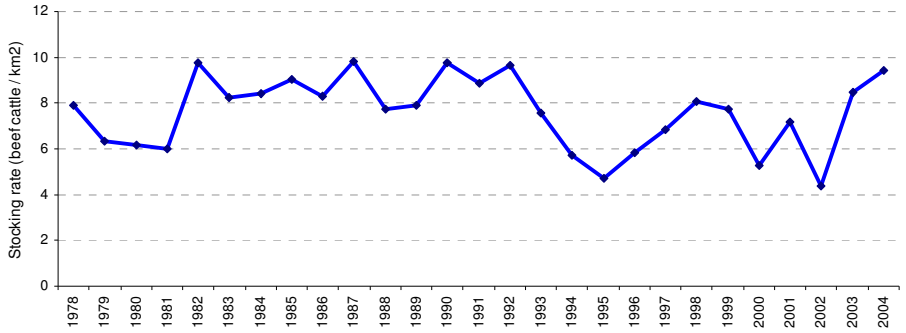
Stocking rates

Trends in the stocking rate across the region reveal firstly climate and resource-base driven fluctuations as well as a decline, by about one third, of stocking rates in the mid 1990s in comparison to the 1980s (Figure 7). In recent years, stocking rates have returned to levels seen during the 1980s and early 90s.

As opposed to previous occasions when the herd size increased this increase has not been at the expense of sales. Rather, sales have been increasing also and sales ratio has remained proportionate to herd size (approximately 30%), which suggests that cattle reproduction rates have been high and death rates low (aided by supplementary feeding). Also, due to the favourable export conditions and unlike on previous occasions, higher sales volumes have not caused a decline in beef price. This has resulted in record farm receipts from beef (quadrupled between 2000 and 2004, after stagnating or declining during 80s and 90s).

Figure 7: Stocking rate for beef properties in central northern Queensland and Atherton Tablelands

(Compiled from data by ABARE/MLA, 2005)



The calculated stocking rate of approximately 10 cattle per square kilometre across central northern Queensland does not suggest that there is a problem with overstocking – specifically in the context of the intensification measures implemented by the grazing industry over the past decades. However, it is impossible to assess whether the land is overstocked in the absence of information on resource condition. Also, as illustrated in section 3.1, intensification measures have combined to add pressure on the natural resource base and biodiversity of grazing lands through the increased capacity of each cow to utilise available grass resources and to spread the impact of grazing more evenly across the landscape.

While Figure 7 indicates that graziers adjust stocking rates from year to year, research by Abgola and Harrison (2005) concludes that the Australian grazing industry is slow in responding to external economic stimuli. Their analysis shows that changes in input and output prices have little impact on grazing systems in the short run, but with increasing impact over a time period of four years. They conclude that production factors in the industry, including labour, capital and cattle numbers are quasi-fixed. While their analysis does not consider adjustments to environmental conditions, the research might imply that graziers may be equally slow in responding adequately to variability in environmental production conditions.

There also appears to be a dichotomy in that land values – at least in Queensland (Carr and Honnef, 2005) – tend to respond quickly to cattle prices whereas the same is not true for the allocation of production factors in the cattle industry.

4. Domestic application of debt-for-conservation swaps

4.1. Stakeholders and principal mechanism

The question is whether a workable approach of debt swaps can be conceived in the domestic context to enhance biodiversity outcomes through debt relief for landholders. Conceptually, debt-for-conservation swaps are an instrument which directly addresses that link. The challenge is to tailor the application of the debt-swap concept to the specific domestic situation.

The first step is to work out who would be involved in debt-for-nature swaps, why and in what capacity. Table 3 identifies the key stakeholders, why they might want to participate, and what role they would play in the transaction.

Table 3: Stakeholders in debt-for-conservation swaps

	Threat	Motivation	Role
Landholder	Farm debt threatens resilience in a variable production environment and therefore financial viability	Reduce debt servicing requirements Improve equity Avoid liquidation of farm Sometimes little opportunity cost associated with committing a specific area of the property to biodiversity conservation	**Participant**
Rural lender	If land values stagnate/fall and/or beef profitability declines, there is a high probability that the incidence of 'bad debt' will increase	Minimise 'bad debt' Commitment to resource sustainability Seen by general public as behaving 'ethically'	**Funding** Forego some profit for increased lending security ("insurance premium")
Government	Intensification threatens reliance of on-farm conservation for securing biodiversity values in savanna regions	Pursue social – and environmental – values through biodiversity conservation Measure in support of ESD principle Opportunity cost to on-farm conservation is purchase of more land for reserves and subsequent management by agencies	1. **Funding** - Share cost of program with financial institutions - Overall scope of program small due to program being highly targeted 2. **Administration** - Possibly through expanded scope of the Agriculture – Advancing Australia package 3. **Enforcement** - Ensure ongoing compliance of participants with swap conditions
Non-government nature conservation organisation	General biodiversity decline and loss of habitats in bio-regions	Alternative model of conservation to acquisition of properties and ongoing active management through salaried manager	**Funding**
Regional NRM body	Gradual loss of biodiverse areas on farms threatens achievement of regional-scale conservation outcomes stipulated in regional NRM plans	Achieve biodiversity conservation outcomes stipulated in NRM Plan Pursue long-term interests of regional community Support regional landholders	1. **Brokerage**: - Facilitate the establishment of debt-for-conservation swaps agreements 2. **Monitoring** and evaluation

Landholders are the debtors and (potential) beneficiaries in the program. The idea is to target the policy at family farms, which are more exposed to financial risk associated with running a grazing enterprise, and compounded by debt, than corporation-owned/shareholder-based property portfolios, which tend to be diversified

as well as geographically stratified for environmental risk management and to maximise vertical integration.

Financial resources to finance a debt-for-conservation swap could come from three sources. Firstly, government has traditionally assisted the farming sector, most recently through Agriculture – Advancing Australia (AAA), a package of Commonwealth programs administered by the Department of Agriculture, Fishing and Forestry (DAFF, 2005). It was implemented in September 1997 and is designed to help primary producers in agriculture, fishing, forestry and processed food industries become more competitive, sustainable and profitable. A number of programs within this package are specifically relevant to crisis circumstances, including the Rural Financial Counselling Service, the Farm Help (Supporting Families through Change) package and the Farm Management Deposits scheme. AAA is also administering the federal Exceptional Circumstances program and Natural Disaster Relief Arrangements. Similarly, at the state level, the Queensland Rural Adjustment Authority currently provides low interest loans and interest subsidy assistance for eligible farmers in the form of (among others) drought carry-on loans, drought recovery loans, interest subsidy in exceptional circumstances, natural disaster assistance, and Landcare loans (QRAA, 2005). If government was to fund debt-for-conservation swaps, the funding would equate to a subsidy.

Secondly, rural lenders could strategically write off some landholder debt, the rationale being that some debt write-off could help minimise the incidence of future bad debt ie. a loan receivable that is considered uncollectible and is written off by the bank. However, the continuing strength in the rural property market and a "historic low" of bad debt would seem to provide little incentive at present for rural lenders for participating in a possible debt-for-conservation program. A point in favour of participation, however, is that banks are starting to see themselves as stakeholders in natural resource management. There is growing recognition of the link between farm debt and resource condition. The North Queensland Beef Research Committee conducted a bankers' forum in February 2005 in the Burdekin region which saw 30 agribusiness managers from nine banking institutions attend (DPI, 2005). The forum specifically explored the link between bank lending practices, carrying capacity and debt serviceability. There was recognition that these relationships needed to translate into bank policy through the involvement of high-level bank managers. More recently, the 3rd Regional Banking and Agribusiness Forum in September 2005 (Australian Bankers Association 2005) invited speakers to address the question of resource sustainability. The relationships are specifically relevant in the context of structural adjustment. A presentation by Head of Corporate Affairs of the National Australia Bank in Sydney to the Outlook Conference in March 2005 (McKanna) alerted to significant changes in the rural lending sector including the emergence of new lenders and corporations, and a suite of new products that are available to farmers such as farm management deposits and water mortgages. McKanna (2005) sees the objectives of lenders as maintaining asset values for non-viable farms and facilitating growth of efficient and viable farming enterprises. Both objectives can only be achieved it the resource base of farms is maintained.

Thirdly, non-government conversation organisations such as the Bush Heritage Trust are reviewing their current investment models, which are based on the strategic acquisition of land holdings and subsequent (ongoing) management of that land for biodiversity conservation purposes (DEH 2005). Debt-for-conservation swaps might provide an alternative and complementary investment strategy for them.

Regional NRM bodies could provide an important brokerage function in the negotiation and implementation of debt-for-conservation swap contracts. They pursue biodiversity conservation objectives as part of their business of implementing management actions to achieve regional resource condition targets, which are outlined in the regional plans. While the financial resources of these bodies (eg. $20 million for the Burdekin Dry Tropics region over three years) are unlikely to be substantive enough to provide the sums presumed necessary for debt-for-conservation swaps, their information and human resources can facilitate the implementation of the incentive.

4.2. Tailoring debt-for-conservation swaps

To maximise the effectiveness of debt swaps as a biodiversity conservation instrument it is useful to geographically target the policy by defining an area with significant and critical on-farm biodiversity assets, where farm debt is considered an issue for landholders. The Bowen-Broken-Bogie rangelands are such an area.

The process of selecting participants in a debt-for-conservation swap program could be mirrored on the Victorian Bush Tender program (Connor and Hatton MacDonald, 2002), whereby landholders submit bids that outline what area and type of land they would be willing to swap for what amount of debt. The bids would be sorted on the basis of dollars per unit of biodiversity 'value' and the best value bids would be funded, up to the scope of the program. Bids would be further reviewed and assessed on site.

The biodiversity value of the bids would be established through a metric, which systematically assesses the land offered on the basis of possibly several biodiversity-related attributes. The metric would identify areas of high biodiversity value, for example wetlands, riparian vegetation, endangered habitats, and examples of largely un-modified ecosystems. Metric design can be a complex task and a multitude of approaches exist to quantify the biodiversity value of areas (Fleishman et al., 2005). Metrics need to include structural and functional indicators and be tailored to the geographical scale of the inquiry and the biogeographical region (Langanke et al., 2005). Despite the advance of remote-sensing based indicators (Bastin et al., 2002) designing a metric for the purpose of biodiversity conservation in the Bowen-Broken-Bogie rangelands needs to be the subject of separate research.

Unlike the Bush Tender program, the contract detailing a debt-for-conservation swap would need to be of considerable duration to truly safeguard biodiversity rather than defer the inevitable by a few years. Also, it can be expected that large sums of debt relief would be sought by landholders, so contract terms could be of equivalent length to loan terms. For the duration of the contract, the swap conditions would form part of the title to the designated land.

Finally, monitoring and evaluation procedures need to be defined and appropriate processes and penalties defined for breach of contract conditions.

4.3. Experience with debt-for-conservation swaps elsewhere

An extensive literature and information search revealed only one application of the debt-for-nature concept in a country-internal context. The United States Department of Agriculture implemented the "Debt for Nature Program", also know as the "Debt Cancellation Conservation Contract Program" in the year 2000 (USDA, 2001). Since

then, approximately US$ 61 million of farm debt have been 'forgiven' on the basis of 740 conservation contracts covering an aggregate area of 1457 square kilometres (Mel Thompson, USDA, personal communication 13/01/2006).

Farmers can qualify for cancellation of a proportion of their indebtedness[2] in exchange for a conservation contract. The contract is a voluntary legal agreement that restricts the type and amount of development that may take place on environmentally sensitive areas of a borrower's property. Contracts may be established to conserve wildlife habitat and improve the environmental and scenic value of farms. Borrowers reduce their debt and thereby improve their overall financial stability.

In the program, the 'nature value' of the land offered by borrowers is not taken into consideration when establishing contracts with landholders. Rather, the metric involves area and debt parameters only. The maximum amount of debt cancellation is derived from the present market value of the farm, the borrower's debt secured by real estate, and the size of the area to be covered by the contract. Generally, a 33 per cent cancellation limit applies to loan principal.

Contracts are entered with terms of 10, 30 or 50 years and stay with the land. Contract establishment costs and ongoing administrative costs are covered by the government. Severe penalties apply for breaches of contract conditions, including re-instatement of the debt.

In general, the following activities are prohibited on land covered by a debt for nature contract: building and construction; altering of vegetation and water systems; grazing; agriculture; timber harvesting; dumping of wastes. The landholder retains the right to control public access and may use the area in a manner compatible with the contract – if allowed by the management plan.

Thompson (Mel Thompson, USDA, personal communication 13/01/2006) explains that the Debt for Nature Program is a loan servicing program but stresses that the land entered into a contract must have conservation value. He adds that "…we try to assure that the land entered into a conservation contract has conservation value as well as assisting the borrower with debt cancellation".

There is a remarkable absence of information about the program on the USDA and related websites, and correspondence with various nominated contact officers in central and regional offices of the USDA have revealed scant knowledge about the program in the administration. This would seem to indicate that the debt for nature program is not a program of significance or prominence. This has been confirmed by P. Sullivan (USDA, personal communication 6 October 2005) who explains that *"since the early 1990's, U.S. farmland values have generally increased faster than farm debt. If a farmer is interested in putting land into a conservation easement, either for financial reasons or for some other reason, it would generally make more financial sense to use a conservation easement program (w/ reimbursement based on market value) rather than a debt forgiveness program, so demand for the debt forgiveness program has been pretty close to zero. Debt forgiveness only makes sense if land values are falling or for farmers that have managed to convince their lender to loan them more money than their collateral is worth."*

[2] Eligibility is restricted to borrowers who have debt secured by real estate through the Farm Service Agency

5. Review of domestic debt-for-conservation swaps

Any individual policy or incentive instrument tends to have strengths as well as weaknesses. An evaluation of the concept of debt-for-conservation swaps against a suite of evaluation criteria is helpful in determining firstly, whether the concept bears merit, and secondly, whether and how it could be best employed to complement the existing policy mix targeting biodiversity conservation. The following list of criteria is based on Young et al. (1996) and has been previously implemented by Greiner et al. (2000).

The incentive evaluation is based on conceptual thought, supported by empirical data collected from an (in-progress) landholder interview and survey in the Bowen-Broken-Bogie rangelands. To date, 17 landholders – about half of all family-operated farms in the region – have participated in the study, with a combined land holding of 200,000 hectares. All but four respondents have discussed their debt situation. Of those, two respondents are debt-free, the other have debt ranging from tens-of-thousand dollars up to $10 million. Combined debt is $29.2 million, mean debt is $2.4 million, median debt is $2.1 million. Equity is generally between 70 – 90%. The information obtained from the respondents was triangulated by a financial advisor and a rural property analyst, who were also consulted as part of the research.

5.1. Effectiveness and dependability

The question is whether debt-for-conservation swaps are technically suitable for achieving biodiversity outcomes and whether they can deliver a desired conservation objective even when knowledge about likely biodiversity responses is uncertain and measurable responses may be obscured by other factors such as rainfall variability and climate change.

Of the 17 respondents, all except one rate the impact of debt on on-farm biodiversity conservation as highly negative. The principal cause is that those in debt carry more cattle than they would ideally want to carry because of loan servicing commitments. This supports the underpinning assumption about the relationship between farm debt and on-farm biodiversity conservation. However, due to ongoing low-rainfall conditions most respondents currently carry 10-30% fewer cattle than what they think the property ‘typically’ carries.

Six respondents are very interested in pursuing a possible debt-for-conservation swap while another five respondents are cautiously positive. On the basis of only basic assumptions about the program, a total of five written bids have been submitted, covering a combined area of 14,300 hectares for total debt relief of $2.95 million. This indicates significant interest in the incentive – and could lead to a significant area supplement of the small area of formal conservation areas within the Bowen-Broken-Bogie rangelands.

Assuming similar contract conditions to the USDA Debt for Nature Program, a landholder would cease the productive use of the land covered by the contract but continue to manage the land for conservation objectives. In the Bowen-Broken-Bogie rangelands this would typically involve removing cattle from the land and possibly fencing it off and closing off existing water points for cattle. Ongoing control measures would be required to combat the spread of noxious weeds and to minimise competition and impact by feral animals – and possibly some prolific native animals – on sensitive native plant and animal species. Without cattle as the primary weed

control mechanism, the question is what other means landholders could usefully employ in its place – or whether strictly limited access for cattle would be a legitimate weed control mechanism and thus 'compatible' use of the land.

Overall, the effectiveness of the incentive as a biodiversity conservation mechanism can be rated as possibly positive. Equally, it can conceivably 3be an effective debt relief mechanism.

5.2. Precaution

Precaution assesses whether an instrument avoids the chance of serious or irreversible consequences. The precautionary effect of debt-for-conservation swaps is linked to three variables, the total biodiversity value (area) subscribed to the program, the length of the contract period and the degree to which landholders adhere to contract conditions. If – like in the case of the US example – contract periods of as little as 10 years are available, then the program has at best a 'deferring' effect on grazing and intensification-related biodiversity impacts. From the bids received it is evident that respondents prefer short contract periods over long ones. The land under conservation contract is only 'safe' if stringent compliance mechanisms are place and appropriate penalties which deter from breach of conditions. On the other hand, if substantive areas and/or areas of significant biodiversity value can be put under conservation contract through this mechanism, then it will have precautionary outcomes.

Overall, the instrument would rate as questionable to possibly positive against this criterion.

5.3. Efficiency

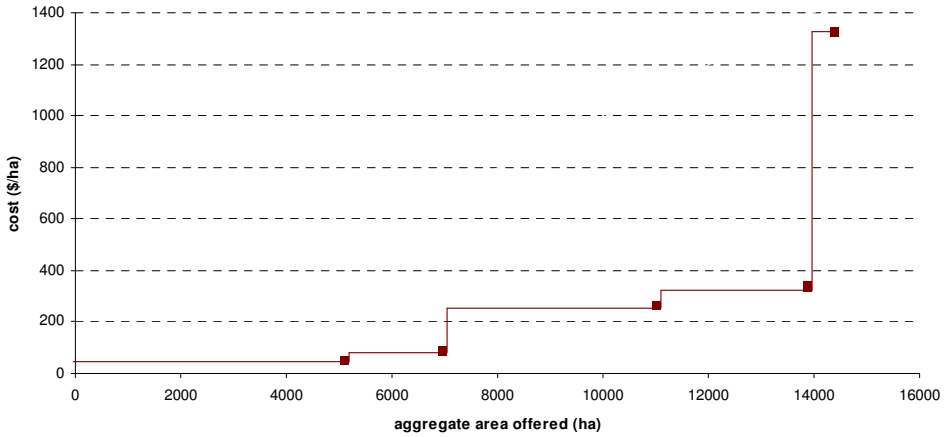
There is a need to distinguish between three aspects of efficiency. First, the question needs to be asked whether debt-for-conservation swaps are an efficient instrument for achieving biodiversity conservation, asking about the cost per unit of biodiversity conservation. Secondly, the impact of debt-for-conservation swaps on productive efficiency or farm profitability needs to be assessed. Thirdly, there is the question about the impact of the incentive on allocative efficiency of the grazing industry.

Cost of conserving biodiversity

Landholders in the Bowen-Broken-Bogie rangelands participating in the research were asked to submit written bids if they were interested in participating in a potential debt-for-nature swap program. Of the 17 respondents five have submitted bids. A total of 14,290 hectares of land are offered in the bids, with total debt reductions sought of $2.95 million. Respondents seek to retire between 6 – 100% of total farm debt.

In the absence of a metric to determine the biodiversity value of land, the analysis is restricted to assessing cost on a per hectare basis. The cost per bid ranges from $40/ha to $1364/ha. The area offer curve is shown in Figure 8. The bids are ranked in order of cost. The area offered is shown as cumulative. Despite the low number of bids, the data points draw a familiar supply curve.

Figure 8: Area offer curve for debt-for-conservation swaps



As shown earlier in this paper, recent land prices in the region in the study area have topped $200/ha. Of the five bids, two are below that amount, two are 30-65% above and one respondent is asking about 7-fold the top per-hectare market rate. An explanation for this may lie in what Rolfe et al (2006) term 'engagement costs' and the premium that some landholders are seeking to recover when engaging with government.

In terms of instrument cost, debt-for-nature swaps may offer cost savings over the more traditional approach to biodiversity conservation through land acquisition in some instances. Importantly the incentive may provide access to some areas within existing land holdings that would otherwise not be available for biodiversity conservation.

Productive efficiency

The effects of a debt-for-conservation swap on enterprise profitability can be positive if the debt reduction is significant enough to decrease the costs associated with interest payments (and principal repayments) – while at the same time the reduction of productive area has a relatively benign effect on farm income. That means that the areas set aside as part of the swap are of low productivity or – if they are very productive – are small in size. The swap also improves the equity situation of the property – provided that the asset value is not affected by the swap – and therefore provides the landholder with renewed options for on-farm and off-farm investment. However, many respondents in the research expressed concern about the possible effects of a swap – and associated conditions – on the property value and future sale price.

During the interviews with respondents it became evident that landholders use farm debt strategically as an effective means for minimising income tax liabilities and maximising their assets. Several respondents indicated that – if they had a significant amount of debt written off – they would seek to buy more land elsewhere to continue their financial strategy. Debt does not appear to be a problem for efficient landholders, rather a financial tool which is favoured by current taxation laws.

Collective efficiency

If the incentive is offered in a geographically and financially contained manner, this would have little impact on resource allocation decisions by the cattle industry. However, the incentive has the potential to slow structural adjustment process by improving the viability of some otherwise unviable farms. This, combined with the improved liquidity and quest to purchase more land by other participants, may put upward pressure on land prices in the area where the incentive is operating.

The widespread use of intensification measures in the beef cattle industry demonstrates that land in the tropical savannas is an increasingly scare resource (Makeham and Malcolm 1993). As the trend continues, economically efficient grazing practices will be increasingly detrimental to the grazing sensitive spectrum of biodiversity. Debt-for-conservation swaps are unable to change these fundamental relationships, which raises the questions whether the term 'on-farm conservation' may be a contraction in terms and, consequently, whether biodiversity conservation is best pursued through a deliberate spatial separation of production and conservation.

5.4. Continuing incentive and innovation

Debt-for-conservation swaps are not an instrument that encourages experimentation and change, or provides an ongoing incentive for biodiversity improvement. It can be argued that once the debt is written off, the incentive for fulfilment of the swap conditions is only maintained if effective penalties are in place for breach of the conditions, which requires strict monitoring and enforcement. The USDA Debt-for-Nature Program threatens re-instatement of debt for significant breaches of contract conditions. The motivation to conserve biodiversity is extrinsic (as opposed to intrinsic) and – as in the case of regulatory instruments tends to achieve compliance through reward for just-compliance and punishment for non-compliance (Greiner et al, 2000).

Unless the incentive is combined with suasive and educational measures it does not achieve learning about biodiversity by landholders nor effect change in land management practices on the farm areas that are not included in the swap contract.

5.5. Administrative cost and feasibility

Debt-for-conservation swaps are an administration-intensive instrument. To start off with, it would require significant negotiation with all stakeholders and research into a swap metric just to put the program into practice. Further significant resources are required for administering and policing the program. Specifically, the level of planning and negotiation that would be required to complete every single contract is high, and ongoing monitoring, evaluation and enforcement costs are also high due to the geographically dispersed nature of the areas offered to the program and the need for on-ground monitoring to check that the swap conditions are being complied with and measure the biodiversity outcomes of the incentive.

5.6. Equity

By its very definition, the instrument is targeted at landholders with debt. It thus excludes landholders without debt. The supply of (biodiversity) area is limited by farm debt. Landholders with large debt stand to gain more from participating than those with less debt. The instrument does not discriminate between the sources of the

debt. There is a risk that debt alleviation could 'reward' poor past investment decisions and poor land management – and possibly entice landholders to go into debt to be eligible for participation in the program or increase existing debt in order to maximise the amount of potential debt relief.

In summary, the incentive is inequitable, the distribution effects of debt-for-conservation swaps are questionable and there is the possibility of perverse outcomes of the incentive.

5.7. Political and community acceptability

Acceptability is a necessary condition for the durability of a policy. Transparent and equitable policies reduce political and bureaucratic rent seeking, hereby reducing the risk of government and bureaucracy failure (Young et al, 1996). The acceptability of debt-for-conservation swaps hinges on its ability to convince people that it can deliver biodiversity conservation outcomes – rather than being a subsidy for debt-stricken landholders, as is the case with the US debt-for-nature program. There is also the question as to whether rural lenders – as an identified prime stakeholder in a possible program – are willing to support the policy.

5.8. Durability

This is not a criterion that is commonly discussed, but does take some significance in the context of debt-for-conservation swaps. The effects of debt-for-conservation swaps are durable over the contract period, which in the US are up to 50 years in length. This is an advantage over incentives which rely on annual payments or short-term funding and therefore rely on ongoing approval and recurring positive funding decisions by (successive) governments and through changing situations.

5.9. Debt-for-conservation swaps as part of a policy bundle

Multiple authors have stressed that a policy mix – of market and non-market instruments – is necessary to achieve an efficient long-term level of conservation and sustainable use of biodiversity (eg. OECD, 2004; Young et al, 1996). This thinking builds on Tinbergen (1950) who suggested that a policy mix is superior to a single instrument approach in situations where there are multiple objectives and issues. An effective mix contains at least one policy instrument to alleviate each threat and pursue each objective, allowing for adjustment of each element of the mix without compromising other objectives. Young et al (1996) argue that compliance with the Tinbergen principle ensures that as knowledge, prices, technology and social values change over time, the policy mix can be adjusted efficiently and equitably.

There is a suite of incentive mechanisms that already operate in the Australian Rangelands (DEH 2005). These include national market-based incentives but also non-government initiatives such as revolving funds – whereby non-government organisations purchase properties and sell them on after conducting conservation works or covenanting of areas with high biodiversity value – and the establishment of a non-public property estate through the philanthropy-funded purchase and subsequent management of properties by non-government conservation organisations.

Debt-for-conservation swaps are an economic instrument and fall under the Industry Commission (1997) category of subsidies and tax concessions. As opposed to some broadly conceived instruments such as regulation and income tax incentives, they are

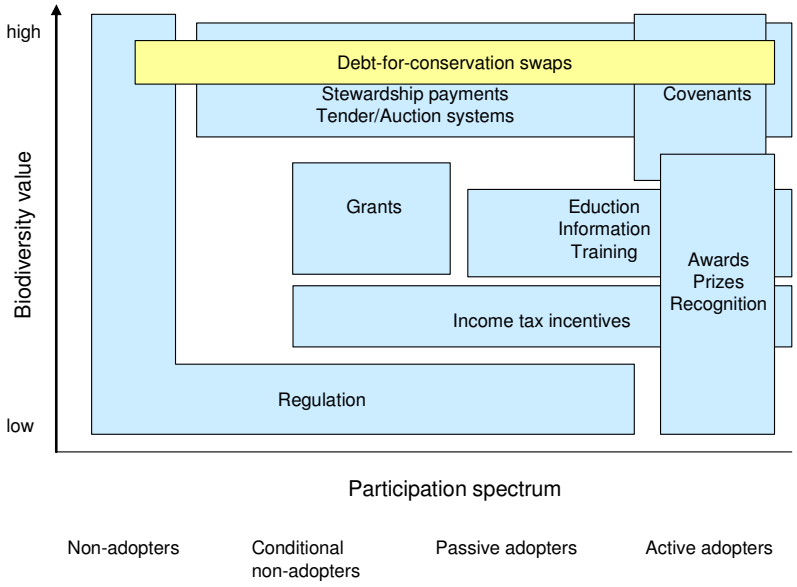
highly targeted and would be tailored to landholders with high levels of debt – irrespective of their economic performance and conservation orientation – who seek to reduce the on-going cost of servicing debt and would receive this subsidy in exchange for a commitment to producing biodiversity outcomes on part of their land.

Greiner and Lankester (2006) visualise the instrument as part of a mix of policies and stress specifically that a debt-for-conservation swap program may generate involvement by landholders across the 'participation spectrum' (Figure 9), as long as they meet the eligibility criteria. It would thus appear that the incentive can provide a useful addition to more broad-brush policies, such as environmental regulation and income tax incentives for investment in conservation, which are not suitable for protecting geographically specific biodiversity resources.

However, that policy space can also be filled with other incentives, specifically stewardship (and other forms of compensation) payments. The payments received by participants in the Victorian bush tender program are stewardship payments, which are essentially recurring remuneration payments for biodiversity services provided by landholders.

Figure 9: Debt-for-conservation swaps as part of a policy mix

(based on Greiner and Lankester, 2006)



6. Conclusions

Debt-for-nature swaps have been extensively applied in an international context. Some fundamental conditions apply in the domestic context of Australia's savanna regions – including the detrimental effects of grazing intensification on landscape functionality and biodiversity conservation, and increasing farm debt fuelled by rapid rises in land values – that warrant the exploration as debt-for-conservation swaps in this setting.

An initial assessment of possible participants and players in the swap supports the principle of the swap concept. Financial support could conceivably come from government, rural lenders and non-government conservation organisations, while

regional natural resource management bodies could play an important rule in brokering and evaluating the incentive.

A detailed assessment of the incentive against a number of policy criteria, supported by empirical research, reveals that the incentive has the potential to safeguard some on-farm areas cost-effectively and can do so over possibly extensive contract periods. However, the incentive is shown to be inequitable, with no intrinsic motivation for a change of land-management practices, and there is an overwhelming potential for unintended perverse consequences. Firstly, the swap could reward past management and investment decision, and/or entice landholders to incur debt to be eligible for participation. Secondly, farm debt is used as an effective tax minimisation and asset maximisation tool by many landholders. Debt swaps conceivably reinforce this strategy and inflate land prices. Thirdly, by improving the viability of otherwise unviable farms, the incentive could hinder structural adjustment of the grazing industry. Finally, the transaction costs of the incentive are large. In the lead-up to implementation a metric would need to be designed for relating debt relief to biodiversity conservation outcomes. Debt swaps would need to be tailored to every single participant and negotiations would involve several parties. Similarly, the ongoing monitoring of compliance enforcement and evaluation would incur substantive administrative costs.

In summary, debt-for-conservation swaps have initial appeal as an incentive to alleviate farm debt and improve biodiversity conservation. However, this paper raises serious concerns about the efficacy of the incentive mechanism. Furthermore it is unable to conclusively demonstrate that farm debt is detrimental to on-farm biodiversity conservation, which is the key assumption supporting the swap concept. A debt-for-nature swap program implemented in the USA does not deliver convincing conservation outcomes. Also, a buoyant property market does not provide a favourable environment for the implementation of a debt-swap incentive.

It is therefore suggested that a domestic application of debt-for-conservation swaps should not be further pursued as a possible incentive for biodiversity conservation. Instead the paper provides clues that the notion of on-farm biodiversity conservation might require re-appraisal in the context of the conservation of grazing-sensitive biodiversity. The findings suggest that other possible (market-based) incentives, including stewardship payments, warrant further exploration.

7. Acknowledgements

This research has been commissioned by the Burdekin Dry Tropics Board and is funded by the Queensland Department of Natural Resources and Mines through the National Action Plan for Salinity and Water Quality and the Natural Heritage Trust II.

We wish to thank Prof Kevin Parton, and Drs Beth Clouston, Jeanette Stanley and Jill Windle for helpful comments on an earlier draft of this paper.

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