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Contents

From the Editors

Thank you very much to those readers who were interested in our first edition and were encouraging about the publication.

We are coming to appreciate that there are several sources for Connections articles:

- Contribution of extension style articles converted from agricultural economic and resource research papers (self-initiated or editor encouraged);
- Editor invitation to people with recognised expertise on current issues;
- Spotting of relevant and topical material meriting a wider audience than its initial forum of presentation.

If you are preparing, or are aware of others preparing relevant and topical material, please contact us. We hope that you enjoy the second issue and encourage you to provide us with frank feedback.

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Keeping Eyes On The Ball In The World Trade Cup

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The Doha WTO meeting late last year initiated a broad round of negotiations that should increase the chances of more negotiations than previously and issues of importance to them are likely to be given

Setting the scene

In November 2001, trade ministers from WTO member countries met in Doha in Qatar, and agreed to launch a new multilateral trade round. This could set the stage for advances in WTO negotiations for agricultural reforms that have been proceeding in isolation for two years and have yet to make much progress.

The wider round could breathe new life into the agricultural negotiations for two main reasons:

- It covers a broad range of products and issues, providing opportunities for tradeoffs. Potential negotiated gains in other sectors could encourage some countries to accept trade liberalising agricultural reforms.
- It was agreed that all the negotiations be treated as 'a single undertaking', which means all areas of negotiations must be agreed to for any of the negotiated outcomes to be binding. This can place pressure on negotiators in areas like agriculture, where agreement is difficult, to find common grounds in the interest of reaching an overall agreement.

Even though the agreement to launch a wider round is positive for the negotiations on agriculture, it is far from clear that the demand for agricultural trade policy reforms is currently strong enough to result in more than minor reforms from the negotiations. Indeed, some key participants appear more concerned to maintain the status quo or even to secure additional options to support their farmers or protect them from import competition.

There has been a concerted effort by some countries, including the European Union and Japan, to inject a raft of 'new' issues into the negotiations that could be used as a basis for blocking imports or for providing exempt subsidies. These issues include environmental concerns, animal welfare, viability of rural communities, food security, and geographic indications. Already, the European Union can claim some success by having a provision inserted into the Doha declaration under which the relationship between existing WTO rules and specific trade obligations set out in multilateral environmental agreements should be included.

These 'new' issues have a potential to divert the negotiations away from their traditional main 'three pillar' focus on reducing barriers to imports, reducing market distorting domestic support and reducing export subsidies, while at the same time providing opportunities to extend protection.

Developing countries will almost certainly play a much larger role in the present WTO agricultural negotiations than in the previous round. They constitute most of a rapidly increasing number of member countries, with some of the new entrants, such as China, being very large economies. Consequently, the dynamics of negotiations that were previously dominated by the United States, the European Union and Japan are rapidly changing.

The main issues that are likely to influence the current WTO negotiations are addressed here. These include the positions being taken by major participants, the interface between the traditional 'three pillars' approach to trade liberalisation and reform and the 'new' issues mentioned above, and the issues of importance to developing countries.

Positions being taken in negotiations so far

There is a general appreciation by the members of the WTO that more open markets that are less distorted by national subsidies are important for sustaining and enhancing national and global economic growth and higher living standards. However, there is a strong propensity for many participants to regard agriculture as a special case that warrants exceptions from general trade rules.

The negotiations on agriculture so far have been characterised by strong positions being taken by major participants, many of them being incompatible with more open, less distorting policies.

Positions taken by some of the main countries and groups may be summarised as follows.

United States

The United States is anxious to open markets for its exports, of which one element is to address what it perceives to be 'unfair' competition from others' statutory export marketing bodies. At the same time, it has been markedly increasing subsidies to its own producers and wishes to maintain and even extend the scope for exempting some major forms of domestic subsidies from cuts or limitations. The United States is advocating elimination of export subsidies but is itself a major user of export subsidy-like measures that are not constrained by present WTO rules. These include concessional export credits and use of some international food aid in market distorting ways. The United States opposes substantive reforms of these latter measures.

European Union

The European Union is pursuing a defensive strategy to maintain the exemptions that are in the present WTO Agreement on Agriculture that now form a cornerstone for support arrangements for some of its own major industries. The European Union is averse to eliminating export subsidies, of which it is the world's largest user. It also seeks to incorporate a number of concerns, including environmental considerations, animal welfare and health, and food safety, more fully into WTO trade rules. These issues have been categorised by some under the term 'multifunctionality of agriculture' under which they emphasise the positive side effects of agricultural activity but discount the negative side effects, to justify continued agricultural support and protection.

Japan

Japan is also pursuing a defensive strategy with an emphasis on food security, which it chooses to identify with targeting specified self sufficiency rates. It has become a strong advocate of the concept of multifunctionality.

Developing countries

Developing countries are taking relatively disparate positions depending on their particular circumstances, but there is a strong common thread that they should be accorded special treatment because of their development needs and difficulties that they face with adjustment.

Generally, they want the developed countries to open their markets more for products from developing countries. In addition, they want exemptions from cuts to domestic subsidies and export subsidies, or less stringent rules governing the use of such subsidies than apply for developed countries. Some are calling for a special 'development box' and, at the extreme, are proposing that they should be permitted to have unlimited use of all the import restricting measures and trade distorting subsidies that they wish to be removed by developed countries.

Cairns Group

The Cairns Group of agricultural exporting countries is advocating far more open markets, tighter rules limiting domestic support and elimination of export subsidies.

Clearly, there are wide differences among the parties, with the only group that is pushing strongly and unequivocally for both more open markets and lower subsidies being the Cairns Group. Nevertheless there are areas of common ground that provide prospects for reforms.

What is required for success in negotiations?

The success of WTO negotiations hinges on how much they enable both exporting and importing countries to obtain benefits from trade and from producing the goods and services in which they have a comparative advantage. These benefits arise simply from making markets as large and accessible as possible, and from enabling producers to maximise their profits by responding to market signals rather than to subsidies and other trade distorting government interventions.

Generally, these subsidies and other interventions are designed to ensure that producers are as unaffected by market forces as possible. Not only are such measures costly for the economies of the nations that apply them, but they also force greater adjustment pressures on producers elsewhere. For the world as a whole, they result in overproduction in areas where governments provide protection and support and underproduction in areas where undistorted production costs are lower — this reduces world incomes.

In the WTO Agreement on Agriculture that emerged from the Uruguay Round of multilateral trade negotiations, a comprehensive approach was adopted to address this problem, involving separate

measures to expand market access, reduce market distorting domestic support and reduce export subsidies and like measures.

Implementation of the agreement has shown it to be a mixed bag. Export subsidies have been markedly reduced and limited gains have been made with market access. The domestic support rules were the weakest and the result has been a wholesale reorientation of assistance into forms of domestic support that were exempted from any reductions or limitations. It is no coincidence that the United States and the European Union have been the main countries to reorient their support in this way — they were the two members who agreed on these exemptions in the Blair House Accord, the provisions of which were later written into the WTO Agreement on Agriculture (Orden, Paarlberg and Roe 1999).

What then is required to secure appreciable gains from agricultural reforms this time around? The answer is clear. Market access reforms must expand actual trade markedly more, and not merely result in notional 'reductions' in trade barriers. Furthermore, the avenues for shuffling domestic support between forms of assistance to avoid agreed cuts must be curtailed.

Market access

Bound (agreed maximum) tariffs must be reduced sufficiently to ensure that actual applied tariffs are reduced markedly.

Where present access is limited by tariff quotas and reductions in bound tariffs will not appreciably expand imports, the import limiting factors must be addressed. Where the limitation is from within-quota tariffs, they must be reduced; where it is restrictive administrative arrangements, they must be reformed; where it is quota volume limitations, the volumes must be increased.

Special safeguards that enable countries to temporarily increase tariffs must be restricted so that, if they apply at all, they should only apply when domestic industries are actually threatened by very abnormal levels of imports.

The approach to special safeguards should be to tighten their application in members currently with access to them, rather than to extend them to more members. In most cases, the present general safeguard arrangements and antidumping and countervailing remedies should be sufficient to address major increases in cheap imports.

Export measures

Substantial reductions in or phasing out of export subsidies should occur.

As a first step, currently agreed levels of permitted subsidised exports must be reduced to below actual current subsidised exports — otherwise the potential exists for a reversion to higher levels of this very market distorting form of support. This alone will necessitate large cuts to present bound levels.

More effective reform of export measures will also require export subsidy-like measures including government subsidised concessional export credits and the misuse of food aid for surplus disposal to be markedly reduced.

Domestic support

There is an urgent need to overhaul the rules for the highly permissive exemptions for various forms of domestic subsidies — in particular, so-called decoupled support and production limiting arrangements. Both the United States and the European Union have reoriented support for key agricultural industries into these categories, involving billions of dollars of subsidies, thereby exempting them from reductions, limits or cuts.

Changes foreshadowed for the 2002 US farm bill in area and yield bases for wheat, feed grains, rice and cotton compromise the decoupled status of this support that is required to be determined from fixed bases. The proposed changes enable farmers to update their bases, giving them a signal that they can obtain increased future benefits by planting and producing more and then exerting political pressure to further update payment bases. This means that production becomes linked to anticipated support, breaking a fundamental tenet of decoupling that support and production should be independent.

EU support under production limiting arrangements for cereals and oilseeds remains market distorting (Nelson and Andrews 2001), although less so than the pre-1992 price support that it replaced (Roberts et al. 1999). Payments for cattle and sheep that are exempt under production limiting arrangements remain highly market distorting.

Definitional weaknesses in the current way of determining the Aggregate Measurement of Support (AMS) need to be addressed. They have enabled members to 'achieve' large cuts in domestic support by retaining their support levels but claiming that they no longer apply administered support prices. In 1998, Japan did this for rice, reducing its AMS for agriculture from 3171 billion yen to 766 billion yen (WTO 2000b, 2001a). Such a change is possible because the AMS is determined from administered support prices and not actual supported prices.

Nontrade concerns – how do they fit in?

For many years, a range of issues related to agriculture that are considered to be important and that may be influenced by trade have been of concern to people in many countries. These issues are sometimes termed 'nontrade' concerns. They include concern about the environment, animal welfare, viability of rural societies and food security. Environmental payments that are deemed to be minimally market distorting are incorporated as exemptions in the present WTO Agreement on Agriculture. However, the various other nontrade concerns are not considered, apart from in Article 20 where it is indicated that nontrade concerns should be taken into account in the continuing reform process. Some countries are calling for these issues to be given more prominence in current WTO negotiations.

An increased focus in WTO negotiations on these concerns could reduce the prominence of core trade issues — market access, domestic support and export measures. A prime objective of members that wish to elevate nontrade concerns in WTO negotiations is to ensure that the multifunctional nature of agriculture is maintained. The proponents of this concept argue that the multifunctional nature of agriculture can only be guaranteed through the continued use of production and trade distorting support because these nontrade values are jointly provided with agricultural output. As such, they are attempting to slow or reverse agricultural liberalisation, and this concept represents a significant risk to the reform agenda.

Advocates of multifunctionality emphasise the positive side effects of agriculture and ignore the negative side effects. They point out such things as agriculture's role in reducing environmental damage through water runoff, its contribution to regional employment, valued landscapes and even its role in providing a habitat for wildlife. Some also include food security within the concept. Based on these claimed benefits, the proponents argue that it is justifiable to subsidise agriculture.

However, by ignoring the negative impacts of agriculture and failing to consider less costly alternative means of achieving the stated multifunctional objectives, it is clear that the proponents of this concept are attempting to harness legitimate public concerns to try to justify protection for farmers. Such protection is at a cost to domestic economies, to producers in other countries and to the global economy.

An example of nontrade concerns being used to justify industry support is proposed exemption of payments to compensate EU producers for the costs of meeting animal welfare standards from WTO limits or reductions (WTO 2000a). It may be claimed that such payments are required because of widespread public support for high animal welfare standards. It would appear, however, that if their public really demanded that particular standards of animal welfare should be adhered to by farmers, they would be prepared to pay higher prices for commodities that met their desired standards. Consumer demand would encourage identification of products that met particular requirements, through labeling or other forms of commercially based advertising.

Demand for the product produced in ways preferred by consumers would efficiently determine the desired degree of production adjustments to meet the actual degree of community concern as expressed through its willingness to pay. Although provision of subsidies as incentives to use particular production methods may improve animal welfare to meet government imposed standards, this approach would be less efficient than a market based system at matching those standards with community concerns.

If the proponents of multifunctionality succeed in raising nontrade concerns to the same plane of importance as market access and subsidy issues on the WTO agricultural reform agenda, it could seriously undermine the gains from more open markets and less distorted trade.

Other WTO issues that may affect agricultural trade

The Doha meeting launched a round of negotiations across a broad range of issues. Some issues that are specified for action, but that are outside the agricultural negotiations, have the potential to affect agricultural trade. It is therefore important to analyse issues that indirectly affect agricultural trade in addition to those that are directly covered in the agricultural negotiations. Two of the issues for which negotiations or consultation were agreed include the overlap between multilateral environment agreements and WTO rules and 'geographic indications'.

The main countries insisting on incorporation of these other issues are those that already have substantial barriers against agricultural imports and that provide a great deal of support to their farmers. It is possible that they may use these issues in ways that have little effect on trade. However, there is a risk that some may use their particular interpretations of these other issues to further buttress their fortresses of agricultural protection. Important consequential considerations for trade protection include the following key areas.

Environmental agreements

To date, the inconsistencies between multilateral environmental agreements and WTO trade rules have not been substantial, and such a situation may continue. However, it is also possible that extreme positions might be taken by some countries in interpreting agreements in ways that could prejudice trade. Negotiators need to be aware of this risk, and manage the process in such a way as to minimise such potential negative outcomes.

An example of a Multilateral Environmental Agreement that might be used to give importing countries political discretion to block imports without scientific justification, and which has a potential to influence trade is the Cartagena Biosafety Protocol. Scientific justification has an established place in the WTO Sanitary and Phytosanitary Agreement. That agreement allows members to restrict imports to protect human health and animal and plant health and safety, but it obliges them to demonstrate that such restrictions are based on science.

The Cartagena Protocol requires exporters to seek consent from importers before the first shipment of living modified organisms that are meant to be introduced into the environment (Environmental Issues 2001). Under such conditions some countries might take the position that they can withhold consent even in the absence of scientific proof that the products are harmful (Oxley 2001).

The potential use of links between modified organisms and any risks that they might pose for the environment raise issues of the degree of risk that is acceptable to communities and the need to establish the actual degree of those risks when making rational choices. Under what has come to be called the ‘precautionary principle’, that was adopted in the Rio Declaration from the 1992 United Nations Conference on Environment and Development, particular measures might be adopted to prevent environmental degradation even where there was a lack of full scientific certainty. While this principle had been considered in relation to environmental risks, the EU Commission extended it to deal more generally with risk to include the environment, human, animal and plant health, in 2000 (Moschini 2001).

Moschini observed that ‘the precautionary principle should be interpreted as a tool for risk management, the policy stage of choosing the optimal risk exposure. Its basic tenet is that, when some uncertainty exists about the outcomes of an action, this uncertainty must be factored into the choice problem’.

Even though this principle is capable of being applied in this apparently unexceptionable way, some countries may be capable of applying it in an extreme form in order to restrict trade in products, if the imported products cannot be unequivocally proven to be free of harmful characteristics. A requirement to prove products safe beyond any doubt would be of great concern as it is impossible to prove scientifically that virtually any product, including most that are regular components of current diets, do not have any harmful characteristics to anyone.

Countries whose governments wish to block imports to protect their own industries would even have an incentive not to pursue scientific proof of the safety status of potential imports if the precautionary principle were adopted in this extreme way. In the European Union, which advocates application of this principle, problems to date from food contamination and threats to public health have arisen much more from domestic contaminants than from those generated outside.

While the extreme application of the precautionary principle would be of major concern for trade in agricultural products, the ‘principle’ really only represents an approach to risk management.

Environmentally based controls on processes used in production

Another area where the overlap between environmental agreements and WTO agreements could be at risk of being misused to restrict trade is environmentally based controls on production processes. Environmental groups are keen to incorporate into a multilateral environment agreement, other than in the WTO, rules that would allow the United States to reimpose restrictions on imports of shrimp, based on how they are caught (Crousse 1999).

Previously, the US imposed restrictions on imports of shrimp (prawns) from countries that did not adopt a certain type of turtle excluding device in nets. That restriction was successfully challenged in

the WTO as the United States did not allow imports from countries using other devices that were as effective. Even fisheries that do not have turtle populations were required either to use the devices or to undergo a lengthy certification process to establish that they were a turtle free zone.

It was found that the restriction was not just attempting to achieve an environmental outcome, but it was 'process protection', placing trade barriers on imports because the products are produced in particular ways. Environmental groups have cited this ruling in particular as evidence that the WTO places business interests above environmental interests.

The United States has since altered the approach, allowing for variations in methods to be used, but trade bans have still resulted. A subsequent WTO panel was initiated by Malaysia because the United States was still imposing trade bans unilaterally even though it had not concluded an international agreement for the protection of turtles that included Malaysia. The panel found that using trade bans is inferior to establishing an environmental agreement. However, given that the United States was negotiating environmental agreements on this issue in good faith, the bans were, for the time, acceptable. Malaysia did not challenge whether the new US approach resulted in unfair or arbitrary discrimination against supplying countries, and this latest panel therefore made no judgment on the legitimacy of process protection (WTO 2001c).

This case highlights the possibility that restrictions on trade through process based environmental protection might become legitimised through the review of WTO rules in the light of consistency with multilateral environmental agreements. The risk is that unjustified or arbitrary trade discrimination may be allowed, even if it is not a very effective means of achieving the desired environmental outcomes.

Geographic indications

At Doha, it was agreed that the WTO should undertake talks on the possibility of extending protection for 'geographic indications' beyond wine. Geographic indications are terms that associate particular products or processes with particular regions, such as cheddar cheese, champagne, and Kentucky bourbon. The concept is considered by some to be a form of intellectual property that should restrict production of products with that name, to the specified regions. The European Union was the main instigator, but a number of developing countries have also indicated support for such arrangements.

Geographic indications are based on the concept that production within a particular region, or use of a process associated with a region, is linked to a perception of quality. Currently, there are several bilateral arrangements requiring signatories to protect prescribed lists of the geographic indications of other countries' wine. Through those arrangements, names such as Port, Champagne and Rhine have been reserved for use only by producers located in the relevant regions of Europe. Australian regions including the Barossa and Hunter valleys are similarly reserved.

While such arrangements may seem attractive to countries that produce a product generally considered to be superior, such as Thai silk, Egyptian cotton or Cuban cigars, there is a substantial downside to the extension of such arrangements. The wine agreements require signatories to establish systems to ensure the protection of all geographic indications of other signatories.

If such a system were extended beyond wine, the administrative burden of compliance would be substantial. In addition, the use of names based on particular regions has become so entrenched in differentiating categories of some products that reserving those names to the original place of manufacture alone would require the development of new names for similar, or even indistinguishable, products produced elsewhere. A result would be substantial disruption, confusion and cost to consumers as well as producers throughout much of the world. Cheese provides a good example, where most types, including cheddar, edam, mozzarella, brie and camembert are named after European places, whereas the names are actually being used to indicate a style of product that may be produced in many different locations.

It should be evident from the above that these other issues could be of serious concern to people, whether they live in importing or exporting countries. Governments in countries with protective policies could specify unreasonable or unsubstantiated characteristics to lock out imports. It is also possible to establish such costly administrative arrangements for entry of particular products that the benefits from trade can be eroded or even eliminated.

Two concepts that are embedded in WTO rules should be very important in limiting abuse. One is equivalence and the other is national treatment. The idea behind equivalence is an acknowledgment that the same objectives for food safety, the environment etc can be attained by different measures in different countries or areas because the situations, environment and degrees of risk differ between countries and areas.

National treatment is a fundamental element of the WTO/GATT system — it requires that goods or services that are imported should be accorded no less favorable treatment than like products of national origin (paragraph 4, Article III of the General Agreement on Tariffs and Trade, WTO 1995). These principles along with the focus on scientific justification, as is applied for barriers under the present agreement covering quarantine restrictions, should provide sound guidelines for many of the nontrade measures.

The fundamental objectives in WTO reforms are to make markets more open and less distorted in order to obtain the benefits from more liberal trade. This must remain the central focus in WTO agreements. If, however, precepts in other international agreements such as environmental agreements are at variance with those currently within the WTO and these are given credence in WTO agreements, the damage that they could do to trade and the associated economic gains could be substantial.

So, while these other issues have been given a place in WTO deliberations under the Doha declaration, it is important that they should not be used as means of restricting rather than advancing trade. It is also important that wrangling over the many abstract questions arising from a raft of largely undefinable issues that are only indirectly related to trade, should not be used as a stalling tactic to prevent or delay agreement on agricultural reforms. They should not divert members from the main game in the negotiations, namely reducing barriers to trade and trade distorting subsidies.

Developing country issues

Developing countries have become increasingly important players in WTO negotiations in recent years, and there is widespread recognition within the WTO membership that issues of particular interest to these countries need to be reflected in WTO agreements, including those on agriculture. The heightened awareness of these interests reflects not only the rapidly expanding developing country membership but also increasing awareness of developing country issues by governments of developed countries and advocacy of those issues by nongovernment organisations (NGOs).

Agriculture accounts for a far greater proportion of the economy and of employment in developing countries than in developed countries — there are, however, some exceptions, such as oil rich arid countries. Because of this greater orientation toward agriculture, these countries as a group stand to gain significantly from agricultural trade liberalising reforms. Nevertheless, the effects will differ between individual countries within this disparate group because of differences between the situation of agriculture in their economies and in the agricultural products that they produce.

However, these countries can observe that the large northern hemisphere developed countries — the United States, the European Union and Japan — have been reluctant to make more than cosmetic reforms to their agricultural policies. Despite the Uruguay Round, support in these countries in recent years has differed little from peak levels in the mid-1980s (OECD 2001 and previous). Other developed countries like Australia and New Zealand, that depend heavily on agricultural trade, need to ally themselves with developing country interests if they are to exert sufficient pressure to advance trade liberalising reform for agriculture through the WTO. This alliance of Australia and New Zealand, and also Canada with developing country interests is most obvious with the Cairns group of agricultural exporting countries.

Although it is in Australia's and like minded countries' interests to seek common grounds with developing countries to exert pressure on developed countries to open their markets and reduce their subsidies, such an approach cannot be at the cost of accepting protectionist policies by developing countries themselves, if the goal is to maximise global welfare from trade.

It is now widely accepted within the WTO that particular characteristics of developing countries justify 'special and differential' treatment for them in agricultural agreements. Some of those characteristics include greater potential difficulties in industry adjustment because of a lack of strong social security systems and difficulties in fostering regional food security because of inadequate infrastructure and transport facilities. To date, special and differential treatment has been mainly through lesser agreed cuts for various forms of support and wider exemptions for agricultural subsidies by developing countries than applies for developed countries.

However, there are some developing countries that see the WTO reform process largely in terms of forcing developed countries to open their markets and at the same time allowing developing countries the 'right' to protect their own farmers and not reform their own policies. Such an approach would generally be detrimental to their own economies as well as contrary to objectives being pursued through the WTO.

In recent years, much of the considerable growth in trade by developing countries has been with other developing countries. If many developing countries were to pursue protective policies for their own

agricultural sectors, one consequence would be reduced market opportunities and lower incomes for other developing countries. Also, in a negotiating context, one group of countries seeking legitimisation of protectionist policies for themselves, would play into the hands of developed countries that wanted to maintain their own protection.

Trade reforms through the WTO to open markets and make them less distorted are important for developing as well as developed countries. However, in many developing countries a large part of the gains from trade reform will only be realised if there are also substantial domestic reforms. Such reforms require that key factors that have impeded economic growth in those countries be addressed. Some such factors include ill defined or insecure property rights and legal institutions that do not enable low cost transfers of goods and services, or promote production, trade and investment. Other limiting factors include low levels of literacy and numeracy and underdeveloped logistical networks.

Addressing these limitations will not only increase benefits from trade liberalisation, but should assist with income growth and sustainable economic development whether or not trade liberalisation is successful. Importantly, these factors can be pursued by developing countries independently of progress in the WTO.

Consequently, developed countries can have a substantial positive impact on the long term sustainable economic growth of developing nations through assistance with the necessary reforms as well as by opening their own markets. They can contribute by targeted development assistance to improve infrastructure, health and education. In addition, technical assistance such as specialised training, or outposting of experienced technical staff can help developing countries establish or improve the legal and social institutions that affect trade and economic activity.

Developed countries have been providing some such assistance. However, a substantial part of the assistance provided by large developed countries has been through providing selective assistance to chosen developing countries via preferential trading arrangements. Such arrangements are inherently discriminatory in favor of the chosen group, diverting export opportunities away from countries that do not receive the preferences, many of which are also developing countries. They are demonstrably inefficient, effectively extending high domestic support in the preference giving countries to the preference recipients. They foster continued dependence of the recipients on assistance, and discourage innovation and a broadening of the economic bases in recipient countries (Topp 2001).

The value of these preferences to recipients relies heavily on the gaps between high internal supported prices in the preference providing countries and world market prices. Such gaps may be further eroded if the developed countries reform their own support arrangements, and recipients who rely heavily on them will face significant adjustment costs.

Conclusions

The launching of a new round of trade negotiations at Doha provides an added impetus for the present agricultural negotiations in the WTO and enhances the prospects for successfully concluding a new improved agreement on agriculture.

Nevertheless, the inclusion of some negotiating issues, particularly the overlap between WTO rules and multilateral environmental agreements, could present significant risks to reforming the agricultural trading system.

This, along with other issues prescribed at Doha including animal welfare and expanding the range of products covered by geographic indications, could result in negotiating resources being bogged down in issues that are peripheral to the objective of making markets more open and less distorted by subsidies.

Some of these issues extend well beyond trade considerations and would be best dealt with in other forums in the WTO or other international bodies. Indeed, there are some members that could well use them to sabotage effective agricultural trade reform and as a justification for protectionism.

There has recently been a hardening of protectionist positions in the United States and Japan, and although many countries subscribe in general terms to the desirability of more open, less distorted markets, they are reluctant to embrace liberalisation for agriculture. This presents a particular challenge, not only for efficient agricultural exporting countries like Australia but also for developing countries.

As a group, developing countries would benefit from agricultural trade liberalisation, and they are likely to be more influential in the present negotiations than formerly. The special needs of developing countries must be addressed if the current negotiations are to succeed.

Necessary internal reforms and assistance from developed countries with education and improved infrastructure, along with trade liberalisation, would help with this.

However, some developing countries view their special conditions as justifying high protection of their own agriculture, which would be to their own economic cost as well as prejudicing a successful outcome for agriculture from the WTO round.

The new trade round presents an opportunity for realising increasing benefits from more liberal agricultural trade and less distorted markets.

However, vigilance will be required to ensure that what is agreed actually opens markets further and makes them less distorted. There are currently many threats to such an outcome and many issues being injected into the agricultural trade policy debate that can divert us from the main game.

References

Crousse, D. 1999, 'Guest editorial: the WTO shrimp turtle case', Marine Turtle Newsletter, 83:1-3.

Environmental Issues 2001, 'Trade in GM crops: the Cartagena protocol', Environmental Issues, (http://environment.about.com/library/ weekly/blbiotech5.htm), 19 December.

Moschini, G. 2001, 'Who is afraid of the precautionary principle', Iowa Ag Review, Fall, 7(4), Centre for Agricultural and Rural Development, Iowa State University, Ames.

Nelson, R. and Andrews, N. 2001, 'Agenda 2000: The European Union's reform package for grain', Australian Commodities, 8(2):317–30.

Orden, D., Paarlberg, R. and Roe, T. 1999, Policy Reform in American Agriculture: Analysis and Prognosis, University of Chicago Press.

OECD (Organisation for Economic Cooperation and Development) 2001, Agricultural Policies in OECD Countries: Monitoring and Evaluation: 2001, Paris.

Oxley, A. 2001, Doha and the Threat of EU Environmental Trade Coercion, APEC Study Centre, Melbourne.

Roberts, I., Podbury, T., Freeman, F., Tielu, A., Vanzetti, D., Mélanie, J. and Hinchy, M. 1999, Reforming World Agricultural Trade Policies, ABARE Research Report 99.12, RIRDC Publication no. 99/96, Canberra.

Topp, V. 2001, Trade Preferences: Are They Helpful in Advancing Economic Development in Poor Countries? ABARE Report, Canberra.

WTO (World Trade Organisation) 1995, The Results of the Uruguay Round of Multilateral Trade Negotiations: The Legal Texts, Geneva.

—— 2000a, EC Comprehensive Negotiating Proposal, G/AG/NG/ W/90, Committee on Agriculture Special Session, 14 December.

—— 2000b, Notification Concerning Domestic Support Commitments by Japan, G/AG/N/JPN/ 47, Committee on Agriculture, 21 February.

—— 2001a, Notification Concerning Domestic Support Commitments by Japan, G/AG/N/JPN/ 61, Committee on Agriculture, 28 February.

—— 2001c, United States – Import Prohibition of Certain Shrimp and Shrimp Products, Report of the Panel, WT/DS58/R, 15 May.

NEGOTIATING WINS FOR AUSTRALIA IN AGRICULTURE

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In November 2001 Ministers from 144 members of the World Trade Organisation (WTO) meeting in Doha, Qatar agreed to launch a new round of broad-based trade negotiations. This was a welcome outcome for Australia – not only because the launch of a new round of trade negotiations was our highest trade policy priority, but also because the Ministerial Declaration launching the Round addressed all of Australia's key concerns.

For Australia this successful outcome involved extensive technical work and dialogue and negotiations - at home with domestic stakeholders, and abroad working alongside the WTO-member partners with whom Australia shares common interests of strengthening to the greatest extent possible the rules of international trade.

One of the most important outcomes for Australia in the Doha Ministerial Declaration was the inclusion of ambitious language which opens the way for comprehensive negotiations further to reform global agricultural trade. The mandate agreed in Doha provides for "substantial improvements in market access; reductions of, with a view to phasing out, all forms of export subsidies; and substantial reductions in trade-distorting domestic support."[1]

Australia's negotiating objectives are for agriculture to be fully integrated into the WTO rules; for agricultural tariffs to be brought down to the level of those in other goods; to eliminate the billions of dollars spent every year on export subsidies; and substantially reduce the billions spent every week on distorting domestic support.

We are under no illusions about the enormity of this task. Seven years after the end of the Uruguay Round, world markets for agricultural products are still characterised by huge subsidies and high levels of protection. In 2000, the OECD reported that its members provided US$ 327 billion in subsidies to agriculture – compared with US$ 43 billion in developed country aid to developing countries.[2]

These are depressing statistics for an efficient agricultural producer like Australia, and also for the developing countries making up the bulk of the Cairns Group, which rely heavily on their agricultural sectors for growth and development. Confronting this bleak picture, it is sometimes easy to overlook the importance for Australia (and the Cairns Group) of achieving agreement in the WTO seven years ago to a legally binding instrument dealing with trade in agricultural commodities. But now, as we embark on another round of multilateral negotiations, it is important to remind ourselves of the fundamental importance and relevance of the Agreement on Agriculture.

Firstly, long experience has shown that the problems of agricultural support and protection cannot be addressed effectively by trade liberalising methods such as bilateral Free Trade Agreements. This is partly because of the political dynamic but partly also because it is not possible to address subsidies which have a global impact in the context of a purely bilateral FTA. It is through continuing to negotiate at the multilateral level that we and coalition partners in the Cairns Group maximise our push for reductions in trade distorting measures that will translate into meaningful gains in global agricultural trade.

Secondly, inclusion of the Agreement on Agriculture into the body of GATT law means members have recourse to WTO dispute settlement mechanisms to resolve agricultural trade disputes. The dispute settlement system, "a central element in providing security and predictability to the multilateral trading system"[3], provides for a system of both compulsory and binding jurisdiction, with remedies for the enforcement of rulings. To date Australia has successfully prosecuted four WTO complaints, all of which have resulted in improved market access for agricultural commodities. These include:

In March 1998 India was required to phase out quantitative restrictions on a range of agricultural and manufactured goods.

In July 1997 Hungary was required to cease using agricultural export subsidies on several items.

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[1] Doha Ministerial Declaration, WTO Secretariat WT/MIN(01)/DEC/W/1

[2] Agricultural Policies in OECD Countries: Monitoring and Evaluation, OECD (2000), p26.

[3] Article 3.2 of the Understanding on Rules and Procedures Governing the Settlement of Disputes.

In July 2000 Korea was required to liberalise its beef import and retail arrangements as then existing arrangements were found to be a significant barrier to beef imports.

In 2001 the United States was required to remove its safeguard arrangements on lamb imports.

Thirdly, the Agreement on Agriculture has conferred some real benefits on Australian agricultural exporters – market access improvements for Australian agricultural products being the primary and most visible of these. This not only includes outcomes negotiated during the Uruguay Round itself, but also outcomes achieved when countries acceding to the WTO have to agree to a package of market opening measures and changes in their domestic regulations as part of that accession process. In the latter regard China's recent entry into the WTO and attendant reforms undertaken by China in its agriculture sector will provide new opportunities for Australian exporters to secure a much larger share of an expanding commodities market including in barley, cotton, sugar, wheat and canola.

Market access wins

Improvements in access to export markets are rarely defined by a single event or outcome. In the seven years since Uruguay Round Agreements entered into force, Australian successes in developing or forging new markets for agricultural exports have been influenced by a range of factors - economic crisis in East Asia, devaluation of the Australian dollar, strengthening/weakening of commodity prices in response to supply/demand factors, the global slowdown post September 11, outbreaks of disease and climatic events. However, important in underpinning improvements in market developments for a number of Australian exports have been the range of market access agreements and support reduction commitments arrived at during Uruguay Round negotiations.

For instance the Uruguay Round access into Japan for certain cheeses has underpinned a strong export performance by the Australian dairy industry, with cheese exports to Japan increasing from A$150 million in 1994 to A$340 million in 2000. Globally, Australian exports of dairy products have doubled, from A$1.3 billion in 1994 to $ 2.6 billion in 2000.[4]

Prior to the Uruguay Round many Asian rice markets were closed or highly restricted to Australian exports of rice. During the Round, Australia negotiated market openings in a number of Asian countries. As a result, available markets increased in value from less than US$250 million in 1990 to more than US$2.5 billion in 1999.[5] Australia's higher-priced, higher-quality rice has made real inroads in the Japanese markets. Australia has just won its first tender for rice to Korea.

Beef exports markets into Japan, US and Korea have also benefited considerably as a result of Uruguay Round outcomes. The remainder of this paper is devoted to a brief case study of beef exports into these three markets.

Australian beef exports

In its submission to a House of Representatives Standing Committee inquiry into the benefits to rural Australia of international agricultural trade reform, Australian meat and livestock industries estimated that liberalisation of beef markets in 2001 in Japan, Korea, the European Union, United States and Canada will provide gains up to A$4.93 billion over the period up to 2011[6]. Modelling for the same submission has indicated that the opening of the Japanese and Korean markets in particular in 1990-1997 have increased the gross value of Australian production by around 10 per cent – with prices rising 3 per cent on average and export sales increasing by 7 per cent.[7]

[4] Composition of Trade Australia, 2000, DFAT, p213.

[5] Uruguay Round Outcomes: Agriculture, DFAT (1994) pp26-30; DFAT STARS database.

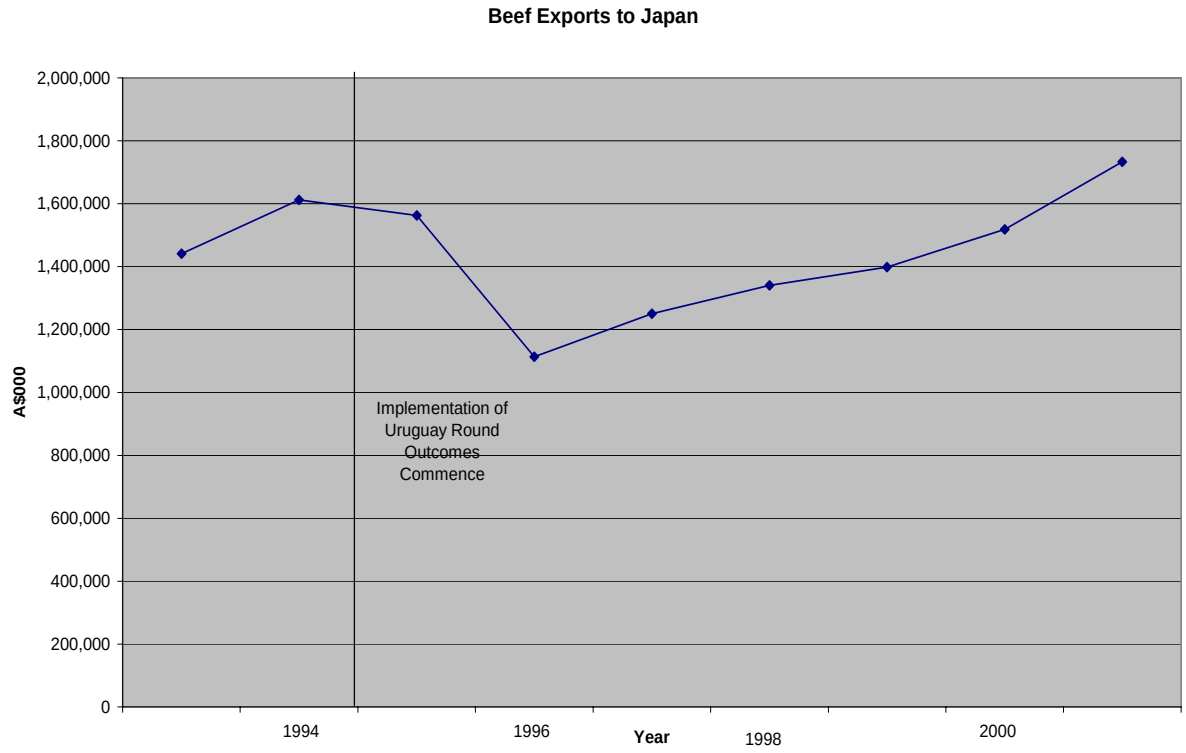
6. "Benefits to the meat and livestock industry from agricultural trade reform", Australian meat and livestock industries' submission to the House of Representative Standing Committee inquiry into the benefits to rural Australia of international agricultural trade reform (1997), p9.

[7] ibid. p4.

Japan

Liberalisation of Japan's beef market began in 1989 with the removal of quantitative restrictions, replaced with tariffs which are declining over time. In the Uruguay Round, Japan committed itself to further reductions in tariffs from 50% in 1993 to 38.5% by the end of the implementation period in 2000 with a safeguard clause which permitted the Japanese government to raise the tariff to 50% for a limited period if imports exceeded a critical level.[8] The safeguard has been triggered on several occasions.

Graph 1



Source: ABS statistics

Liberalisation and associated reductions in prices for Japanese consumers have led to significant increases in imports over the first half of the 1990s (reflected in graph 1) ABARE analysis suggests that this growth may have been greater had the entire price reduction been passed on to consumers. Relative lack of competition in the Japanese retail market has been cited as the reason that this did not occur.[9] The mid-1990s shows a steep dip in exports – a function of decreased demand with the onset of the East Asia crisis. From 1997 onwards a period of relative static demand - but starting from a higher base than in the pre-liberalisation period - has reflected flat incomes and health and safety concerns about imported beef.

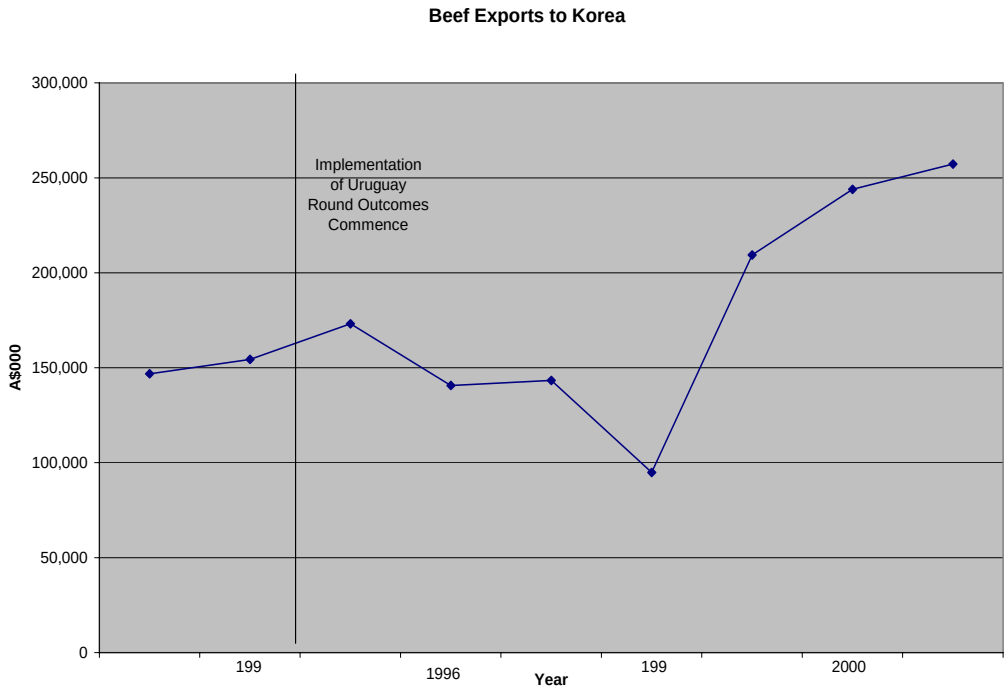
[8] op cit, DFAT (1994), p21.
[9] Agricultural Trade Policies in Japan: The Need for Reform, ABARE(2001), p49.

Korea

Australian beef markets into the Republic of Korea have doubled in value since the conclusion of the Uruguay Agreement on Agriculture was finalised. Korean commitments during the Uruguay Round included a quota increase from 123,000 tonnes to 225,000 tonnes over the five year implementation period with complete quota elimination by 2001, when the market moved to a tariff-only basis. Associated with this was a tariff quota reduction from 43.6% in 1995 to 40% in 2004. Removal of restrictions on imported beef is estimated to increase Australian beef sales to Korea from 70,000 tonnes to 90,000 tonnes by 2002, a gain of approximately A$200 million per year.

Graph 2 tells the story of Australian beef exports to Korea with a steep dip in growth over the period of the East Asian crisis with Korea unable to meet its minimum import requirements in 1998[10]. Recovery of the Korean economy on the back of strong commodity prices and a depreciating Australian dollar has prompted an increase in demand for beef. The successful challenge in the WTO by Australia and the US against discriminatory measures imposed by Korea for imported beef, ranging from the imposition of discriminatory border measures through the entire distribution chain to retail butcher shops is expected further to bolster strong demand.

Graph 2



Source: ABS statistics

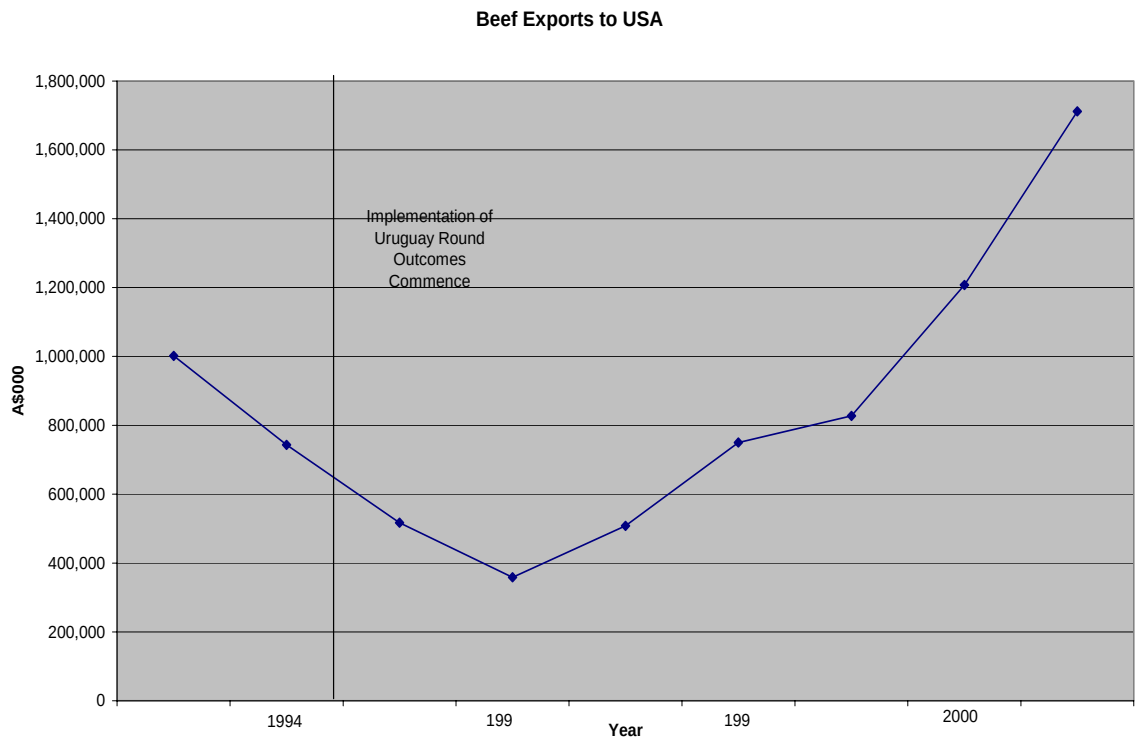
[10] Korea Rebuilds: From Crisis to Opportunity, East Asia Analytical Unit (DFAT), (1999), p129.

United States

US commitments on beef during the Uruguay Round included replacement of the Meat Import Law with tariff-only protection and increased access through tariff quotas. This led to an immediate increase of 17% in access in 1995 compared with the level in 1994 and a global quota of 656,621 tonnes of which Australia had a 57.6% market share[11]. The out-of-quota tariff rate decreased minimally – from 31.1% to 26.4% from 1995-2000.

Graph 3 reflects the value of beef exports to the US market. During 1999, 34 per cent of Australia's beef exports were to the United States.

Graph 3



Source: ABS statistics

More difficult to measure in terms of market access implications, but no less significant for beef outcomes was US agreement during the Uruguay Round to reduce the volume of beef eligible for export subsidies from 22,265 tonnes in a 1986-1990 base year to 17, 589 tonnes by 2000.

Similarly the European Union reduced by 26% its subsidised beef exports. We consider this to be a major factor accounting for the increase in exports of chilled and frozen beef to Russia, from 4522 tonnes in 1996-97 to 29,402 tonnes in 1997-98. Reductions in EU export subsidies also led to Australia being more competitive in markets such as Bulgaria, Croatia, Hungary and South Africa.[12]

Conclusion

Success in moving forward Doha agriculture negotiations requires sustained enthusiasm and commitment. This must be underscored with a clear sense of the importance and relevance of the Agreement on Agriculture, and an understanding of the scope for potential real benefits to Australia's agriculture sector.

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[11] op cit. DFAT (1994), p18.
[12] Trade Outcomes and Objectives Statement, DFAT (1999), p225.

References

ABARE (2001) Agricultural Trade Policies in Japan: The Need for Reform, “Benefits to the meat and livestock industry from agricultural trade reform”, Australian meat and livestock industries’ submission to the House of Representative Standing Committee inquiry into the benefits to rural Australia of international agricultural trade reform (1997)

DFAT (1994) Uruguay Round Outcomes: Agriculture

DFAT (1999) Trade Outcomes and Objectives Statement,

DFAT (2000) Composition of Trade Australia

East Asia Analytical Unit (DFAT) (1999) Korea Rebuilds: From Crisis to Opportunity,

OECD (2000) Agricultural Policies in OECD Countries: Monitoring and Evaluation,

WTO Secretariat, Doha Ministerial Declaration, WT/MIN (01)/DEC/W/1

Single Desk Selling and The NSW Grains Board – Selling A Pup To The Public

Bob Farquharson and Garry Griffith

NSW Agriculture

The debate about Government-mandated agricultural marketing arrangements was given a new direction in 1995 with the agreement of the Council of Australian Governments on a net public benefit test for legislative review (Council of Australian Governments 1995). The focus in policy analysis was shifted from the previous justification of 'improved marketing', from the producer's perspective, to that of a broader societal view.

A recent Review conducted in the net public benefit context (NSW Government Review Group 1999, Farquharson and Griffith 2001) showed that the estimated gains from restrictions to competition written into the *NSW Grain Marketing Act 1991* were not likely to be positive. Overlaying this review process has been the much-publicised bankruptcy of the NSW Grains Board. The reasons for that failure have been investigated, and further review processes are continuing. However, we contend that the operational reasons for the financial failure are not necessarily connected to the above public benefit test finding, and that this is an important point to make in the policy debate. In this paper we review the NSW Grains Board analysis of Farquharson and Griffith (2001) in the context of recent industry developments.

Single desk selling, price discrimination and the public benefit

All members of COAG endorsed a Competition Principles Agreement to review legislation that restricts competition (Milham and Davenport 1999). The Agreement required that legislation should not restrict competition unless it could be demonstrated that the benefits to the community as a whole outweighed the costs, and that the objectives of the legislation could only be achieved by restricting competition.

In the case of the NSW Grains Board, the Act granted vesting of certain coarse grains and oilseeds (principally malting barley, feed barley and canola) in the Board and the power to sell as a single desk. The Act also allowed the Board to impose a $1.50 per tonne levy on 'authorised buyers' of these grains in NSW. In terms of concepts of economic theory, vesting and single desk selling are the monopsony (single buyer) and monopoly (single seller) cases, respectively. Farquharson and Griffith (2001) focused on single desk selling as a restriction to competition in the above framework.

For the Review of the NSW Grains Board two questions were addressed. First, was the Board able to use its single desk selling power to alter market outcomes in certain ways? Second, if this was the case, was there a net public benefit involved? The Board's use of single desk selling was considered a restriction to competition if it was used to "price discriminate" (or 'price to market'). The first question therefore involved an assessment of whether the NSW Grains Board was able to price to market and the second involved the net social benefit evaluation of that ability, if it had occurred.

Three types of price premiums are possible (Meyers Strategy Group 1996) – competitive, market restriction and price discrimination (see the first box). Of these, price discrimination was the only one considered relevant in a restrictions-to-competition context. However, we need to be careful in considering the concept of price discrimination. Lipsey, Langley and Mahoney (1981) noted that price discrimination often has a bad reputation. It is prohibited under Section 49(i) of the Trade Practices Act (in relation to the prices charged to different purchasers), but judging whether price discrimination is good or bad depends on the details of each case, as well as personal value-judgements.

Types of price premiums

A seller or marketer of a product can obtain three types of price premiums. These are:

- 'competitive' premiums reflecting normal pricing activities of suppliers attempting to achieve the highest possible price in a market and/or gain a sale over a competitor;
- 'market restriction' premiums which can be generated as a result of intervention by governments in a market such as the use of quotas, tariffs, subsidies or taxes; and
- 'price discrimination' premiums resulting from the ability of a supplier to price discriminate to customers, or 'price to market', based on some market power.

Of these the first two were not considered relevant in a Competition Principles context, but the third was. Vesting and single desk arrangements are commonly associated with market power and price discrimination premiums and these were the focus for the review.

Was the NSW Grains Board able to price discriminate?

In theory the restrictions to competition can generate a benefit to producers in an agricultural industry through effective price discrimination. This involves using legislative fiat to acquire stocks of produce and adjust quantities sold in different markets, impacting on prices received and raising revenue for producers. The first question above asks whether the Board was able, in theory and practice, to price discriminate. The necessary conditions for this question are discussed in this section, and evidence for the sufficient conditions is presented in the next. These sections follow closely the information presented in Farquharson and Griffith (2001).

The ability to price discriminate across markets depends on two key assumptions, that markets are separated in some dimension, and that different demand relations (price elasticities) exist in the markets. If the demand relations differ between markets, then equating marginal revenues means that different prices are received in the different markets. Prices are higher in those markets where the exporter faces relatively inelastic demand. So a supplier, such as a central selling agency with market power, may be able to achieve price premiums in some markets, which are sufficient to increase overall returns to the industry. In theory a rule can be used to maximise profit to the supplier under this arrangement.

The amount by which prices can be increased depends on market share and demand elasticities. Evidence and *a priori* thinking for each of the three grain types indicated that there was likely to be potential for price discrimination between markets (domestic versus export) on the basis of varying demand elasticities. However, offsetting this is that the Board's sales as shares in export markets were often small.

Evidence of price differences

The sufficient condition to be met for price discrimination is that prices must differ substantially between markets. Statistical tests following those described in Griffith and Mullen (2001) were conducted of sales data provided by the Board. The analytical model tested the effects of market, year and exchange rates in explaining FOB grain prices received by the Board.

The maintained hypothesis was of a single competitive market (ie a single price) for sales of the given commodity by the Board. The alternative hypothesis was of an imperfect market involving price discrimination. If some of the individual market influences were not zero, and the price was higher in the less elastic market, then price discrimination could have occurred and price premiums could have been obtained.

For feed barley and canola there were no significant statistical relationship suggesting price differences of this sort. This suggests a competitive market for these products. However, the analysis indicated that malting barley prices on the domestic market were higher than on export markets, suggesting the possibility of price discrimination.

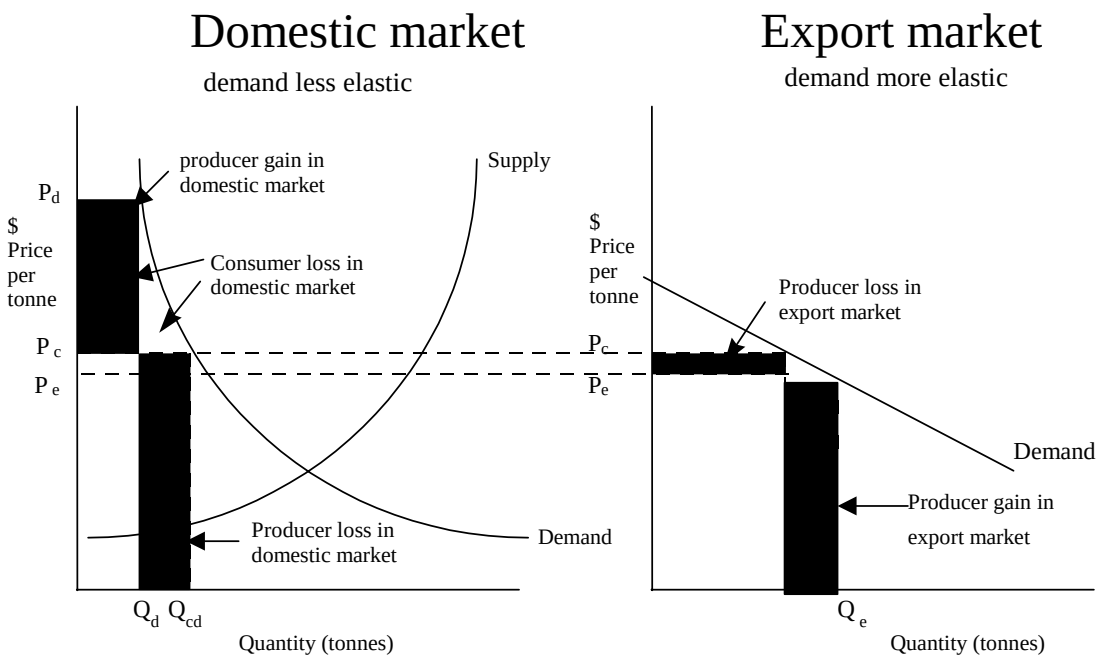
When combined with the conditions considered necessary for price discrimination, this evidence indicates that price discrimination may have occurred for malting barley. The next step was to measure the costs and benefits to affected parties.

Evaluating the effects of price discrimination

The existing price and quantity information in each market was the starting point for the analysis of benefits and costs of the arrangements. The requirement was to estimate the prices and quantities that would have occurred in each market, *if price discrimination were not practised*, ie if the law of one price prevailed. With this information the producer revenues and consumer/end-user impacts of removing the competition restriction could be valued. The methodology developed by the Centre for International Economics (1997) was used to make these calculations.

The methodology, assumptions, analysis and results used in this evaluation are presented in Farquharson and Griffith (2001). The graphical representation of price discrimination is presented in Figure 1. The observed domestic and export prices under the current (price discrimination) arrangements are P_d and P_e, respectively. Using assumptions about the demand elasticities in each market and an equilibrium equation, the equilibrium price P_c was then calculated. This information, together with observed prices and quantities, allowed estimation of consumer and producer benefit levels associated with price discrimination compared to the perfect competition case. These benefits are calculated using the concepts explained in the second box.

Figure 1: Graphical representation of price discrimination



Economic surplus concepts

Consumers are said to receive utility or "surplus" from the purchase of a good or service if the price they pay for the good or service is less than the price they would have been willing to pay. If their willingness to pay is represented by their demand curve, the area under the demand curve and above the price line typically measures consumer surplus (to all consumers).

Similarly, producers are said to receive "surplus" from the sale of a good or service if the price they receive for the good or surplus is greater than the price they would have been willing to accept. If their willingness to accept is represented by their supply curve, producer surplus (to all producers) is typically measured by the area above the supply curve and below the price line.

The analysis for malting barley showed that the operations of the Board delivered a small net benefit to producers. It indicated that the Board price discriminated between domestic and export markets and, as a result, prices on the domestic market were higher. This implies that processors of malting barley paid a higher price, resulting in a net cost to them.

For a best estimate of the export demand elasticity of –10, the results indicated a net gain to grain producers of $0.206 million per annum, a net processor/consumer loss of $1.235 million per annum, and an overall net cost of $1.029 million per annum. These results assumed that the Board knew with certainty the values of export demand elasticities, and further that it used that knowledge to maximise returns to growers. In sensitivity analyses these assumptions were relaxed, but the results were seen to be quite stable and there was never likely to be a net (positive) benefit for the NSW economy as a whole from price discrimination in malting barley markets.

Failure of the NSW Grains Board

A Public Accounts Committee of the NSW Parliament found that reasons for failure of the NSW Grains Board included a conflict between the Board structure and incentives, industry change, the high growth strategy pursued by the Board in later years, and other operational factors (Public Accounts Committee 2001). These reasons are not related to the public benefit test. However, there is a link in that the high growth strategy appears to have been prompted by the deregulatory push and the review under National Competition Policy (NCP) guidelines (Wyatt and Allen 2000, p. 3).

Issues in monopoly selling

The results above indicate that in a strict consumer surplus/producer surplus context there were unlikely to be net public benefits from the price discrimination model used to assess the activities of the NSW Grains Board. Examination of Figure 1 leads to the conclusion there are never likely to be net public benefits in this context.

The transfer of product from domestic to export markets leads to higher prices paid by domestic consumers or manufacturers, a transfer of surplus in the domestic market from consumers or manufacturers to producers, and an associated efficiency loss to consumers or manufacturers. Product shifted to the export market is likely to earn a lower price with no net gain. However, there are other broader considerations that can be considered in considering such arrangements (Lipsey *et al.* 1981).

A review of the national Wheat Marketing Act by an independent Committee also considered the effects of single desk selling of bulk export wheat (Irving, Arney and Lindner 2000). This Committee could not find clear, credible and unambiguous evidence that these arrangements for the marketing of export wheat were of net benefit to the Australian community.

This is very difficult to do in the broader context beyond consumer surplus/producer surplus measures. Irving *et al.* (2000) considered that any single desk price premiums were likely to be small; and that because there was uncertainty about the magnitude of the key effects (single desk price premiums, innovation in marketing, and grain supply chain costs) there was uncertainty about whether or not there were net benefits to Australian wheat growers and the Australian community.

The Federal Government response was to retain the legislative underpinning for Australia's single desk arrangements for exporting wheat (Truss 2001), with a possible review in 2004 depending on government political decisions.

For barley, the deregulation of the Victorian industry in 2001 (Brumby and Hamilton 2000) occurred on the basis that there was no compelling reason for an export monopoly and that this was expected to stimulate investment and innovation. While the South Australian and NSW (Amery 2000) industry regulated arrangements have been maintained, the Victorian move will provide additional dynamics and a test of state allegiances.

The availability and level of cash prices offered to Victorian producers, and the development of a freer market with more certainty for companies and investors will allow an interesting comparison in 5 or 10 years time.

Concurrently, there have been changes in the co-operatively-owned Bulk Handling Authorities, with Graincorp and VicGrain merging, The Grain Pool of WA and Co-operative Bulk Handling Limited merging, and GrainCo taking over the NSW Grains Board. At least some of these entities are becoming involved in trading grains.

There is also vertical integration with AWB Limited and FreightCorp combining in joint rail freight agreements to invest in Victorian and NSW rail and grain handling infrastructures. These include construction of high volume grain freight consolidation facilities at several centres and investment in grain wagons for rail transport.

Thus, there is an expansion of handling and transport authorities into grain trading, and of trading organisations into handling, transport and storage. This vertical integration should allow further competition and efficiencies in the industries.

This is no doubt being driven by commercial pressures, but also by the public inquiry process in the competition policy framework as evidenced in Irving *et al.* (2000) and NSW Government Review Group (1999).

For the time being, the debate about monopoly selling powers has appeared to subside. However, the issue will surface again if governments again decide to review legislation. The measurement of direct benefits from single desk selling will be complicated by new commercial structures, but there will be more information as a basis for analysis.

There may also be less importance placed on the net public benefit test if NCP guidelines are watered down. However, debate and analysis of the benefits from a single desk arrangement will be part of the process.

References

Amery, Richard (2000), 'State Government Retains Vesting Powers of NSW Grains Board', Media Release, Minister for Agriculture, Sydney.

Brumby, John and Hamilton, Keith (2000), 'Victoria opens its $102 million barley market to export competition', Media Release, Minister for Agriculture and Office of the Treasurer, Melbourne.

Centre for International Economics (1997), Review of the Victorian and South Australian Barley Marketing Act 1993: Under the National Competition Policy Review Legislative Restrictions on Competition, Canberra.

Council of Australian Governments (1995), Competition Principles Agreement, Memorandum between Governments, Canberra.

Farquharson, R.J. and Griffith, G.R. (2001), 'Single Desk Selling by the NSW Grains Board: Public Benefit or Public Cost', *Australian Agribusiness Review*, Paper 6, Volume 9. Available on line at: http://www.agrifood.info/Review/2001v9/Farquharson/FarquharsonGriffith.htm

Griffith, G.R. and Mullen, J.D. (2001), 'Pricing-to-market in NSW rice export markets', *Australian Journal of Agricultural and Resource Economics* 45(3): 323-334.

Irving, Malcolm, Arney, Jeff and Lindner, Bob (2000), *National Competition Policy Review of the Wheat Marketing Act 1989*, NCP – WMA Review Committee, Canberra.

Lipsey, Richard G., Langley, Paul C. and Mahoney, Dennis M. (1981), *Positive Economics for Australian Students*, Weidenfeld and Nicolson, London.

Meyers Strategy Group (1996), 'Economic Analysis of the Value of the Single Desk', Confidential Report to the Australian Barley Board, Sydney, April.

Milham, N. and Davenport, S. (1999), 'Plant and Animal Health Regulation: Some Competition Policy Issues', *Agribusiness Perspectives*, Paper 19. Available on line at: http://www.agrifood.info/Review/Perspectives/milham.htm

NSW Government Review Group (1999), *Review of the NSW Grain Marketing Act 1991: Final Report*, The Government of New South Wales, Orange.

Public Accounts Committee (2001), *Inquiry into the Collapse of the New South Wales Grains Board*, Report 10/52 (No. 128), Sydney.

Truss, Warren (2001), 'Wheat single desk to remain', Media Release, Minister for Agriculture, Fisheries and Forestry, Canberra.

Wyatt, S. and Allen, L. (2000), 'NSW Grains Board losses top $8.5m', [Online]. Available:http://www.afr.com.au/news/20000728/A34723-2000Jul27.html [2000, 28 July].

Loving, Losing and Living With Our Environment

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Abstract

The messages of this paper are as follows.

- When it comes to protecting the environment, love is not enough.
- Money is not enough either, particularly if we spend it unwisely.
- Living with some environmental degradation is the best option.
- We need to prioritise and plan based on good science and economics.
- We need to invest in creating innovative new solutions to environmental problems.

Introduction

This is a broad-ranging paper in which I attempt to pull together some of the lessons which have arisen from new research and analysis over the past four years. It brings together consideration of natural ecosystems, social issues, economics, physical science, commercial agriculture and politics.

For the purposes of this paper, I consider the environment to have two elements which are inter-dependent, but distinct: (a) natural ecosystems and their elements (habitat, native species, biodiversity) and (b) natural resources consumed by people or used by people in earning their income (particularly land and water).

One thing I am not going to do is focus on the impacts or the costs of environmental degradation. For one thing, we all know already that they are large; the numbers continue to get bigger and more distressing. But more importantly, I believe it is unhelpful to focus too much on the costs. They can mislead us about the nature of the problem and distract us from the appropriate responses.

The focus of the paper is land degradation, and particularly salinity. I have maintained this focus, although much of the paper is relevant to environmental issues more generally.

The paper is structured around a number of key messages, which form the section headings through the remainder of the paper.

1 Love is not enough

Since the early 1990s, the most prominent and by far the best resourced government response to environmental problems in Australia has been through programs like the National Landcare Program and later the Natural Heritage Trust. These are complex and multifaceted programs, but the essence of their aim is to tap into and support the conservation ethic of good-hearted people, and to strengthen that ethic where possible. Subsidies for environmental protection have been provided but they have been small relative to the true costs borne by participants, and so the programs have really been about people taking voluntary action and making generous sacrifices for the good of the broader community.

In South Australia in 2000, over 70,000 volunteers were involved in environmental projects through government programs. Clearly, this constitutes a considerable success story. The programs have raised awareness of environmental issues to new levels, and mobilised many volunteers into action.

Increasingly, however, it is recognised that the total scale of this response is not sufficient to address some of the serious environmental problems we face. Earlier general critiques of the assumptions and expectations of the Landcare program (e.g. Curtis and De Lacy, 1997; Lockie and Vanclay, 1997) are now supported by empirical evidence about the limited extent of change in land management which has actually occurred (e.g. Kington and Pannell, 2002; Curtis et al., 2000).

If environmental management was a high jump competition, we would not even be clipping the bar, but passing right underneath it. Furthermore, the apparent height of the bar has been rising, as new empirical evidence (e.g. George et al., 1999) and computer modelling studies (e.g. Campbell et al., 2000; National Land and Water Resources Audit 2001; Stauffacher et al., 2000) emphasise that the task at hand is even more substantial than previously thought. We are starting to appreciate that it was actually a pole vaulting contest all along, but we have not provided the competitors with poles.

Is it conceivable that a scaled up Landcare/NHT program might be able to convince more people to change their land management, and convince all of the existing participants to change by much more than they already have? Predicting what people will do is certainly difficult. Before the collapse of the South Sea Company in England in 1720, Isaac Newton was heard to say,

'I can calculate the motions of the heavenly bodies but not the madness of the people.'

Nevertheless, there is now a wealth of empirical evidence on the factors that influence farmers' adoption of innovations (see reviews by Feder and Umali 1993; Feder et al. 1985; Lindner 1987; Pannell, 1999; Pannell, 2001c), and it includes some very clear-cut messages. Unfortunately, responding to these messages is often not straightforward. We can identify the conditions necessary to achieve adoption of an agricultural innovation but it remains difficult to meet the conditions.

In the case of land management for land and water conservation, there are many factors which have contributed to lower adoption than desired. However, in my judgement the single factor which has been most decisive and most neglected is cost. If the cost of change is low enough, low intensity programs like Landcare and NHT can make a real difference. We could all point to examples where this has occurred. On the other hand, where the cost of change is very high and greatly outweighs any private benefits from the change, the outcome is usually not hard to predict. The focus on "people issues" and "social processes" in Landcare/NHT has resulted in a complacency about the issue of cost, at considerable cost to the environment of Australia.

A related issue is "burnout". Love does not necessarily last forever, particularly if the object of our love is unresponsive, and the environment, of course, can be cruelly fickle. There is a widely observed increase in Landcare burnout amongst previously committed farmers and farmer groups (e.g. Frost et al., 2001) and also among some Landcare professionals. Marsh (2001), considering the plight of Landcare facilitators who are now observing the raising of the high jump bar to pole vault heights, notes

"These developments put serious pressure on people already working in difficult, unsupported circumstances. It is important to critically evaluate Landcare, but it is also important not to devalue effort that has been expended in good faith, or lose human capacity at the individual and community level that has been built by the Landcare movement. It is also essential for Landcare to move on, in the light of a new understanding of the problem and what is required to address it. This is often more difficult than it seems."

I have argued elsewhere (Pannell, 2000) that there are some ethical imperatives for government to move on, beyond the well established Landcare/NHT approach. For one, greater effort is needed to provide honest and competent information to landholders about the costs and benefits *to them* of the available management responses. For another, government has an ethical imperative to have environmental policies which are effective. A policy that relies on farmers complying voluntarily with ethical principles that they may or may not agree with will not be effective.

2 Money is not enough either, particularly if we spend it unwisely

One outcome of the growing appreciation of the scale of the problem has been the emergence of proposals for dramatically increased funding. The most prominent has been that of the National Farmers Federation and the Australian Conservation Foundation (based on an analysis by Virtual Consulting Group and Griffin NRM, 2000), which appears to have influenced Toyne and Farley (2001). The NFF/ACF proposal's bottom line cost of $65 billion over 10 years has been widely publicised. While I am very sympathetic to the idea that the government should make a greater contribution towards protecting the environment, it is most unfortunate that this proposal should be the vehicle for pursuing it. Some might be prepared to excuse its manifest and manifold failings on the grounds that it is purely a political device, but in the present context, where we desperately need a more rational, logical and scientifically sound policy (Pannell, 2001a, 2001b), flawed proposals need to be criticised.

The core problem with the proposal is that it considers only the cost side of the equation and ignores the benefits. In other words, it is based on an assumption that all environmental degradation is worth fixing, so all we need to do is quantify the costs of the required measures and then seek them.

In reality, there is great variability in:

- the environmental, social and economic values at stake
- responsiveness of the environment to management
- the real cost of implementing treatments

In many of the locations which would be treated at considerable expense under the NFF/ACF plan, the values at stake are not high enough, or the environment is not sufficiently responsive to management or the real cost of management is too high, so that living with and adapting to some environmental degradation is, on balance, the best strategy for the community. For salinity, in particular, it is very easy to spend very large amounts of money in ways which generate little or no benefits. We have done just that with “large” amounts of money in the NHT program. I sincerely hope that we will not proceed to do it with “extremely large” amounts in some future program.

To properly weigh up the benefits of the land-use changes advocated in the NFF/ACF proposal, we would need to consider not only their direct costs but also their indirect costs (e.g. reduced runoff of fresh water in some catchments), the effectiveness of the changes, the value of the degradation avoided, the timing of the benefits and costs, and the alternative uses of those funds. The alternative uses include: other methods of achieving the same outcomes (e.g. engineering methods are likely to be more effective than perennial plants in some cases), other environmental problems which may be more pressing or more amenable to management, and development of new technologies for environmental management rather than relying on direct subsidies.

A determination to prevent all environmental degradation at any cost only makes sense if one is willing to overlook the potential alternative uses for these enormous sums of money, including improved services for people with mental and physical disabilities, health services, poverty alleviation, education, and so on. Of course the environment can and should hold its own in the allocation of resources, but one cannot sustain an argument that it should take precedence over all other uses of public funds. By unrealistically proposing to prevent or repair all land and water degradation, the NFF/ACF proposal sidesteps one of the most pressing needs of good environmental policy, which is that it prioritises well, based on sound science and economics.

3 Living with some environmental degradation is the best option

Prevention might be better than cure, but it is not necessarily better than living with the disease. The side effects of preventative medicine might do more damage than the disease itself. Tradeoffs of this type are an everyday reality in medicine, and they are also highly relevant to decisions about the environment. In particular, much of the forecast salinisation of land is not technically avoidable without changes in land use which are so large and costly that they would be judged by most people to outweigh the resulting benefits, which are often partial and long delayed. Two case studies illustrate the point.

Case Study: Wanilla, SA

Table 1 shows several systems of perennial vegetation analysed by Stauffacher *et al.* (2000) for Wanilla Catchment on the Eyre Peninsula of South Australia. All six scenarios involve establishment of perennials on well over 50 per cent of land in the catchment. Similarly dramatic changes in land use are envisaged by Stirzaker *et al.* (2000) for the Murray Darling Basin and by Campbell *et al.* (2000) for Western Australia.

Despite the massive scale of intervention involved in these management scenarios, their expected impacts on salinity are very modest. For example, the last column of Table 1 shows the forecasts of Stauffacher *et al.* (2000) for the Wanilla catchment. Strategies involving establishment of perennial vegetation on very large proportions of agricultural land (not just the land threatened with salinity) would prevent, at best, 10 per cent of land from going saline within a 20-year time frame. Under most of the scenarios, radical and costly changes in land use over large proportions of the catchment would prevent salinity on just two or three percent of the catchment.

Table 1: Low-recharge land use scenarios for Wanilla Catchment, Eyre Peninsula, South Australia

Scenario	Upper Catchment Land Use	Lower Catchment Land Use	Reduction in Recharge (%)	Area Lost to Salt (%)
Status quo	Retain existing land-use	Retain existing land-use	0%	15%
A	100% trees	50% crops, 50% lucerne	49%	12%
B	50% trees, 25% crops, 25% lucerne	50% crops, 50% lucerne	33%	13%
C	100% trees	50% crops, 50% deep-rooted lucerne	59%	9%
D	50% trees, 25% crops, 25% deep-rooted lucerne	50% crops, 50% deep-rooted lucerne	47%	12%
E	100% trees	50% trees, 25% crops, 25% lucerne	74%	5%
F	50% trees, 25% crops, 25% lucerne	50% trees, 25% crops, 25% lucerne	42%	12%

Source: Stauffacher *et al.* (2000) cited in Hajkowicz and Young (2000)

Not surprisingly, the economics of these strategies is highly adverse, with no strategy achieving the break-even benefit:cost ratio of 1. Table 2 (sourced from Hajkowicz and Young, 2000) shows the benefit:cost ratios for all the strategies, calculated in two different ways.

The second column includes only agricultural benefits, while the third column factors in additional impacts on infrastructure, primarily roads. In this catchment, the predominant impacts of salinity are on agriculture.

According to Read et al. (2001), this is the most common situation around Australia. There are some catchments where the off-farm benefits of treatments for protection of public assets such as nature reserves would be very large, but these are the exception rather than the rule.

Table 2: Economic performance of the six dryland salinity management scenarios in the Wanilla Catchment, Lower Eyre Peninsula, over the twenty year period (2000-2020)

Scenario	Benefit:Cost Ratio (on farm only)	Benefit:Cost Ratio (on and off farm)
0	*NA*	*NA*
A	0.543	0.546
B	0.670	0.672
C	0.549	0.555
D	0.673	0.676
E	0.425	0.434
F	0.542	0.544

Source: Hajkowicz and Young (2000)

Case Study: Merredin, WA

In around 50 towns of Western Australia, and some towns of other states, dryland salinity is a threat to buildings, roads, gardens and railway lines. Interestingly, hydrologists recommend that the most important and effective treatment for preventing salinity damage within town sites is reducing recharge within the town site, and/or enhancing discharge in and around the town by engineering treatments, such as pumping (Matta, 1999; Dames and Moore – NRM 2001).

In most cases, benefits from revegetation of surrounding farmland will be insufficient and/or too slow to prevent major damage to town infrastructure.

For towns such as Merredin (260 km east of Perth) which have fresh water piped to them for domestic use, the problem is worsened by the release of this imported water into the ground from garden irrigation systems or septic tanks.

A number of towns have been subjected to hydrological studies to identify systems of intervention which would be needed to reduce the impacts of salinity, and for six of them, detailed economic analyses of these interventions have been conducted by consultants.

Some of the actions recommended by the consultants are cheap and could be taken up immediately (e.g. appointment of “Water Wise” coordinators to provide advice to businesses, householders and builders).

Nevertheless, preventing the rise of groundwaters in most of the towns will require expensive engineering works, particularly pumping.

In some of the towns, the cost of the recommended works is so high that it outweighs the potential salinity damage costs which would be avoided, implying that living with the salinity damage may be more economically efficient than attempting to prevent it.

This is apparent in Table 1, which shows a summary of the economic analysis for each of the six towns. The costs shown are total costs over 30 or 60 years, discounted to present values using a 7% discount rate.

Table 3: Summary of economic analyses of salinity management for six towns in the Rural Towns Program

Town	Timing of onset of major costs	Damage costs from salinity if no works undertaken	Total cost of possible works to control rising groundwater	Potential gain from engineering works
(timescale of estimates)	(years)	($ million)	($ million)	($ million)
Brookton (60 years)	4	0.62	0.28	0.34
Corrigin (60 years)	2	0.21	-0.10	0.31
Cranbrook (60 years)	22	0.61	2.3 to 5.7	-1.6 to -5.1
Katanning (30 years)	1	6.9	7.6	-0.74
Merredin (60 years)	26	0.38	1.8 to 4.6	-1.4 to –4.2
Morawa (30 years)	1	0.25	0.90	-0.65

Source: Dames and Moore – NRM (2001)

The final column shows an estimate of the net benefits of strong intervention in the towns, based on an assumption that it would result in prevention of all costs listed in the third column. In four of the six towns, the economics of the engineering interventions studied are adverse. The two towns with positive results, Brookton and Corrigin, have the advantage of being able to make some valuable use of the pumped water. Even in Katanning, which is probably the most salt-threatened town in Australia, the costs estimated for disposal of pumped saline water into lined evaporation ponds is so high that costs more than offset the benefits from salinity prevention. Given that it is difficult to economically justify lined evaporation basins to protect the extreme example of Katanning, it seems unlikely that this approach could pay off in any less extreme cases.

Care is needed in interpreting the result that engineering works for salinity prevention are not economically viable in several of the towns. It does not imply that the town's infrastructure should be left to deteriorate without any response. Rather it implies that it is cheaper to allow groundwaters to rise and then to repair the damage caused, than to attempt to prevent that damage. Money would be spent on repairs, but in three of the towns, the cost of repairs would be no more than 25 percent of the costs of preventing the damage.

The results highlight the importance of cheap disposal of saline pumped water, and should encourage investigation of potential safe and cheap alternatives. The positive economic results for Brookton and Corrigin suggest that making good use of the water may be the key to making the engineering systems economically viable. It may be that continuing advances in desalination methods will make the pumping option attractive in more towns.

The Merredin town site is currently the subject of a major trial involving pumping of groundwater, desalination of a proportion of the water with the resulting fresh water substituting for piped water from Mundaring Dam, and disposal of saline effluent in a lined evaporation basin outside the town. Although prospects for a full-scale version of such a system to be viable in Merredin currently appear poor, much will be learnt in the trial that may improve those prospects either in Merredin or other towns.

Living with salinity

Even with major interventions, continuing salinisation of resources will occur in Australia. For example, damage to key rivers will continue for many years (centuries in some cases) even if large-scale revegetation programs are implemented (Hatton and Salama 1999). If large-scale changes to farming practices are made immediately, salinisation processes already under way will take many years to reach equilibrium. Water which has been added to groundwaters over the past decades will continue to discharge over steadily larger areas in coming decades.

Therefore, regardless of what we might wish, we have no choice but to attempt to find ways to live with salinity. Farmers in Australia with large areas of salt-affected land are already trialing and implementing farming systems based on salt-tolerant plant species. These farmers are viewing saline land as a potentially productive resource, and are attempting to develop new ways to make use of it. There are a number of "halophytic" plants that will grow on saline land, and some are suitable for livestock forage. Lambs grazed on saltbush are said to have an enhanced flavour, which may provide marketing opportunities. Livestock industries are likely to be the major users of salt land, but a number of opportunities exist to develop new commercial uses for salt water:

- Saline aquaculture is attracting growing interest. A number of farmers are already stocking salty dams with yearling trout.
- Saline water can be used for electricity generation, algae (eg. for agar, β-carotene, pigments, or fish food), seaweed and, if it is not excessively saline, irrigation water.
- There is potential to process saline water to extract valuable salts and minerals, including magnesium, bromine, potassium chloride.

Where water resources are salinised, desalination as a form of "living with salinity" is an option which appears to warrant further investigation. The economics of desalinisation are more likely to be favoured if the water can be desalinated locally and substitute for water piped over long distances. Further, if prevention of salinisation of a water resource catchment involves very high costs, desalination may again be a cheaper method to obtain fresh water. I suggest that this option deserves serious consideration and investigation for Adelaide's water supply. Desalination may well form part of the best integrated strategy for providing fresh water to the city.

Other types of engineering methods to adapt to salinity may also be more efficient than salinity prevention. These potentially include engineering works for flood mitigation, and replacement of damaged infrastructure with structures designed to better withstand salinity.

4 Prioritise and plan based on good science and economics

Regardless of possible arguments about the merits of extremely large budgets being allocated to buy a comprehensive solution to land and water degradation in Australia, the reality is that funding available will never be sufficient for a comprehensive solution to all environmental problems. Therefore, the need to prioritise alternative investments in the environment is unavoidable.

It is worth asking whether the alternative investments are approximately as attractive as each other (in which case prioritisation can safely be somewhat rough and ready) or whether the alternatives are very different in their net benefits (in which case "getting it right" is extremely important). The answer is that they are extremely different. Three factors contribute to the great variability in attractiveness among possible investments in environmental conservation:

Great spatial variability in the ecological, social and economic values of the assets at risk from environmental degradation, with small areas having extremely high value, and large areas having relatively low value. The extraordinary concentration of high community values into small areas is a feature of the results of one element of the National Land and Water Resources Audit, which, at the time of writing, is not yet released.

Great spatial variability in the responsiveness of the environment to management. The Audit has, for example, categorised Australia's catchments into different groundwater flow systems, broadly grouped into local, intermediate and regional systems, which have dramatically different degrees of responsiveness to treatments (National Land and Water Resources Audit, 2000, 2001).

Overlaid on the other two sources of variability, there is great variability in the real cost of implementing the changes in land management needed to prevent land and water degradation. For some issues in some regions, the costs are very low, or even negative (where sustainable new land uses are actually more profitable than traditional land uses). In other cases, the changes required for effective protection of the environment would drive landholders rapidly to bankruptcy. A related but

additional issue is variation in the capacity of individual landholders to respond, even if the response would actually be in their interest (Barr et al., 2000). Apart from the direct costs of implementing treatments, some treatments themselves have adverse off-site impacts which need to be factored in, and these too vary spatially. For example, establishing trees in high rainfall regions of the Murray Darling Basin may reduce fresh run-off and actually increase river salinity, at least in the short- to medium-term before groundwater effects are realised (Heaney et al., 2000). In other parts of the Basin this issue does not arise or is not so serious.

The combination of these issues means that a small minority of locations should receive the very highest priority for funding, while for most regions, the case for funding is very much weaker. For maximum benefits overall, public investment in on-ground works would need to be somewhat concentrated into a minority of the area, rather than spread thinly over most of it. There have been processes of prioritisation and targeting involved in the government programs to date, but the recent scientific, social and economic information to emerge indicates that the targeting should ideally be much narrower than it has been.

Note that I am *not* saying that environmental degradation is only occurring on a small minority of locations. Identifying areas suffering degradation is *not* the basis for a sound process of prioritisation. It constitutes only one out of a number of elements of a sound process.

The State Salinity Council of Western Australia has over the past 18 months developed a “Framework for Investment in Salinity Management” which is intended to deal with all three elements outlined above. The framework was strongly endorsed by the state’s Salinity Taskforce (Frost et al., 2001) and will be trialed in 2002. There is not space to describe the framework in detail, but I will present the six principles which underlie the process which has been developed.

The top priority public investments are those which generate the greatest public benefits per dollar of public investment. Whether protection of a particular asset falls into this "top priority" category depends on the costs of preventative treatments, the effectiveness of the treatments and the values of the assets. "Values" include social and environmental values, as well as economic values.

Direct financial assistance to landholders to undertake salinity action should be strategic and should not exceed the public benefits that result. (i.e. focused on priority areas with high value and high probability of success)

Where the priority is high and net public benefits are sufficient, Government should be prepared to take strong action to ensure protection of the asset (e.g. Compensation or structural adjustment, regulation, monitoring to ensure achievement).

Where the public priority is low but there are extensive private assets at risk, the public investment should be aimed at industry development (i.e. profitable systems to prevent or contain salinity or to adapt to saline land and water.)

Inevitably, a targeted investment strategy in salinity management will result in an unequal distribution of investment across the state. Over time, funding priorities will change as new information becomes available and programs adapt, goals are met and new challenges arise.

Government must fulfill its statutory obligations for land, natural resources and functions (such as research) when it sets its priorities for investment in salinity action.

The framework is a laudable attempt to deal with a very difficult issue, and could be of great benefit to other states and the commonwealth if used to evaluate possible investments under the National Action Plan for Salinity and Water Quality, or the second phase of the Natural Heritage Trust.

Some of the lessons which have come out of the development of this framework include the following:

Application of the framework is information intensive and has a high requirement for scientific and economic input.

It is important to know what we don’t know. For example, of the states, only WA has detailed knowledge of the biodiversity at risk from salinity (Dillon and Lewis, 2001), thanks to a substantial investment in biological surveys in WA since the 1996 Salinity Action Plan. Collecting further information is one of the investment options.

Some investment options need to be prioritised/planned at the state or national level, not the regional level (e.g. R&D).

5 Invest in creating innovative new solutions to environmental problems.

A message which is often put across is that we know what to do – we just have to make it happen. I'm not quite sure what is intended by such comment, but it seems to imply that we already have available suitable technologies for managing the environment. In a purely technical sense, it might be close to the truth.

But in a realistic and practical sense, it could hardly be further from the truth. The problem, as I argued earlier, is cost. Landholders are expected not only to bear the up-front costs of land use change, but also to forego the income from their traditional commercial enterprises on that land.

The simple reality is that the existing options for bringing perennials into very large commercial farming systems across most of Australia are so unprofitable that it will not happen on anything like the scale we need. Not even if we factor in local salinity benefits, salinity credits for external benefits, greenhouse credits and biodiversity credits will we make the current options attractive to landholders in many, and probably most, regions.

Apart from hotspots, the only real hope to prevent the majority of predicted land degradation in Australia is to develop perennial-based farming systems which are at least as profitable as existing farming systems. If we fail to do this, we are inevitably going to be living with a lot more environmental degradation.

Unfortunately, this understanding has been almost entirely absent from the policy thinking in Australia. The amount of funding allocated to efforts to create viable new management options has been a disgracefully small percentage of the environmental budget. It appears to have been assumed that suitable technologies are already available (Pannell, 2001b).

The attractions of greatly increasing the level of public money targeted to development of new farming systems based on profitable production of perennials include the following.

Scientists believe that substantial improvements in the range and scope of profitable perennials are achievable. The current paucity of profitable perennials reflects a low investment in development rather than intractability of the task.

Some of the benefits we seek are probably only achievable if profitable perennials become available (e.g. diffuse benefits such as avoidance of flood risk, protection of remnant native vegetation on farms, watertable control in regional flow systems).

Where subsidies for perennials on farms are used, any improvement in the profitability of perennials would allow a reduction in the subsidy which needs to be provided. Less costly perennials increase the area over which economic policy instruments could be beneficial.

In the case of woody perennials, profitable options will attract private sector finance to meet the establishment costs, which are beyond the means of many farmers.

Of course, the challenges involved in creating a new perennial-based industry are formidable. The tasks required vary from one case to another, but for shrubs, for example, they would include screening of plant species, identifying potential products, developing harvesting and processing technologies, conducting market research, establishing marketing bodies, obtaining finance, and establishing perennials over large areas.

For perennials pastures, the technical challenges of development are probably less, but the reliance on livestock to convert plant biomass to marketable products may be seen as a weakness. So this strategy involves delays and uncertainties. Nevertheless, it appears to be the only prospect for preventing many of the impacts of salinity.

As I said earlier, we are starting to appreciate that the game we are in is pole vaulting not high jumping, but we have not provided the competitors with poles. We had better start work on making the poles.

Conclusion [1]

The politicisation of the environment since the early eighties has certainly raised the level of resources available, and helped to increase awareness of the issues.

Unfortunately this politicisation has also meant that decisions about environmental management occur in a sphere where it is difficult for them to be anything other than superficial, whimsical, poorly informed, subject to pressure groups and unresponsive to changed information or changed circumstances.

The big environmental issues that we care about involve complex combinations of scientific/technical aspects from many different disciplines, as well as social, economic and ethical dimensions. In my judgement, the political and bureaucratic processes which drive environmental policy have done a fair job of dealing with the social, economic and ethical dimensions, but an extremely poor job of the scientific issues.

Profound implications of latest research are missing from the policies, either because the research is not known, or its implications are unrecognised, or the implications are politically unpalatable.

I suspect that part of the problem is the low scientific literacy of politicians and some bureaucrats. Another part is that the issues are intrinsically complex, and even few scientists are on top of the range of technical knowledge needed to design sound policy.

For example, in salinity alone, the perfect policy maker would need a working knowledge of hydrology, agronomy, engineering, soil science, ecology, geology, psychology, sociology, economics, and practical farm management.

For those of us who love the environment, who care about losing it, and wish to continue living with it, the challenge in the future is to ensure that the limited environmental budget is spent in ways which will have the greatest possible net benefit.

For the biggest of issues, like salinity, the key in my view is to stop treating the natural environment and natural resource conservation as being separate from the commercial activities which drive most of the daily lives of people.

We need to make it so that the best available land use systems for commercial production are also environmentally friendly.

Only in that way will we be able to focus the public funding for the environment into the truly critical hotspots, rather than spreading it thinly, like vegemite across an enormous piece of toast.

[1] This paper was presented to the Getting It Right conference, an initiative of The Government of South Australia, Adelaide, 11-12 March 2002, Productivity Commission, Melbourne.

References

Barr, N., Ridges, S., Anderson, N., Gray, I., Crockett, J., Watson, B., and Hall, N. 2000, 'Adjusting for Catchment Management: Structural Adjustment and its Implications for Catchment Management in the Murray Darling Basin', Murray Darling Basin Commission, Canberra.

Campbell, N., George, R., Hatton, T., McFarlane, T., Pannell, D., Van Bueren, M., Caccetta, P., Clarke, C., Evans, F., Ferdowsian, R. and Hodgson, G. 2000, 'Using Natural Resource Inventory Data to Improve the Management of Dryland Salinity in the Great Southern, Western Australia', Implementation Project 2, Theme 2 – Dryland Salinity, National Land and Water Resources Audit, Canberra.

Curtis, A. and De Lacy, T. 1997, 'Examining the assumptions underlying Landcare', in: Lockie, S. and Vanclay, F. (eds), *Critical Landcare*, Key Papers Series 5, Centre for Rural Social Research, Charles Sturt University, Wagga Wagga, pp. 185-99.

Curtis, A., MacKay, J., Van Nouhuys, M., Lockwood, M., Byron, I. and Graham, M. 2000, 'Exploring Landholder Willingness and Capacity to Manage Dryland Salinity: The Goulburn Broken Catchment', Johnstone Centre Report No. 138, Charles Sturt University, Albury, NSW.

Dames and Moore – NRM 2001, 'The Economics of Predicted Rising Groundwater and Salinity in Rural Towns', Dames and Moore – NRM, East Perth.

Dillon, B. and Lewis, S. 2001, *Implications of Salinity for Biodiversity Conservation and Management*, Report of a taskforce established by the Standing Committee on Conservation, Australian and New Zealand Environment and Conservation Council.

Feder, G. and Umali, D. 1993, 'The adoption of agricultural innovations: a review', *Technological Forecasting and Social Change* vol. 43, pp. 215-39.

Feder, G., Just, R. and Zilberman, D. 1985, 'Adoption of agricultural innovations in developing countries: A survey', *Economic Development and Cultural Change* vol. 33, pp. 255-98.

Frost, F.M., Hamilton, B., Lloyd, M. and Pannell, D.J. 2001, *Salinity: A New Balance, The report of the Salinity Taskforce established to review salinity management in Western Australia*, Perth. Report can be downloaded from http://www.ministers.wa.gov.au/edwards/Features/salinity.htm

George, R.J., Nulsen, R.A., Ferdowsian, R. and Raper, G.P. 1999, 'Interactions between trees and groundwaters in recharge and discharge areas - a survey of Western Australian sites', *Agricultural Water Management*, vol. 39, pp. 91-113.

Hajkowicz S and Young M 2000, *An Economic Analysis and Cost sharing Assessment for Dryland Salinity Management A Case Study of the Lower Eyre Peninsula in South Australia*, Policy and Economic Research Unit, CSIRO Land and Water, Adelaide

Hatton, T. and Salama, R. 1999, 'Is it feasible to restore the salinity affected rivers of the Western Australian wheatbelt?' in Rutherford, I. and Bartley, R. (eds.), *Proceedings of the 2nd Australian Stream Management Conference, Adelaide, 8-11 February 1999*, pp. 313-18.

Heaney, A., Beare, S. and Bell, R. 2000, 'Targeting reforestation for salinity management', *Australian Commodities*, vol. 7, pp. 511-18.

Kington, E.A. and Pannell, D.J. 2002, 'Dryland salinity in the upper Kent River catchment of Western Australia: Farmer perceptions and practices', *Australian Journal of Experimental Agriculture*, (in press).

Lindner, R.K. 1987, 'Adoption and diffusion of technology: an overview', in Champ, B.R. Highley, E. and Remenyi, J.V. (eds.), *Technological Change in Postharvest Handling and Transportation of Grains in the Humid Tropics*, ACIAR Proceedings No. 19, pp. 144-51.

Lockie S. and Vanclay F. (eds.) 1997, *Critical Landcare*, Key Papers Series 5, Centre for Rural Social Research, Charles Sturt University, Wagga Wagga.

Marsh, S.P. 2001, 'Social dimensions of landcare', State Landcare Conference 2001, 11-14 September 2001, Mandurah Western Australia, pp. 117-28. SEA Working Paper 01/09, Agricultural and Resource Economics, University of Western Australia. http://www.general.uwa.edu.au/u/dpannell/dpap0109.htm

Matta, J. 1999, 'The Rural Towns Program, groundwater modelling, the Merredin catchment', Agriculture Western Australia, Perth, unpublished report.

National Land and Water Resources Audit 2000, *Australian Groundwater Flow Systems Contributing to Dryland Salinity*, CD-ROM, National Land and Water Resources Audit, Canberra.

National Land and Water Resources Audit 2001, *Australian Dryland Salinity Assessment 2000,* National Land and Water Resources Audit, Canberra.

Pannell, D.J. 1999, 'Social and economic challenges in the development of complex farming systems', *Agroforestry Systems* vol. 45, pp. 393-409.

Pannell, D.J. 2000, 'Ethics in dryland salinity management and policy', SEA Working Paper 2000/04, Agricultural and Resource Economics, University of Western Australia, http://www.general.uwa.edu.au/u/dpannell/dpap0004.htm

Pannell, D.J. 2001a, 'Dryland Salinity: Economic, Scientific, Social and Policy Dimensions', *Australian Journal of Agricultural and Resource Economics*, vol. 45, pp. 517-46.

Pannell, D.J. 2001b, 'Salinity policy: A tale of fallacies, misconceptions and hidden assumptions', *Agricultural Science* vol. 14, pp. 35-37 .

Pannell, D.J. 2001c, 'Explaining non-adoption of practices to prevent dryland salinity in Western Australia: Implications for policy', in: Conacher, A. (ed), *Land Degradation*, Kluwer, Dordrecht, pp. 335-46.

Read, M., Watson, A., Sturgess, N. and Pannell, D. 2001, 'Capacity to change – case studies of dryland salinity and watertable control', National Land and Water Resources Audit, Canberra. http://audit.ea.gov.au/ANRA/people/docs/national/Theme6_33.pdf and http://audit.ea.gov.au/ANRA/people/docs/national/Theme6_33_app.pdf

Stauffacher, M., Bond, W., Bradford, A., Coram, J., Cresswell, H., Dawes, W., Gilfedder, M., Huth, N., Keating, B., Moore, A., Paydar, Z., Probert, M., Simpson, R., Stefanski, A., and Walker, G. 2000, 'Assessment of Salinity Management Options for Wanilla, Eyre Peninsula: Groundwater and Crop Water Balance Modelling', Technical Report 1/00, CSIRO Land & Water, Bureau of Rural Sciences, Canberra.

Stirzaker, R., Lefroy, T., Keating, B. and Williams, J. 2000, *A Revolution in Land Use: Emerging Land Use Systems for Managing Dryland Salinity*, CSIRO, Canberra.

Toyne, P, and Farley, R. 2001, 'The decade of Landcare, looking backward – looking forward', *State Landcare Conference 2001, 11-14 September 2001, Mandurah Western Australia*, pp. 61-63.

Virtual Consulting Group and Griffin NRM 2000, *National Investment in Rural Landscapes, An Investment Scenario for NFF and ACF with the assistance of LWRRDC.*

Social Trajectories for Rural Landscaping

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As a social researcher working in government, I feel I have become fashionable again. The current interest in “triple bottom line”, “community capacity” and “social sustainability” means my phone is ringing quite regularly with requests for simple explanations of these phrases. Many people are required to report outcomes under these headings as part of the development and implementation of Regional Catchment Strategies. Unfortunately, the guidelines are less than forthright on how to do this.

I am also hearing these phrases used regularly in the media. What is also apparent is the conflicting objectives being wrapped within the same rhetorical phrases. It’s almost as if we agree to agree on the language rather than the concepts behind the language where we know we will disagree.

The meaning of social sustainability varies according to where you live. In a small country town in the wheat belt, social sustainability generally means maintaining the town population, maintaining services and amenity and keeping the young people in town. In the capital cities of Australia “social sustainability” can mean maintaining population and services and young people if you live in Hobart. In Sydney it can mean maintaining amenity and quality of life.

The language of “community capacity” is most often used in Canberra. There it rarely means maintaining small towns. Instead, the language of “community capacity” is used with the assumption that these small towns have to change or wither and the community needs to be given a “capacity” to cope with this rather than additional resources to maintain their towns. From the regions this argument sometimes sounds as if it is merely cloaking the bitter pill of abandonment with a sugary film of understanding language.

In this paper I will try and explore why I feel uneasy with both a static view of rural social sustainability sometimes emanating from the regions and policies of “community capacity” emanating from the metropolis. To do this I will explain my understanding of some of the forces shaping our rural social landscapes, how our rural social landscapes are changing in response, and what “social sustainability”, “triple bottom line” and “community capacity” might mean for those of us dealing with catchment plans..

The forces of culture and economics

Surfing the wave of innovation

The modern farmer is engaged in a continuing prisoner’s dilemma game called innovation. If all farmers refused to improve their farming productivity and no-one else wanted to start a farm, there would be no pressure on their terms of trade. But few farmers can afford to sit still if their competitors are improving their productivity. And so there will always be some farmers trying to improve their productivity.

The on-going impact of this innovation is experienced as a long-term compression of the terms of trade in agriculture. Minor advances in the technology of managing existing farming systems bring gradual cost pressures upon those least able or willing to adopt these innovations. The result is a gradual change in the structure of agriculture as farm numbers decline. In recent years there has been an average annual 1.5 per cent decline in the number of farm establishments in Australia.

This decline is the price of maintaining competitiveness (Lindsay & Gleeson 1997). Of course, the impact of declining terms of trade is not always experienced as a gradual pressure. Overall, the terms of trade pressures will ensure the number of farms will continue to decline, and fewer farms will produce more and more of the agricultural production of the country. These trends are obvious not only in Australia, but in other developed nations (Anon 2000; Economic Research Service 1997; Freshwater 2000).

Technological innovation in agriculture does not always progress smoothly at a rate of 1.5 per cent per annum. Innovation is often “lumpy”. Sometimes major innovations will fundamentally reshape agriculture. This reshaping always creates winners and losers, and the new technology often shifts the frontier of agriculture. New technologies have in the past destroyed the agriculture of some regions. The most significant recent innovation in Australian agriculture was the widespread adoption of the internal combustion engine in the middle of last century (Anon 2000). This assisted in doubling the volume of wheat production in Australia and opening a new frontier in the West Australian wheat belt.

The same innovation also gave farmers the capacity to drive a little further to a larger town on shopping days. So while many farmers benefited from the innovation, in the long run shop-keepers in many smaller towns did not.

Are there any new technologies that promise or threaten a similar shift in the structure of Australian agriculture? Two technological innovations are regularly discussed in contemporary debate: genomics and communication technology. The former may create new crops or niches, or change the relativities of advantage between different regions.

Unlike the majority of earlier major technological innovations in agriculture, genomic knowledge is strongly protected by intellectual property law. The technology may favour certain types of farms: those that are more closely integrated into the marketing chains of agri-food conglomerates that own the technology. This may facilitate much more tightly integrated production and marketing chains. These potential impacts of genomics are unclear in the current debate over the ethics of genetic manipulation of food.

The impacts of communication technology are generally expected to be the removal of many intermediaries from marketing chains (disintermediation). The most obvious example in Australian agriculture is the gradual demise and sometimes re-invention of the wholesale fruit and vegetable markets under the influence of growing contract and direct supply relationships between major supermarket chains and producers (Parsons 1996).

The bigger smoke

Urbanisation is the counterpoint of technological innovation in agriculture. Australia is urbanising rapidly and at an accelerating rate. The State of Victoria provides a clear example. In 1920 there were 20 Victorians for every farm in the state. By 1970 the ratio had risen to over 50. Today the ratio is 175 Victorians for every farm in the state.

Modeling of the potential future adjustment of agriculture suggests that this ratio may approach one in 400 by 2021. The contribution of agriculture to the national economy can be expected to reflect a similar decline. There are some obvious consequences that flow from this. The culture of farming will have less and less influence upon the creation of Australian social values. The political influence of the farming lobby will decline.

This is but a continuation of a well-established trend. More importantly, there will probably be increased demand for non-productivity values from agricultural resources. We can see the greatest example of this in the use of the concept of *multi-functionality of agriculture* in the European position on agricultural trade reform. In the Australian context, multiple functions will include improved quality and quantity of water supply, improved health of riverine habitats, ‘clean’ food and landscape amenity (Cocks 1999; Ellyard 1998). These demands will appear more and more onerous when viewed from a traditional farming perspective.

The decline of farming as a lifestyle identity

Increasing demand for multi-functional agricultural services is only one of the changes that will be brought about by changing social attitudes. Over the past thirty years there have been major shifts in social values within agricultural communities in Australia. Farm managers increasingly are likely to see themselves as a manager with skills that have much in common with other business managers outside agriculture (Bryant 1999). This is in part an outcome of the shift towards off-farm work and in part a response to the promotion of a more managerial view of farming through industry, education and government organisations.

Current evidence is that younger farmers are more likely to conduct sophisticated business planning (Tanewski, Romano, & Smyrnios 2000). The increasing requirement for the agricultural sector to interact with the urban world and the greater demands for sophisticated business management and production skills will further change the traditional agrarian values of the Australian farm community. Part of this transformation is what Bryant has called 'the centrality of the market in constructing the self'. This shift is seen in the trend for increasing numbers of farmers to consider their value in terms of strategic decision making on the farm, rather than their ability to undertake physical labour in an outdoor setting. As this trend continues, farm managers will less and less see themselves as farming for the way of life, and will more and more construe their farming activity as a search for business profit and market opportunity.

The farm sisterhood

Few women living on farms today identify with the once traditional role of "farmer's wife". They are increasingly likely to identify as a joint farm manager or as having an occupational life separate from the farm business. It has been estimated that women number 40 per cent of farm business partners and 32 per cent of the farm paid workforce. Many women work off the farm to support farm family living standards. This is a reflection of social trends beyond agriculture and has been well documented by a number of Australian researchers. (Alston 1995; Argent 1999; Gaurnaut, Rasheed, & Rodriguez 1999; Nelson 1999; Oldrup 1999).

The change in womens' roles in wider society over the past 30 years has had some profound impacts upon the process of structural change in agriculture. One of the most obvious implications has arisen from the entry of women into the workforce outside farming. This has greatly increased farm family dependence on off-farm income earned by women. It could be argued that this has in some areas reduced the pressure for structural change in agriculture by removing the imperative to increase income through farm business expansion.

The change in womens' roles extends beyond the workplace into family and relationship expectations. Marriage as an economic contract has been replaced by marriage as an emotional relationship, a recognition of the crucial role healthy relationships play in personal wellbeing (Weston 1999). Fewer women on farms are today willing to endure what they consider to be an unsatisfactory relationship or family lifestyle (Dempsey 2001). And of course, the alternatives to continuing in an unsatisfactory marriage are more socially acceptable than a generation ago (Wolcott 1999).

This has the potential to restructure agriculture. In a study of farm families in the early 90's in a Victorian agricultural area, farm womens' lack of satisfaction with the marriage and family relationships was the greatest predictor of farm business failure. This was more important than farm size or profitability (Barr 1999).

The result in the locality under study was a shift in the pattern of adjustment from consolidation towards churning and fragmentation. The implication of this is that the successful farm business management team today has a greater need to develop the skills of communication and teamwork within the household than may have been the case a generation ago. The wool producer of the future will need to be a Sensitive New Age Grazier… if he can find a partner.

The development of women's career aspirations over the past generation has increased the difficulty for the modern young farmer in finding a partner. At a recent young farmers conference organised by the NFF participants identified this as one of the major issues they faced. In response, the Woman's Weekly magazine recently called for single farmers to be featured in an article looking for partners willing to move to the bush.

The weekly was overwhelmed with interest from young male farmers. The need to consider dual careers in relationship establishment may lead to new patterns of migration as aspiring farmers seek to accommodate the needs of potential partners who do not wish to adopt the traditional role of farm wife. There is anecdotal evidence of decisions to exit farming or move farm location to improve the chances of finding a partner. The premium that must be paid to purchase a farm within commuting distance of major centres in part reflects the proximity to employment for members of the farm household and the attractiveness for prospective partners.

Rural youth and the metropolis

A related social value shift is the lessening attractiveness of agriculture as a career destination for younger rural Australians. This can be seen both in the decreasing entry of younger persons to agriculture and in the continuing lowering of entry scores for tertiary agricultural courses.

This loss of interest is not strongly related to the fluctuations in commodity prices, but reflects the impact of modernity upon the rural youth population (Gabriel 2000). Many rural young aspire to the urban cosmopolitan life. It's where the jobs, concerts, friends and fun will be. The young are better able to migrate because of successful investment in rural education over the past 30 years.

The migration of young Australians from the land is the major factor contributing to the increasing average age of Australian farmers and is leading to new forms of later age agricultural entry and inter-generational transfer (Barr 2001). These changes have the potential to create patterns of farm gentrification in some closer settled agricultural regions. These changes also have the potential to accelerate the shift towards less traditional farming identities.

The retirement of the baby boomers

The first of the 'baby boomer' generation reached the early retirement age of 55 in 2001. The retirement of this generation will peak between 2010 to 2015. This progression will have a significant impact on the structure of the Australian labour market (Access Economics 2001). Demand for labour will remain relatively constant, while labour supply will slow and eventually decrease as a result of declining fertility driven by changing social values (Weston & Qu 2001).

The resulting shortage of labour will mean agriculture will need to compete against improving urban employment prospects for younger members of farm families. It is also possible that the increase in the number of superannuants will accelerate the development of amenity farm landscapes. Agriculture has its own baby boomer generation. But farm retirement strategies differ from those of salaried and waged employees.

A significant number of farmers continue to farm well beyond the age of 65. My own modeling suggests that by 2021 it is conceivable there will be a decline in Australian farmer numbers of between 40 and 60 per cent. There is also the potential for the average age of farmers to continue to rise.

Within the next 20 years a large proportion of rural properties will change ownership. The impact this change in property ownership will have on Australian farming is unclear. Given the de-traditionalisation of farming, the changing expectations of farm transfer and reducing attractiveness of the farm lifestyle to many young rural people, we can expect that the farm population will be considerably different from today's farm population. It cannot be assumed that these new "farmers" will hold the same strong production values as many of today's farming generation.

Future social landscapes

Where are these socio-economic forces leading us? Clearly for some regions agriculture will become less and less important to the welfare of the regional community. Analysis of trends in the United States by the Economic Research Service of the USDA shows a strong decline in the dependence of many rural regions on agriculture and the growth of new economic and social structures based upon secondary industry, amenity and retirement services, public land industries and the services sector (Economic Research Service 2000). In my own region, I can see potentially four rural landscape trajectories: traditional agricultural, amenity, and small farm based.

Broadacre agricultural futures: In part of my region there are landscapes where broadacre agricultural enterprises will maintain competitiveness through farm aggregation and the continued adoption of farm management innovations and technologies. Farm incomes in these landscapes will remain relatively prosperous, though unstable.

The progression of the terms of trade for agriculture and the adoption of productivity innovations will be crucial determinants of farm family wellbeing in these areas. These regions will experience continued population decline and small town decline. Young people will continue to be a major export, and the importation of life partners will remain problematic. The continued expansion of farm size will mean labour availability remains a major limitation on the implementation of environmental works.

Intense irrigation landscapes: In these regions we will see continued agricultural development, but this agriculture will be increasingly concentrated on the better soils and on highest value use for water. There will be significant structural change over the next decades as changing water policy reduces the options available to lower value water users.

The movement of water will be driven by both the messages from both agricultural markets and the change of community values as urbanisation continues. The changing cultures of the urban consumer will call the tunes. Urbanisation changes patterns of consumption and purchase both in Australia and in our traditional markets. In Australia this has contributed to the growth of the market power of supermarkets in the food sector (Piggott, Griffith, & Nightingale 2000).

The Centre for International Economics modeled the implications of population growth and increasing affluence upon the commodity demands of our major trading partners (LWRRDC 1997). The results suggest a significant shift in the relative demand for various agricultural products. The greatest increases in demand was forecast for cotton and horticultural products.

There will be much smaller increases in demand for cereals, wool and beef. Cotton and horticulture are major users of irrigation water. These demand patterns would increase the value of water to the Australian agricultural economy, increasing the competition for the resource within agriculture and between agriculture and both environmental uses and urban water supply.

The resolution of these demands for water will see the water industry rival the forest industry as a battleground between competing cultural demands upon a natural resource.

Amenity landscapes: Currently, demand for landscape amenity is a major influence upon the pattern of structural change in Australian agriculture. The influence is manifest in the high price of land in the more amenable and accessible parts of the rural landscape.

These higher land prices restrict the capacity of agriculture to adjust to maintain competitiveness and inexorably drive the path of adjustment to a non-commercial agricultural future. The potential for these amenity pressures to increase over the next 20 years is strongly linked to the demographic structure of the nation.

Research in the United States has shown the close relationship between rural area development and natural amenity. Over a thirty year period, regions with the lowest landscape amenity, and often the most competitive agricultural businesses, experienced the greatest population losses (McGranahan 1999). Those with the highest amenity generally gained the lion's share of rural population increase.

These landscapes exist at the periphery around metropolitan and provincial cities. They are also found along the eastern and south western seaboards of Australia. Land values determined by amenities such as sea views, proximity to town and a pleasant climate.

With the exception of some intensive industries, there is limited future for agriculture other than as supplementary to other activity such as tourism. From a business perspective, the use of this land for agricultural purposes normally would not be expected to generate an adequate return to capital.

The use of the occupational label of *farming* within official statistics for such areas will tend to reflect past history rather than current use. There is little likelihood that these regions will revert to any agricultural based future as land values will prevent farm businesses maintaining competitiveness through increasing the scale of operations..

The small farm future: In regions characterised as small farm landscapes most farm businesses will be unable to maintain economic competitiveness due to the high cost of land. The value of land will continue to reflect amenity and housing stock value of land rather than its potential for agricultural production. For most small farm land managers there will be continuing or increasing dependence upon off-farm income.

Farm family economic security will increasingly be reliant upon a diversified and strong regional economy. The rural population will be less likely to fall as fast as in the agricultural areas. Production based solutions to land degradation will become increasingly less attractive as the farm population identifies less with agriculture and the need for productivity improvements.

Many areas may be increasingly valued for their ecosystem services rather than their agricultural production. There are major questions over intergenerational transfer and land ownership in these regions during the next two decades. In one region of Victoria following this trajectory we have a generation of farmers who have no expectation of the next generation of the family continuing to farm (Curtis et al. 2000).

It is likely that subsequent generations of users of this land will have different cultural expectations with regard to the land and farming. Changes in the values and aspirations of the land owning population may open new options for catchment protection.

Some districts may move increasingly towards a form of retirement farming with a stable aged population of land managers. This scenario is most characterised by the beef industry in the high rainfall zone and in sections of the wool industry. The uncertain future of regions characterised as small farm landscapes is significant for future natural resource management policy. Substantial areas of the agricultural zone of Australia fall within this structural group, including many areas along the southern sections of the Great Dividing Range.

Old definitions for new phrases

Where does this prognostication leave those people trying to plan for your catchment future? I would like to conclude by offering you my "common-sense" interpretation of those phrases appearing in regional catchment strategy guidelines.

Social sustainability: I see a future of continuing change and restructuring for our rural landscapes. Not all of this is bad. Not all of it is good. But not much of it is easily avoidable. Each of us contributes in our small way to this change through the decisions we make in shopping, travelling, leisure and voting.

I do not believe there is much to be achieved by using a definition of social sustainability in which the structure of our rural landscapes is fixed in time. If this is social sustainability, then we will not achieve it. Rural social landscapes of the Western World have been in constant change since the collapse of the feudal system. Society cannot be sustained without the capacity to adapt to change.

But, of course, not all change is desirable. What change is desirable? Who decides which changes are desirable?

Not all the benefits and dis-benefits of change are fairly distributed. Economists will argue that improvements in standards of living in aggregate are our best indicator. But financial income is not necessarily the best measure of quality of life. It just happens to be easy.

Income distribution and employment status are also important indicators of quality of life and happiness (McDonough et al. 1997; Walker 2001). Maybe we are better off not worrying about a definition of "social sustainability". Maybe we are better off talking about tangible issues that are important to us.

The triple bottom line: To me, the social component of the "triple bottom line" is about the distributional impacts of the changes our society undergoes to ensure its "social sustainability". This is old news. Fifteen years ago in the Victorian salinity program there were enthusiastic arguments about this proposition.

Treasury took a clear position that the distributional impacts formed no part of the economic account that interested them. All that mattered was the aggregate impact on the state.

The response of catchment community groups was to use the "social" side of the ledger to describe those distributional impacts. To me this is still the essence of the social line in the ledger.

Community capacity building: What is "community capacity to change".

To me the first issue of "capacity for change" is the capacity of our community to make informed decisions, to answer the questions on the triple bottom line. To build community capacity we need to build the tools of science to help us understand the implications of our choices. We need consultation processes to allow everyone with a point of view the chance to be heard and considered.

For many years we have been building capacity using services such as extension, rural counseling, community education and community development. These processes are not fast. They are not always successful, because changing other people is not always the best strategy (Barr & Cary 2000). Let us not be fooled into thinking there must be a faster, more effective magic button out there, just because we have a brand new phrase.

My principle for catchment management: understand the trade-off between social impact and speed of change.

One of the messages I think emerges is the scale and difficulty of the challenges posed to us by salinity, river health and greenhouse gases. Solutions will not come without significant social costs. It follows that solutions will also be achieved slowly.

There is a direct trade-off between social cost and speed of change. Effective environmental management will require us to understand this relationship. It requires us to answer the following questions:

- How will the social and economic structure of the community will change if we do nothing?
- How will proposed changes change the social and economic structure of the community over time? Who will benefit and lose from these changes?
- At what rate of implementation will the benefits of our proposed changes justify the difficulty they may cause some sectors of the community?
- Can we agree on a fair way to compensate the losers?

These questions are my “triple bottom line”. Simple as these questions may sound, I can’t remember reading many catchment plans that have answers to these questions. In the long run, failure to answer these questions adequately will create political opposition that slows or blocks our flexibility to adapt to the environmental challenges we face.

Answering these questions will allow us to identify the achievable and allow us to learn to live with that we can’t change.

Having provided a principle, you would be well-advised to ask how we can actually answer these questions. I admit I cannot list the solutions for you. I am confident that we are in a better position than we were a decade ago.

There are some very interesting projects underway or nearing completion across Australia that are developing tools that may help us.

The work of the National Land and Water Resources Audit is gradually appearing on their web site.

The Murray-Darling Basin Commission is funding a the “Landmark” project that is attempting to integrate environmental, social and economic modeling of catchment change.

The tools that arise out of this and other research should improve our capacity to share social decisions about change. Of course, the full spectrum of social impacts of catchment change will never be captured by technical modeling.

There will always remain a place for the crucial skill of listening.

References

Access Economics. (2001) *Population Ageing and the Economy*, Department of Aged and Community Care, http://www.health.gov.au/acc/ofoa/documents/pdf/popageing.pdf

Alston, M. (1995) *Women on the land: The hidden heart of rural Australia*, Allen and Unwin, Sydney.

Anon. (2000) *Western Agri-Food Colloqium on Rural Adaptation to Structural Change: Summary Paper and Critique*, Western Agrifood Institute, Western Agrifood Institute Electronic Colloquium 2000, ftp://132.205.151.25:21/western_agrifood_institute/Rural_Restructuring_Summ_%26_Crit.pdf

Argent, N. (1999) Inside the black box: Dimensions of gender, generation and scale in the Australian rural restructuring process, *Journal of Rural Studies*, vol. 15, 1, pp. 1-15.

Barr, N. (2001) *Structural Change in Australian Agricultural Regions: 1986-96*, National Land and Water Audit, Canberra. http://www.nlwra.gov.au

Barr, N. & Cary, J. (2000) *Influencing improved natural resource management on farms: A guide to factors influencing the adoption of sustainable natural resource management practices*, Bureau of Resource Sciences, Canberra. http://www.brs.gov.au/social_sciences/nat_resource_mgt.pdf

Barr, N. F. (1999) *Salinity control, water reform and structural adjustment: The Tragowel Plains Irrigation District*, Unpublished doctoral thesis thesis, Institute of Land and Food, University of Melbourne, http://adt1.lib.unimelb.edu.au/adt-root/public/adt-VU2000.0002/.

Bryant, L. (1999) The detraditionalization of occupational identities in farming in south Australia, *Sociologia Ruralis*, vol. 39, 2, pp. 236-261.

Cocks, D. (1999) "Scenarios for Australian Landscapes", proceedings of the Fenner Conference: Visions of Future Landscapes, CSIRO, Canberra.
http://www.labshop.cpm.com.au/landscapepaperfinal.html

Curtis, A., MacKay, J., Lockwood, M., Van Nouhuys, M., & Graham, M. (2000) *Exploring landholder willingness and capacity to change in the Goulburn-Broken Dryland*, Charles Sturt University, Albury.

Dempsey, K. (2001) Women's and men's consciousness of shortcomings in marital relations, and of the need for change, *Family Matters*, vol. 58, Autumn 2001,
http://www.aifs.org.au/institute/pubs/fm2000/fm58.html

Economic Research Service. (1997) *Forces Shaping US Agriculture*, USDA.
http://www.ers.usda.gov/Briefing/forces/

Economic Research Service. (2000) *Understanding Rural America*, USDA.
http://www.ers.usda.gov/epubs/htmldoc/aib710/index.htm

Ellyard, P. (1998) *Ideas for the New Millenium*, Melbourne University Press, Melbourne.

Freshwater, D. (2000) *The new structure of agriculture*, Western Agrifood Institute, Western Agrifood Institute Electronic Colloquium 2000,
http://132.205.151.25:21/western_agrifood_institute/Rural_Restructuring_USA.pdf

Gabriel, M. (2000) *Between homes: politics of regional youth migration*, Australian Institute of Family Studies, Melbourne, http://www.aifs.org.au/institute/afrc7/papers.html

Gaurnaut, J., Rasheed, C., & Rodriguez, J. (1999) *Farmers at work: the gender division*, Australian Bureau of Agricultural Economics, Canberra, Report 99.1.

Lindsay, R. and Gleeson, T. (1997) *Changing Structure of Farming*, ABARE Current Issues, Australian Bureau of Agricultural and Resource Econimics, Canberra.

LWRRDC. (1997) *Using foresighting to identify R&D priorities for LWRRDC*, LWRRDC, Canberra, 10/97.

McDonough, P., Duncan, G. J., Williams, D., & House, J. (1997) Income Dynamics and Adult Mortality Adult Mortality in the U.S., 1972-1989, *American Journal of Public Health*, vol. 87, 9, pp. 1476-1483.

McGranahan, D. A. (1999) *Natural amenities drive rural population change*, Economic Research Service, U.S. Department of Agriculture, Washington, 781.
http://www.ers.usda.gov/publications/aer781/aer781.pdf

Nelson, M. K. (1999) Economic restructuring, gender, and informal work: A case study of a rural county, *Rural Sociology*, vol. 64, 1, pp. 18-43.

Oldrup, H. (1999) Women working off the farm: Reconstructing gender identity in Danish agriculture, *Sociologia Ruralis*, vol. 39, 3, p. 343-+.

Parsons, H. (1996) "Supermarkets and the supply of fresh fruit and vegetables in Australia: Implications for wholesale markets," in *Globalisation and Agri-Food Restructuring: Perspectives from the Australasia Region*, D. Burch, R. Rickson, & G. Lawrence, eds., Avebury, Aldershot, pp. 251-270.

Piggott, R., Griffith, G., & Nightingale, J. (2000) *Market Power in the Australian Food Chain:Towards a Research Agenda*, RIRDC, Canberra, 00/150. http://www.rirdc.gov.au/reports/GLC/00-150.pdf

Tanewski, G. A., Romano, C. A., & Smyrnios, K. X. (2000) *Determinants of Australian Family Farm Growth: The role of Owner Characteristics and Strategic Planning*, Canberra, RIRDC, RIRDC 00/131. http://www.rirdc.gov.au/reports/Index2.htm#Future_AgriculturalSystems

Walker, A. (2001) "Health Inequalities and Income Redistribution, Australia: 1977 to 1995", proceedings of the Paper presented to the 7th Annual National Health Outcomes Conference, National Centre for Social and Economic Modelling, Canberra. http://www.natsem.canberra.edu.au/pubs/cp01/2001_002/cp2001_002.html

Weston, R. E. (1999) Finding happiness: Factors contributing to personal wellbeing, *Family Matters*, vol. 52, pp. 54-61, http://www.aifs.org.au/institute/pubs/fm/fm52.html

Weston, R. E. & Qu, L. (2001) Men's and women's reasons for not having children, *Family Matters*, vol. 58, Autumn 2001, http://www.aifs.org.au/institute/pubs/fm2000/fm58.html

Wolcott, I. (1999) Strong families and satisfying marriages, *Family Matters*, vol. 53, pp. 21-30, http://www.aifs.org.au/institute/pubs/fm/fm53.html

Environmental Problems For Sale – Who Bids?

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Key Points

- Clarify the environmental problem and policy objectives.
- Markets can be powerful tools to address environmental problems.
- Understand why markets may be absent — there can be solutions.
- Make policy catalytic — harness the private sector.
- Improve public sector efficiency.
- Establish who should pay for environmental problems.

1 Clarify the 'environmental problem' and policy objectives

We often hear there is an environmental problem. But what precisely is it? What exactly are we trying to fix or prevent? What environmental outcomes do we want? What are the benefits and costs of alternative action? These may seem very simple questions but they are very fundamental for governments designing environmental policy.

Environmental pressures associated with natural resource-based production systems in Australia include: salinisation of land and water; acidification of soil; soil erosion and deterioration of soil structure; spread of weeds; eutrophication of streams and lakes; and loss of biodiversity. Taken together, they are usually seen as systemic — as 'Australia's environmental problem'.

In economic terms, the natural environment has three main (inter-related) roles:

- it provides raw materials for production processes: air water, minerals timber;
- it is a receptacle for wastes generated by businesses and households; and
- it provides amenities and aesthetic values – scenery, wildlife, etc.

The environment differs from other parts of the economy, in that:

- biological resources can be renewable, but if over-harvested they can be wiped out;
- if waste assimilation capacity is over-used, it can be permanently damaged (thus there are serious thresh-holds and discontinuities in their supply); and
- some resources (such as forests and lakes) can provide all three functions.

From an economic perspective, systemic environmental problems are broader than simply the direct costs of the degradation of natural resources. They also include reductions in society's net welfare from inefficient use (including non use) of natural resources. Efficient and effective environmental policy should be based on good science *and* good economics. Unfortunately, because of the complex and often poorly-understood biophysical relationships involved, an accurate assessment of public and private benefits and costs of any actions, or of inaction, is very difficult. Policy design when there are large information gaps or constraints, is a huge challenge for governments.

If we consider any man-made system, such as a factory, mill or power-station, we know exactly where the inputs go in and the outputs (good and bad) come out; we can measure them, we know how much extra pollution there will be if we use an extra tonne of some input, or if we increase output by some percentage. But for natural systems, we have amazing ignorance about where and when the outflows (borne by air or water) will appear, and what nasty surprises they might contain.

Often, our simple models of environmental systems assume that if we change land-use practices in one place, the environmental consequences will show up nearby, almost immediately. In fact, it may take hundreds of years before the effects appear, and they may appear hundreds of miles away. This also means that often apparent 'ecological crises which demand urgent action' are the result of something that happened decades or centuries before, and either cannot be fixed, or don't need to be fixed, now.

Systemic environmental problems are unlikely to be solved by ad hoc and piecemeal policies that do not address their underlying drivers. While individual case by case on ground works may address localised environmental impacts they will not address the root causes of an underlying, more pervasive, malady.

Complex environmental problems are likely to require a mix of policy tools including: carefully designed regulation; voluntary codes of conduct; suasive approaches, such as public awareness and attitudinal change campaigns; taxes; subsidies; and sometimes, markets. The focus of this paper is on markets — just one aspect of an environmental tool box — how the energy and initiative of the private sector can be harnessed and how governments can be catalytic by ensuring appropriate institutional settings are in place for efficient and effective environmental markets to emerge.

How have governments responded?

Historically, governments have directly provided environmental 'goods' (water catchments, parks and outdoor recreation areas) and regulated private sector activities to curtail environmental 'bads'.

Growing recognition of environmental problems has seen Australia committing large, and increasing, amounts of public resources to the objective of improving the environment particularly through natural resource management. For example, the Murray Darling Basin Council has adopted a program of salinity interception schemes worth $60 million over 7 years, complementing the $1.4 billion National Action Plan for Salinity and Water Quality (Truss, 2001).

But high levels of public expenditure are not necessarily a good indicator that systemic environmental problems are being, or will be, adequately addressed. The mere existence of public benefits from a conservation activity is a necessary but not sufficient condition for that activity being undertaken by the public sector. For example, even if most of the benefits of a particular activity go to others, it still pays someone to undertake the activity if their private gains are greater than the private costs. Government involvement may 'crowd out' private sector initiatives. The key criteria for intervention by governments should be whether or not an improvement in social wellbeing results from that intervention. Any assessment should consider the problems that might arise from government actions as well as the potential benefits.

Recently, various proposals have emerged for leveraging more private sector resources to address environmental problems (e.g. Allen Consulting 2001). While the desire to engage the private sector is laudable, care is needed to ensure this is not translated into policy-induced market distortions and perverse incentives that lower net welfare. Well designed and functioning markets for environmental goods and services avoid such problems, since they can:

- harness the initiative and innovative capacity of the private sector;
- alleviate some of the burden on the public sector and enable more remediation to occur; *and*
- address the underlying drivers of environmental problems.

The role of economics

Economics can provide insights into why environmental problems occur, how they might be solved and indeed whether it is worth solving them. At its broadest level, economics is a framework to help in balancing unlimited wants and scarce resources. The 'environment movement' has done economists a service by highlighting that the environment is a scarce and valuable resource and in order to maximise society's welfare, care is required in using it.

Clearly there are benefits and costs associated with the use and non use of the environment. Importantly, scarcity inevitably results in opportunity costs — the value of the net benefit of available alternatives foregone. We need to remember that environmental resources are not 'free' when they could be put to alternative uses. The problem of opportunity costs is complex and widespread in environmental management. According to Bardsley *et al*.. (2001, p.35) it is a common thread in the major public policy issues associated with the use and degradation of natural resources:

Farming land today has an associated opportunity cost in terms of viability of that land in the future. There is much debate on the monetisation of these costs as they require some weighting of current versus future use (in economic parlance there is no agreement on an appropriate discount rate). Similarly farming land may entail some loss of biodiversity and this requires some method for evaluating the implicit cost. Finally, transboundary concerns highlight the fact that the opportunity cost of degradation need not be internalised by nations let alone firms. Bardsley *et al*. (2001, p.35).

This is not to say that all market based solutions will necessarily achieve policy objectives — markets may 'fail' to function according to economic ideals. Nevertheless, even imperfect markets for environmental services may yield better net outcomes than no action or a fully regulated approach.

Consequently, a forward-looking approach is needed, one where the expected total benefits and total costs of alternative initiatives are assessed and action occurs where economic benefits exceed the economic costs (including hard-to-value effects like cleaner water and conservation of biodiversity). Environmental managers should use a policy approach that is conducive to weighing the merits of an extra dollar for conservation against an extra dollar for competing social demands — such as for health, education, transport and welfare. Of course society must also balance non-economic considerations and monitor the trade-offs between non-economic objectives and economic objectives.

Environmental choices usually have a time dimension and this has important economic implications for governments considering the benefits and costs of alternative policy options. Since a dollar today is worth more than a dollar tomorrow, how do we choose between options with outcomes in different time periods? How do we 'discount' over long time frames? For example, high discount rates will weight policy choice toward reaping benefits today rather than later, and will also 'bias' decision making towards activities with rather modest costs now, compared with activities with huge costs much later.

There is on-going debate on the choice of discount rates (box 1). Nevertheless it is helpful to separate rudimentary cost-benefit analysis for relatively short horizon environmental projects from the intergenerational equity issues associated with extremely long time horizons. How (or whether) to discount the *welfare* of future generations and how much capital stock should be passed onto future generations are important questions for governments.

Ecologically Sustainable Development principles suggest the total stock of assets (including natural capital) passed on to future generations should be at least as great as that inherited (PC 1999, p.8). Markets and market principles can be used to help determine the values we place on natural capital, but ensuring a *sufficient* stock of natural capital for future generations is a problem for society to address more broadly through the democratic process. Economists can aid the decision making by providing information on risks and limitations of any government intervention *as well as* addressing the absence of markets that make valuing natural assets difficult.

Box 1 **Discount rates**

Economists have identified (highlighted by Stiglitz 2000) two approaches to the discount problem (which in some circumstances can yield the same result):

- social rate of time preference — based on the degree to which individuals trade off decreases in current consumption with rises in future consumption — the consumers' borrowing rate; and
- opportunity costs — using the rate of return on alternative investments — the producers' borrowing rate.

Various factors complicate the discounting question. First, there may be divergences in the discount rates between individuals and society — individuals may not consider the implications of their choices on future generations and free ride thinking that other individuals will instead take future generations into account. Second, it is not uncommon for the outcomes of environmental action to have an indefinite time dimension — for example consider the time dimensions of how greenhouse emissions reductions may affect climates.

Finally, in assessing benefits and costs of environmental action it is important to consider the human dimension of any policy choices. Where reform is likely to improve the net welfare of the community but also result in significant transitional costs, it is appropriate for governments to consider reducing these adjustment costs and how this might be best achieved.

2 Economic insights into environmental problems

An important insight of economics is that markets can be powerful tools that can be harnessed to achieve better environmental outcomes. The information generated by markets can enable society to improve its well being. Why is this so and what are the limitations of markets associated with natural resources? What can be done when markets do not exist?

To understand these questions it is useful to think of the natural ecosystems as potentially providing both goods *and* services (see Daily *et al*. 1997). Ecosystem goods are goods that can be harvested from natural ecosystems such as food, fibre, timber and biomass. In contrast, ecosystem services are the functions performed by ecosystems that lead to desirable environmental outcomes, e.g. air and water purification, drought and flood mitigation, and stabilisation of climate.

Well functioning markets enable exchange of goods and services and this is no different for natural resources. Markets for ecosystem goods are easily observed in commodity markets that deliver food and many of our clothing and shelter needs. The information exchanges that occur in the marketplace are critical to the success of markets (see box 2).

While there are markets for many ecosystems goods, there are very few effective markets for ecosystems services (Daily *et al*. 1997b). The lack of markets reduces information the available to decision makers to make appropriate resource use decisions and this can reduce the overall wellbeing of society.

The challenge for environmental managers is understanding why markets may not exist for aspects of the environment and what, if anything, might be done to facilitate them. Broad based and well designed economic instruments should be at the fore of an environmental managers' policy toolkit. In particular, they should be directed to getting the price and value of environmental services right — so that they reflect the true marginal social value of the service. Ideally, the policy objective should be to position environment resources including environmental services as an integral part of the mainstream conventional economy.

Box 2 **Market signals**

During this exchange, information is revealed to buyers and sellers that can aid decision making. In the case of markets for environmental goods and services if the markets operate well, the price can reflect the value society places on the good or service. Prices reflect the scarcity of goods and services as well as the preferences of buyers and sellers. The higher the price the higher the implicit value to society.

> Market negotiation provides signals and information to buyers and sellers. As sellers negotiate a price at which a good is sold they reveal information about the cost of producing an extra unit of the product. Similarly, as consumers negotiate a purchase price they reveal information about the value they enjoy from consuming an extra unit of product.
> (Whitten and Bennett 2001, p.3)

In a competitive market, the market value usually reflects the net social value of a good or service. A well functioning market also generates information and incentives more cheaply than a planned economy (Wills 1997). Both government-planned economies and market economies have limitations, but markets are consistently more efficient.

Identifying the causes of the environmental problem

The solution of environmental problems lies in understanding clearly their underlying causes. Edwards and Byron (2001) identify three economic factors that commonly explain much of the environmental damage to Australia's natural resource-based economy: lack of knowledge; government policies that have affected incentives faced by landholders; and the absence of markets.

Lack of knowledge

Settlers found the Australia landscape very different from Europe. Soils were dry and infertile and the summers long, hot and dry (Barr and Cary 1992, p.1). Australians have not had long to learn the relationships between the activities of man and the condition of the soil, water, vegetation and fauna (especially given the long lead-times that sometimes occur between human action and nature's response).

New information will continue to be important to address knowledge and attitude shortcomings of both landholders and society more broadly. This will aid their understanding of the Australian landscape and its responses to natural and human induced change. In terms of policy design, this suggests important roles for research and development, education and extension.

There are opportunities here for private natural resource managers. For example, some private conservation businesses are already generating a portion of their income from selling the research skills and management expertise they have developed. It is likely there will be increasing demand for private extension services that advise on conservation management issues.

Government policies

Some policies have made it rational to behave in ways that could damage the environment. For example some agricultural policies (such as tax incentives for land clearing; fertiliser subsidies; irrigator subsidies; product price supports; drought assistance; and pastoral leases conditions) have encouraged intensive and at times environmentally damaging forms of primary production. Similarly, trade protection policies, such as tariffs, have sheltered inefficient manufacturing technologies and industries, usually at high environmental cost. Moreover, other policies have also acted to constrain markets from possibly addressing environmental problems

In terms of agricultural protection, it is also arguable that declining levels of protection has lead some managers to consider alternative landuse systems. Declining farm support has probably increased the conservation focus of some landholders in marginal rangelands — with some seeking to supplement farm income with revenues from conservation activities such as ecotourism related farmstays and native flora production.

Examples also continue to emerge of large properties being bought by conservation initiatives with the sole focus of undertaking conservation activities on the holding — Birds Australia have purchased Gluepot Station in South Australia and Newhaven in Northern Territory; the Australian Bush Heritage Trust have purchased Carnarvon Station in Central Queensland.

Haszler and Hone (2001, p.39) note that the retirement of land is one way of promoting biodiversity conservation in agricultural areas. The effects of land retirement for small and isolated rural communities that have previously relied on pastoralism should be considered. Changing landuse systems can have adjustment implications and this issue needs to be understood by landholders and governments. Nevertheless, the opportunity costs of lost rural production for some rural industries should not be overstated. For example, withdrawing some marginal wool country from production could have positive price effects for the remaining Australian wool producers (see Haszler and Hone 2001).

Microeconomic reforms of the last two decades have gone a long way toward addressing many of the price distortions in agricultural commodity markets and manufacturing industries. However, there is still room for improvement in other policy areas, for example water markets, pastoral lease conditions and taxation arrangements.

Absent markets

As noted earlier the absence of markets reduces the information available to resource managers and the community more broadly and can lead to undesirable environmental outcomes (box 3). Economics can help us understand why markets might be absent and how this might be overcome.

Even when the knowledge was available, land managers have sometimes had little financial incentive to consider the effects that their decisions have on others. This applies to decisions on water use that affect irrigation salinity, decisions on tree removal that impact on dryland salinity, decisions affecting the addition of nutrients to ground water and surface water, and decisions on control of weeds and animal pests.

Governments have usually taxed or regulated the actions of those responsible for imposing 'bad' environmental spillovers. Where the source and effect of the spillover are clear such as point source polluters of streams, remediating action is most likely to be successful. In some cases, science is only beginning to emerge to help us understand the biophysical relationships and consequently the causes of some spillovers.

Box 3 **Spillovers and public goods**

Markets can fail to form or not operate efficiently because of spillovers and public goods. Externalities (or spillovers) arise whenever an individual or firm undertakes an action that has an effect on another individual or firm for which the latter does not pay or is not paid (Stiglitz 2000, p.215).

So called 'public goods' occur for one or both of the following reasons:

- once a good is provided to one individual, it is provided to all — it is not possible to exclude people from consumption (ie it is 'nonexcludable'); and
- consumption of the good by one individual does not reduce the benefits available to others (ie it is 'nonrival' in consumption (PC 2001)

There is little incentive for an individual or firm to pay for consumption of a public good since it is possible to 'free ride' on its provision to others.

In some cases there has been little incentive for a free market to provide some environmental goods and services even if their provision would enhance overall social wellbeing. Historically, this has been common to goods and services associated with the environment. Governments have traditionally tried to address the 'public good' aspect of conservation through the direct provision of environmental goods and services. For example, in the past national and state parks and reserves were seen as the bastion against biodiversity loss.[1]

Nevertheless, the nexus between public goods and government provision is blurring and this is creating opportunities for private sector conservation initiatives. This is because there is a growing recognition that many aspects of the environment traditionally considered to be public goods can be provided privately. Examples continue to emerge of highly organised private groups and individuals (such as Birds Australia and the Bush Heritage Trust) finding ways to provide what were previously considered public goods.

There are also a multitude of examples of local community groups working with councils and government authorities to provide more local environmental amenities. For example, near Maffra in East Gippsland, the local Landcare group has been working with the local council and catchment management authority to restore a section of the Macalister River to wilderness — bellbirds are beginning to return to what was once known locally as 'Bellbird Corner'.

[1] Many ecosystems are poorly represented in (or absent from) the public reserve system and many public conservation areas are not large enough on their own to maintain ecological processes and viable populations of flora and fauna in the long term. With more than 60 per cent of Australia's land area under private management, conservation cannot be adequately addressed without private sector participation. (PC 2001)

3 Understanding the absence of markets

In many Australian environmental markets the small number of buyers and sellers and uncertainty over the nature of the service being provided are major hurdles to markets addressing environmental problems. While environmental awareness is growing and more people appear to be willing to pay for environmental services, in many markets the scarcity of buyers is constraining the growth of environmental businesses.

For example, Earth Sanctuaries Limited has noted the lower returns from its more isolated operations such as Scotia Sanctuary in Western New South Wales compared to its smaller more profitable Warrawong Sanctuary in the Adelaide hills. One of the challenges for private conservation initiatives seeking to market their services is educating and convincing the public of the mere existence and benefits of their service.

A related major hurdle is the fact that it is very costly bringing buyers and sellers together to establish a market (see box 4) — the high 'transaction costs' of trying to tap into the latent but dispersed demand of Australian consumers and finding buyers for environmental services.

Box 4 **Transaction costs**

Markets are not costless. In fact, the costs of establishing a market can be so high that markets fail to form — the so called 'transaction costs' may exceed the expected gains from trade. Cost of exchange include:

- potential buyers' costs of identifying prospective sellers and sellers' costs of identifying prospective buyers;
- measurement of the quality and quantity of the asset being transferred;
- revealing potential buyers' willingness to pay and potential sellers' willingness to accept; and
- specification of property rights and transfer of rights. Wills (1997, p.69)

Information problems lie at the heart of transaction costs and many absent markets:

> Once this is understood there is the possibility of addressing the problem through the use of modern technology and clever institutional design. The basic reason asymmetric information destroys markets is that it is hazardous to do business with someone who has relevant but hidden information. The uninformed party is liable to be exploited and may be unwilling to participate. Bardsley *et al*. (2001, p.37)

Policy solutions to environmental problems can address information failures. One of the advantages of markets is that they can help reveal information. However, the market based instrument needs to be designed carefully so this can occur. As will be noted later, where information asymmetries exist, the price mechanism associated with conventional markets might not be the most effective method for revealing preferences of participants — other techniques such as auctions and tendering may be more suitable

Many small private conservation businesses struggle to establish markets for their services simply because it is so costly to identify their potential clients and inform them of the product. Even where such costs could be low, other hurdles exist. An interesting example is the Calgar Springs Sanctuary located near Gosford on the Sydney-Newcastle freeway. Despite being on a major tourist route, red tape has prevented any sign on the freeway to inform potential visitors of its existence.

One innovative approach to the transaction cost problem has been to link the marketing and pricing of a good with a related environmental service. For example, Wetland Care Australia has developed a funding model for the restoration of wetlands. Producers of a local branded agricultural product are approached to donate a percentage of the sale price to a wetlands restoration project that can be linked to the product. In return, the producer is able to promote this positive environmental dimension of their product.

This model is working successfully for BRL Hardy Pty Ltd with their Banrock Station range of wines. Sales of these wines have risen with consumers demonstrating a willingness to pay for wetland restoration projects at the Banrock Station winery and other Wetland Care Australia sites.

The marketing strategy has proven so successful for BRL Hardy that they have expanded it to include their European and North American sales (personal communication, Professor Jeff Bennett, Australian National University, 22 February 2002).

Another successful approach (also discussed later in this paper) to the transaction cost problem is auction and tendering. This has been useful where information failures and small numbers of buyers and sellers prevent effective markets from forming. 'Prices' emerge through a structured process of bids rather than the 'invisible hand' of conventional markets. A recent example has been the Victorian Government's 'Bushtender Scheme'.

Addressing complex transaction cost problems can be very resource intensive — particularly in terms of information and capital. In some cases, it seems that a 'critical mass' will be needed for some projects to be established and achieve success (e.g. consortiums of private individuals, groups and businesses).

The role of property rights

A recurring theme of recent Productivity Commission research has been the importance of clear and effective property rights to emerging environmental initiatives. Clear and effective property rights are a foundation of any market or regulatory approach to biodiversity conservation (see box 5).

The emergence of markets for environmental services will be hampered where the rights and responsibilities of the private sector are unclear. If markets for conservation do not function well, there can be a role for governments to establish well-defined and enforceable property rights and thereby facilitate the emergence and operation of efficient markets.

While it is desirable for economic efficiency that rights and responsibilities be more clearly defined, this should only occur to the extent that it is feasible or cost effective to do so. Tightly specified rights can increase transactions costs just as surely as vaguely specified property rights can.

The challenge is to design property rights that are sufficiently defined for markets to form and yet sufficiently flexible to evolve over time in response to changing information and community preferences.

The efficiency with which a society meets the aspirations of its citizens will in the long-run depend largely on the adaptations made to property rights in response to technological developments, newly discovered relationships and community values.

Changes to property rights may occur through the common law or government legislation. Redefinition of property rights needs to be undertaken with care — any changes to property rights can give rise to questions of compensation or assistance.

Box 5 **Property rights**

How producers and consumers use environmental resources depends on the property rights associated with those resources (Tietenberg 1992, p.45). Property rights comprise the bundle of ownership, use and entitlement rights that a user has over a particular resource, good or service and include any responsibilities that the user may have to others. They have to be seen as part of a system which includes the rules under which those rights and responsibilities are exercised (Bromley 1991).

Property rights may change over time with community expectations. An efficient property rights structure — the theoretical ideal — has four main characteristics:

- universality — all resources are owned and all entitlements (rights over how they can be used) are completely specified;
- exclusivity — all benefits and costs that result from owning and using the resource only accrue to the owner, either directly or indirectly by sale to others;
- transferability — all property rights are transferable from one owner to another in a voluntary exchange; and
- enforceability — property rights are secure from encroachment.

In practice, these ideal attributes are seldom met, but markets can work reasonably well despite some deficiencies. It is when one or more of these characteristics is grossly violated that markets are absent or operate inefficiently. For example, if it is not possible to exclude users who do not pay for a good or service, it is unlikely to be provided by normal market (supply and demand) processes.

One approach to aid clarification could be through an appropriate 'duty of care' (see PC 2001b). A legislated duty of care, in conjunction with voluntary codes of practice, can be more flexible and less prescriptive than many alternative approaches. It could complement other initiatives such as voluntary community action, education and, where appropriate, financial incentives and targeted regulation.

A statutory duty of care has already been introduced by some state jurisdictions — for example see the *Queensland Land Act 1994,* the *South Australian Pastoral Land Management and Conservation Act 1989* and the Victorian *Catchment and Land Protection Act 1994*. Nevertheless, it is still largely unclear how such provisions will be applied and how landuse might be monitored or enforced. Further research and public discussion on this issue are needed.

4 Make policy catalytic — harness the private sector

Market based policy instruments can harness the private sector and make government policy catalytic, particularly where the absence of markets is the dominant feature which makes the environment a major policy issue.

By taking actions that reduce transaction costs and improve information:

- the innovation and initiative of the private sector may be tapped unleashing new technologies and investment towards the environment; and
- the resulting markets lower the cost of environmental policy making previously unviable action feasible.

In many cases the actual costs of environmental remediation have been much less than previously estimated because of the capacity of markets to deliver innovative and cost effective solutions.

When the US EPA wanted to reduce air pollution, (Nitrous oxide and Sulphur dioxide) control costs were estimated by the industry to be $1500 per tonne. The EPA's (optimistic) estimate was $750 per tonne in 1993. Yet in 1997, permits were trading at just $100 per tonne. The tradable credits system had stimulated all sorts of undreamt of innovations and flexibility.

What can be done to unleash the innovative capacity of the private sector to achieve more desirable environmental outcomes? Some fundamental steps include:

- removing unnecessary legislative and regulatory constraints; and
- creating new markets for ecosystem services.

Remove constraints to potential environmental markets

Once the environmental problem, and its underlying economic and scientific causes are well understood, before considering any other actions, environmental managers should assess whether potential markets are being constrained by unnecessary or inappropriate regulatory frameworks.

For example, a number of institutional arrangements associated with biodiversity conservation — particularly aspects of the frameworks for land tenure, competitive neutrality, native wildlife and taxation — are characterised by extensive and often complex legislation and regulation (see below). These factors can increase the relative costs and risks of private conservation activities compared with those of other viable land uses. This influences investment decisions and may lead to less efficient and effective conservation outcomes.

Some specific examples of constraints to managing for biodiversity are listed below (also see PC 2001a). While the focus here is largely on Commonwealth and State jurisdictions, others (e.g. Binning and Young, 1999) have considered the constraints imposed by inappropriate local government regulation:

Property rights are not always well specified. For example, property rights for native flora and fauna are not always explicitly, consistently or fully defined in native wildlife legislation, and may vary according to the jurisdiction and any conditions of a licence. The ownership of captive native fauna held under licence in some jurisdictions may be uncertain and some rights appear to be untested, which may limit private conservation initiatives.

Sometimes legislation unnecessarily prohibits potentially desirable private sector initiatives. For example, only public sector agencies and zoos are allowed to undertake international trade in native fauna — commercial conservation firms are excluded from international trade in native species for profit. However, it is unclear whether such general trade restrictions are effective (for example, in terms of protecting native wildlife from illegal activities) or whether other policy options would improve conservation outcomes at a lower cost.

At times, legislation and regulation also reduce incentives to develop innovative approaches to improve conservation outcomes. For example, most jurisdictions use extensive licensing systems and a broad range of regulatory controls to control specific pre-conceived end-uses (such as keeping or exhibiting native wildlife) or prescribe a particular approach, or even piece of equipment. This can restrict private sector initiatives unless they are in accordance with a licence or the native wildlife has been declared unprotected or exempt from the provisions.

Uncertainty regarding the approach or application of legislation and regulations also increases transaction costs and may discourage investment. For example, altering prescribed grazing or stocking levels under existing pastoral lease conditions is usually at the discretion of the relevant minister or pastoral board. The lack of explicit administrative processes or decision criteria can create uncertainty for landholders wishing to undertake conservation activities that require reductions in stocking levels.

Problems can also occur when legislation and regulation is applied inconsistently. For example, different treatments of donations to environment and heritage organisations affect the relative costs (and therefore attractiveness) of alternative types of donations and may consequently influence the type and amount of 'environmental altruism' undertaken. Amendments to existing gifting provisions in income tax law to address these issues have been proposed (Howard 2001).

Inconsistencies also exist between the approach and application of legislation and regulation across jurisdictions. For example, significant differences exist between the State-based licensing systems and controls on the keeping and trading of native wildlife. South Australia has a flexible and non-restrictive system where applications can be made to keep any native fauna. New South Wales, Queensland and Western Australia, have more restrictions and controls which appear to be more complex than necessary and may unduly constrain private conservation initiatives.

These problems may be magnified by other government measures (such as agricultural assistance) and/or tax treatments that encourage other land uses that may adversely impact on biodiversity.

For example, concessions that lower the relative operating costs of production and land use may make those businesses relatively more attractive, consequently drawing more resources to them and, potentially, away from biodiversity conservation. Subsidies to fertiliser and irrigation water, and artificially high prices for agricultural crops, have distorted land-use, favouring agriculture where it is not really viable, often accelerating clearance of natural vegetation.

Create markets for ecosystem services

In the last few years there have been considerable efforts to design and establish markets for specific environmental services. Some have been more successful than others — what are the lessons for future policy development?

In general, while the use of market based mechanisms and the creation of new markets offers potential solutions to help deliver desirable biodiversity conservation outcomes, it is unlikely to be suitable as a policy option for addressing all conservation issues. Rather, it is likely that a combination of policy instruments will be required.

Many combinations of market based instruments can be applied to different environmental problems. While care is required to design the right set of instruments for a particular problem, environmental management is full of examples, such as air pollutant markets in the United States, where the mix has gradually evolved over time to address unforeseen outcomes (see Tietenberg 1995). This is not a sign of policy failure but rather demonstrates the adaptability of market based instruments when knowledge and technology improve.

A distinction can be made between schemes that use conventional prices to reveal consumers' willingness to pay and producers' willingness to supply, compared with schemes that reveal market information indirectly through structured competitive bidding. The conventional price theory approach (such as those used in cap and trade environmental markets) is more suitable where core market conditions exist, such as enough sufficiently well informed buyers and sellers willing to trade a definable, transferable and excludable commodity.

In contrast, Stoneham *et al*. (2000) highlight the usefulness of 'game theory' approaches of competitive bidding (such as the Victorian Government's tendering and auctions approach of the Bushtender Scheme) where basic market conditions do not exist and information asymmetries are prevalent.

In terms of property rights, creating markets for environmental services may involve creating proxy commodities. The commodity for exchange must have an inherent value to individuals in the community. The scarcity of the property right is critical and must be enforceable if necessary — without scarcity the value will diminish. Regulation may be necessary to ensure scarcity. For example, the value of carbon credits lie in the restrictions on carbon emissions.[2] A realisable commodity is also central to businesses attracting investment capital for the formation of ecosystem service markets.

Transferable property rights can encourage technology progress — more so than 'command and control' systems (Millman and Prince 1989). This means the pursuit of the environmental objective will be less expensive and more timely. In addition, it is usually easier to establish markets where there are clear point source producers of an environmental commodity ('good' or 'bad'). Schemes that allocate a property right to produce an environmental bad should be designed to ensure concentrations of the bad are not localised in space or time.

[2] Although schemes are generally linked to some regulation, Tietenberg (1995) points out schemes that have been designed to replace rather than overlay existing regulation are the most successful in achieving environmental goals.

Linking property rights to a defined production technology tends to constrain innovation and the development of new lower cost processes. Successful emission schemes have broadly defined the environmental constraint and then allowed producers freedom to meet it as best they can (see Tietenberg 1995) i.e. they are outcome-based rather than prescriptive.

Not surprisingly information and technology are critical in the design of market instruments. Science is commonly required to define proxy commodities and verify aspects of the exchange in created markets. High levels of scientific information can be central to the success of schemes where the property right is not easily defined, measurable or verifiable. In the case of markets with offsets, the science to measure and monitor the offset is critical.

This information can be costly and add to transaction costs. However, successful schemes have been designed where scientific information is limited or production technologies are still evolving (see Tietenberg 1995, p. 25). For example the feasibility of “Wetlands banking” will depend on the science dealing with the substitutability of the offset areas being traded.

Characteristics of the environment, such as the irreversibility, scientific uncertainty, threshold effects and connectivity associated with biodiversity, attach risks to policy design and implementation. When establishing new markets, a prudent approach to balancing these risks is extensive testing and pilot scale trials. For example, the New South Wales Hunter River Salinity Trading Scheme recently enacted into State legislation started as a pilot scheme in 1995.

Finally, supporting market infrastructure is useful in conventional price markets. In particular a centralised clearing house can improve the efficiency of tradeable schemes. For example, on line trading can facilitate trade in spot and futures markets and trade at short notice. It can also reduce the cost of searching for a buyer and the need for an agency to closely administer the exchange.

5 Improve public sector efficiency

In addition to using markets to allow the private sector to efficiently and effectively deliver environmental goods and services, it is important to examine the performance of public sector provision. Opening up the public environmental sector to greater scrutiny is likely to create opportunities for private conservation entrepreneurs to offer their services in competition.

Private and public sector environmental markets are inextricably bound together and we need to make progress on both fronts simultaneously. Unlike other sectors of the economy where public provision has been prominent (such as utilities and health) there appears to have been limited application of basic competition policy principles to environmental activities (PC 2001b).

For example, governments have collectively agreed on the principle that any competitive advantages that government businesses may have over their private counterparts simply by virtue of their government ownership should in general be removed (resulting in what is known as ‘competitive neutrality’) unless the costs can be shown to exceed the benefits. Despite the apparent generality of this principle, in practice it has had limited application to government conservation businesses.

Similarly, although jurisdictions have reviewed environment related legislation for potentially anticompetitive effects, there appears to have been little change in many areas, such as those related to the conservation of biodiversity. Aspects of pastoral lease arrangements and native wildlife regulatory frameworks may be anticompetitive and overly prescriptive. For example, private sanctuaries have to obtain many licences that are not required by competing public providers and face a broad range of regulatory controls on keeping, use, trade and movement of native wildlife.

The application of other aspects of competition policy could also be considered including the pricing of, and access to, natural assets such as national parks, state forests and reserves.

Further discussion and analysis of these issues is needed.

6 Establish who should pay for environmental problems

One advantage of using markets to address environmental problems is that they are a mechanism to gain funds for environmental action from the private sector. Markets are only one policy tool and others may also be necessary. Other mechanisms will be required to address who should bear the costs of environmental actions.

Establishing appropriate cost sharing frameworks can create incentives for individuals to use resources more efficiently — governments can reduce costs of beneficial private conservation activities and increase the costs to private entities which harm the environment.

Clarifying the rights and responsibilities of the private sector is a fundamental step in determining who should bear the cost of additional conservation on private land. How these rights and responsibilities are assigned is a matter for political judgement based on perceptions of equity or fairness rather than efficiency (Aretino *et al*. 2001). But at present, when it is unclear who is responsible, very little action is taken by either side.

When the effects of actions by a landholder to address, prevent or reduce environmental damage are confined to his/her own property, it is appropriate for the landholder to pay the costs of addressing the problem, as well as the costs of adapting to it. The case for governments to pay in this situation is weak — examples of situations of this type include some dryland salinity (Pannell, McFarlane and Ferdowsian 2001) and soil acidification.

But where there is a public demand for more conservation than would be provided voluntarily by the private sector alone, an important question arises as to how the additional burden should be shared. If property rights effectively require resource users to maintain an environmental standard, those who fail to achieve this standard are imposing costs on the rest of us. In such situations the *'impacter pays'* principle should generally be adopted. This effectively amounts to enforcement of an individual's existing legal responsibilities to protect the public "downstream".

In contrast, if the community demands results well beyond the level required by established property rights, those benefiting from the additional conservation activities (neighbouring property owners, the local or regional community or the broader community, for example) should generally be required to contribute to the cost of undertaking them — the '*beneficiary pays'* principle.

The final choice of cost sharing principle and how it is implemented would need to take into account the costs of implementation as well as equity considerations (Aretino *et al.*.2001). For example, in adopting the 'impacter pays' principle, some individuals may seek to avoid paying for conservation, so implementation requires effective monitoring and enforcement. If these costs are too high, it may be simpler for the public to just pay up.

Governments may also choose to pick up more of the tab in the short term to help landowners adjust. Issues surrounding the social consequences of cost sharing arrangements, and the possible need for adjustment assistance, are complex and require examination on a case by case basis, but there are some general basic principles.

Markets structures will ultimately determine the distribution of the costs associated with agriculture-related environmental damage. Even when farmers pay for the environmental costs initially, part of the costs will ultimately be passed on to consumers, domestic and foreign, for those commodities facing imperfectly elastic demand and supply curves. However, for major Australian agricultural commodities other than wool, price is determined totally by overseas supply and demand — no part of extra policy induced environmental costs paid by producers are passed on to consumers.

Edwards and Byron (2001) demonstrate that there is also a broader dimension — if farmers around the world are required to incur extra environmental costs, commodity prices will rise as higher production costs shift the global supply curve upward.

Farmers in those countries where environmental costs are relatively low could be net winners when the market response to the multi-country environmental measures is allowed for. Cassells and Meister (2001) found that New Zealand dairy farmers would lose if they alone were made to bear the costs of effluent controls, but that they would gain if they along with farmers in the other three leading dairy export regions (EU, Australia, and US) all had those costs imposed on them.

Conclusions[3]

This paper has focused on the role markets can play in environmental policy. While they are not a panacea for the environment problem, they are nonetheless a helpful tool for environmental managers. Governments may be an important catalyst bringing the potential of markets for environmental goods and services to the fore.

There are many ways in which markets can be established or market based instruments applied. Our design knowledge is still growing — no doubt there will be successes and failures in the future. Basic market design principles continue to emerge as practitioners focus on addressing poor information and high transactions costs. As environmental science and technology and economics improves so too should the flexibility of the markets we create[4].

References

Allen Consulting 2001, *Repairing the Country: Leveraging Private Investment*, Report to the Business Leaders Round Table, Canberra.

Aretino, B., Holland, P., Matysek, A. and Peterson, D. 2001, *Cost Sharing for Biodiversity Conservation: A Conceptual Framework,* Productivity Commission Staff Research Paper, Ausinfo, Canberra.

Barr, N. and Cary, J. 1992, *Greening a Brown Land: the Australian Search for Sustainable Land Use,* MacMillan, Melbourne.

Bardsley, P., Chaudhri, V. and Stoneham, G. 2001 'New directions in environmental policy', in *Public Funding of Environmental Issues*, 4th AARES Annual Symposium, 5 October 2001, Le Meridien at Rialto, Melbourne.

Binning, C. and Young, M. 1999, *Conservation Hindered: The Impact of Local Government Rates and State Land Taxes on the Conservation of Native Vegetation*, National Research and Development Program on Rehabilitation, Management and Conservation of Remnant Vegetation, Research Report 4/99, Environment Australia, Canberra.

Bromley, D.W. 1991, *Environment and Economy: Property Rights and Public Policy*, Basil Blackwell, Oxford.

Cassells, S. and Meister, A. 2001, 'Cost and trade impacts of environmental regulations: effluent controls and the New Zealand dairy sector', *Australian Journal of Agricultural and Resource Economics,* 45:2, 257-74.

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[3] This paper was presented to the Getting it Right conference, an initiative of The Government of South Australia, Adelaide, 11–12 March 2002, Productivity Commission, Melbourne.

[4] This paper includes some material presented by Geoff Edwards and Neil Byron to the 4th AARES Annual Symposium, *Public Funding of Environmental Issues,* 5 October 2001, Le Meridian at Rialto, Melbourne. It also draws on recent Productivity Commission research related to biodiversity conservation including:

- Creating Markets for Biodiversity: A Case Study of Earth Sanctuaries Ltd
- Constraints on Private Conservation of Biodiversity
- Cost Sharing for Biodiversity Conservation: A Conceptual Framework
- A Duty of Care for the Protection of Biodiversity on Land
- Harnessing Private Sector Conservation of Biodiversity
- Productivity Commission Submission to the Queensland Parks and Wildlife Service
- A Full Repairing lease: Inquiry into Ecologically Sustainable Land Management

These publications are available from the Productivity Commission and may also be downloaded at: http://www.pc.gov.au/publications.

Box 6 The Productivity Commission

The Productivity Commission, an independent Commonwealth agency, is the Government's principal review and advisory body on microeconomic policy and regulation. It conducts public inquiries and research into a broad range of economic and social issues affecting the welfare of Australians.

The Commission's independence is underpinned by an Act of Parliament. Its processes and outputs are open to public scrutiny and are driven by concern for the wellbeing of the community as a whole.

Information on the Productivity Commission, its publications and its current work program can be found on the World Wide Web at www.pc.gov.au or by contacting Media and Publications on (03) 9653 2244.

Daily, G., Soderqvits, T., Aniyar, S., Arrow, K., Dasgupta, P., Ehrlich, P., Folke, C., Jannson, A., Jannson, B., Kautsky, N., Levin, S., Lubchenco, J., Maler, G., Simpson, D., Starrett, D., Tilman, D., and Walker, B. 1997a, 'Ecosystem Services: Benefits Supplied to Human Societies by Natural Ecosystems', *Issues in Ecology*, No. 2, Spring, Washington.

Daily, G., Soderqvits, T., Aniyar, S., Arrow, K., Dasgupta, P., Ehrlich, P., Folke, C., Jannson, A., Jannson, B., Kautsky, N., Levin, S., Lubchenco, J., Maler, G., Simpson, D., Starrett, D., Tilman, D., and Walker, B. 1997b, 'The Value of Nature and the Nature of Value', *Science*, July, vol. 289.

Edwards, G. and Byron, N. 2001, 'Land degradation and rehabilitation: A policy framework', in *Public Funding of Environmental Issues*, 4th AARES Annual Symposium, 5 October 2001, Le Meridien at Rialto, Melbourne.

Haszler, H. and Hone, P. 2001, A spillover paradox', in Haszler, H. (ed) *Landuse Policy for Environmental Objectives - Contributions from Economics*, Proceedings of a Workshop for Environmental Managers, Healesville, Victoria, 7-8 February 2001.

Hone, P., Fraser, I. And Haszler, H. 2001, 'Agricultural landuse and biodiversity: Policy principles', in Haszler, H. ed, *Landuse Policy for Environmental Objectives - Contributions from Economics*, Proceedings of a Workshop for Environmental Managers, Healesville, Victoria, 7-8 February 2001.

Pannell, D., McFarlane, D. and Ferdowsian, R. 2001, 'Rethinking the externality issue for dryland salinity in Western Australia', *Australian Journal of Agricultural and Resource Economics,* 45:3, 459-75.

PC (Productivity Commission) 1999, *Implementation of Ecologically Sustainable Development by Commonwealth Departments and Agencies*, Report No. 5, Ausinfo, Canberra.

PC 2001a, *Constraints to Private Sector Conservation of Biodiversity*, Commission Research Paper, Ausinfo Canberra.

PC 2001b, *Harnessing Private Sector Conservation of Biodiversity*, Commission Research Paper, Ausinfo Canberra.

Wills, I. 1997, *Economics and the Environment: A Signalling and Incentive Approach*, Allen and Unwin, Sydney.

Howard, J (Prime Minister) 2001, *Address to the Prime Ministers Awards for Excellence in Community Business Partnerships 2001*, 20 August 2001.

Millman, S. and Prince, R. 1989, 'Firm incentives to promote technological change in pollution control', *Journal of Environmental Economics and Management*, 17:3, pp.247-65.

Stoneham, G., Crowe, M., Platt, S. Chaudri, V., Soligo, J. and Strappazzon, L. 2000, *Mechanisms for Biodiversity Conservation on Private Land*, Natural Resources and Environment Victoria, July.

Stiglitz, J. 2000, *Economics of the Public Sector*, W.W. Norton and Company, London.

Tietenberg, T. 1992, *Environmental and Natural Resource Economics*, HarperCollins, New York.

Tietenberg, T. 1995, 'Policy lessons from existing air pollution control systems: The United States', in Hanna, S. and Munasinghe, M. (eds), *Property Rights in a Social and Ecological Context: Case Studies and Design Applications*, Beijer International Institute of Ecological Economics and The World Bank, Washington.

Truss, W. 2001, *Truss Releases Murray-Darling Basin Salinity Strategy*. Press Release AFFA01/257WT 17-9-01.

Whitten, S.M. and Bennett, J.W. (2001), *Policies for Wetlands Management Change on Private Land*, Research Report No.11, National Centre for Development Studies, Australian National University, Canberra.

Competition Breaks Out! - The New Dairy Market in Transition

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The Australian dairy industry went through a deregulation of its farmgate pricing and supply arrangements in June 2000. This process was brought about by a combination of factors, the most influential of which was the commercial pressure brought by major farmer-owned dairy product manufacturers and exporters.

These companies claimed that the regulated milk pricing placed their farmers at a disadvantage compared to their counterparts who were protected from the commercial price of milk by what was known as market milk regulation. The dairy farmers of Victoria agreed and the formal means by which dairy regulation was challenged at law – a state national competition policy review – resulted in a recommendation that the Victorian government repeal the Dairy Industry Act 1992.

During the period in which dairy regulation was under the spotlight in a number of state and federal reviews, the merits of so-called controls over the pricing and supply of milk were criticized by the rational economic fraternity for creating an artificial environment which distorted milk production and led to "undesirable economic outcomes". Such outcomes were said to result in an undue quantum of resources being attracted to the dairy industry from alternate uses of farming land, water, capital and labour.

The early effects of deregulation on the dairy industry have been well chronicled in the media which has highlighted the effects of the loss of incomes of farmers who were most significantly exposed to falls in milk prices.

This paper however outlines some of the changes that have occurred in the dairy industry value chain since the removal of regulation almost two years ago. The changes that the move towards a totally commercial milk market include:

- The effects of supply and demand on the farmgate milk market;
- The impact of change on the business of the processor/manufacturer;
- The nature of the milk producers' contract with the marketplace, and
- Transparency and ongoing development of market information.

Change in context

Change within the industry has to be taken in context. Any analysis of what has happened in the dairy industry in the two short years since deregulation has to be read against a background of ongoing change in world market dynamics and in the way that retailers and consumers influence the marketing of products at home and in offshore markets.

In specific terms, the dynamics that have affected the Australian industry whilst changes occurred in farmgate markets have included:

- Fluctuations in fortunes in world dairy markets;
- Marketplace deregulation of the pricing and wholesale distribution of packaged milk;
- The increasing use of generic brands in packaged dairy milk and a range of dairy products;
- Gradual increasing liberation and sophistication of major export markets – requiring increased product and service differentiation and specialisation, and
- Consolidation of major global dairy companies, the formation of a major single manufacturer and exporter in the NZ industry in the form of Fonterra, and that company's investment in Australian manufacturing and export marketing

Deregulation has – in my view – given the dairy industry, at a national level, greater ability to deal with these challenges. At a regional level, the impact of deregulation on farmers and processors has varied and in some areas has been extremely adverse.

Supply, demand and competition

In short, the deregulation of the dairy industry has introduced new types of competition into the industry which were previously unseen:

In the past	New forms of competition now and in the future
• Service level competition at wholesale levels for packaged milk • Price, service and quality competition for dairy products at wholesale level • Price, service level and product quality competition in export markets for dairy products	• Strong price competition at wholesale levels for packaged milk products • Supply competition between milk buyers (processors, manufacturers and traders) for milk suppliers

Much of the focus of the change in the dairy industry was placed on the formerly regulated packaged liquid milk sector – which at a national level consumes less than 20 percent of all milk produced by volume. Yet because the level of milk used in packaged milk products in certain states and regions was much higher than average the impact of this change has varied.

The Australian dairy industry now exports more than half its output in milk equivalent terms. The "world price" for dairy products that are exported is governed by several factors, including the prevailing export spot prices out of Europe and the US (determined by prices net of subsidies), the Australian dollar exchange rate, the demand for product from importing countries (which is affected by the use of tariff protection). As is the case with New Zealand (the major other "free market exporter"), the majority of those exports by volume are dairy commodities and ingredients – cheese, milk powders and butter – though there is an increasing degree of specialisation and customisation in the product range which offers some protection against spot market prices.

With the complete removal of regulated milk prices and supply management arrangements, the total returns to the industry are now more directly driven by the level of export returns available to major exporting manufacturers. In basic terms, other uses of milk in the domestic market – over time – are priced off the base level of returns set by the export market. The other direct influence of the world market on our industry is the significant volume of cheese that is imported from New Zealand, which to some extent keeps a cap on the returns that local manufacturers can extract from the domestic retail cheese market. In the past, the pooling of regulated market milk returns to farmers offered some insulation from these effects.

In the second half of 2000, while deregulation was starting to adversely effect milk prices across the liquid milk sector, export prices moved favorably for Australia, resulting in a surge in export demand and in unit selling prices. Poor seasonal conditions across the major production regions of Victoria limited available milk to meet this strong demand for milk. Within months of the change in industry arrangements, the industry faced a situation where significant shortages of milk were creating strong competition for supply between dairy manufacturers, driving up the price of milk at the farmgate and in particular in the "spot" bulk milk market for dairy components (milk protein and butterfat) between companies.

Supply competition has taken two forms:

- The scurry for sufficient milk to fill (mostly export) market orders. This occurred across south-east Australia driving up milk prices in the second half of the 2000-1 season.
- The use of milk price to capture milk supply to damage competitors by limiting throughput, weakening factory profits and the ability to respond to market competition. This form occurred as Murray Goulburn and Nestle took supply from Bonlac in 1998-2001. It is still occurring in South East Queensland in 2001-2 between Pauls and Dairy Farmers.

Neither form is specifically new since July 2000, but the emergence of the latter has come about due to the weakening of companies who were and are exposed to milk supply that depended upon regulated incomes.

Change to the business of the processor

The lead up to farmgate deregulation saw the introduction of new demands on the business of certain processors. New milk purchase contracts were released by companies that were previously able to rely on regulated supply management arrangements to deliver milk to their factory door. The prices offered at the time in such contracts had not fully anticipated the sudden swing in world market fortunes.

With the onset of commercial farmgate prices (and given the transparency of those prices), major retail chains stepped up to the plate and called for fresh rounds of tenders, forcing strong price competition between processors for the share of the supermarket segment of the packaged milk market (which is approximately 50 percent of all packaged milk sales).

As a result of the fall in packaged milk margins as new lower prices swept the supermarket shelves, the sharp fall in milk prices was passed onto farmers with the most severe effects being felt in NSW and Queensland regions.

Average milk prices at farmgate quickly fell by as much as 8 cents a litre (depending on the dairy company supplied and the farmer's former access to market milk returns). Over time, the effects of the supply response to falls in returns took their toll on milk production volumes in these regions through the exit of hundreds of producers.

In this respect, the effects of reduced supply has put significant pressure on the profitability of commodity product manufacturing operations in areas north of the Murray River, ironically at a time when export product prices were at their highest for many years.

The total lower supply has not enabled recovery of fixed production overheads – forcing consolidation and closure of many small regional operations.

The nature of the milk supply contract

In the absence of certain regulatory controls on the supply and pricing of milk, the milk supply agreement is the major form of commercial regulation of milk supply that operates in the industry today.

The major form of contract used in the industry prior to deregulation has been in the form of a co-operative milk supply policy, where each of the farmer-owned businesses sought to operate with a generic milk purchasing policy common to all member-suppliers. The use of these pricing policies is today largely unchanged.

The advent of a range of sophisticated milk supply contracts, mostly by liquid milk processors, has accompanied the deregulated farmgate market.

Certain co-operatives have been forced to adopt more differentiation in their pricing in order to produce a milk supply curve more suited to their business needs, and/or to lay-off some pricing risk to the producer.

The greater role for "the contract" as a tool provides the following contrast between the past and future:

Control through regulation	**Management through a commercial contract**
Control of supply • (pooling states) the milk processor was able to rely on their milk needs being met through directions being made by the regulator • (quota states) individual farm production was influenced by limits as to the quantity of milk output that would return the market milk price	**Supply management** • direct supply agreements (usually for all milk produced by a farm) • a limited number of contracts contain a stipulation that the producer be required to supply an agreed minimum contract volume
Control of pricing • Fixed input prices to milk processing – which varied by region • (pooling states) farmers incomes were supplemented by an allocated share of the proceeds of packaged milk usage at regulated prices • (quota states) farmers made business and production decisions based on their chosen level of exposure / dependence on market milk incomes • The cost of manufacturing products for the domestic market were higher due to the DMSS payments	**Sharing of the price risk** • Pricing signals convey bonuses and penalties for: o Under or over-production (against a plan) based on the end use of milk by the buyer o Production of milk with superior milk component levels (butterfat and protein)

Conveying signals in milk pricing

As identified above, in the past two years, there has been some advancement in the sophistication of the price signals conveyed by processors and manufacturers to their suppliers. Chiefly, signals are used to:

- Enhance the overall quality of milk;
- Promote expansion of individual farm business enterprises;
- Match milk flows to the market demand according to each company's market/product mix, and
- Share the cost of unplanned milk production.

The great majority of milk purchased at farmgate in the industry is priced according to standard terms and conditions that are offered by co-operatives and other major exporting manufacturers. The will to vary these policies is not strong; the major co-operatives still treat as sacrosanct the obligation to take all the milk produced by their suppliers at the times when it is cheapest to make milk, without discriminating between suppliers on the basis of size and location. Co-operatives lead in the structure of those policies; their competitor exporters and milk buyers mimic those buying policies.

Despite the broad trends towards the market for Australian dairy product requiring more year-round product supply, the structure of these policies has not changed significantly in the past few years. Farmer-owned manufacturers remain committed to supporting seasonal milk production as a low-cost strategy to their suppliers, whilst maintaining investments in facilities sufficient to cope with the mounting peak supply volume on the highest milk production day of the year. Only timid use of pricing signals to encourage a flattening of the production pattern, which would provide more efficient utilisation of factory capacity, has been advocated. However, the desire of company managers to achieve that outcome is strong.

In this time however, some greater use has been made of:

- Seasonal production incentives, which promote movement of production towards the times of the year when milk is more difficult to produce;
- Bonuses and penalties for quality parameters;
- Differential payments rewarding larger producers, both through fixed cartage charges and production volume incentives, and
- Growth incentives – rewarding increases in production over the prior season.

The greatest use of signals in pricing has come from companies who have the greatest at stake in ensuring their milk supply flows match their market requirement (liquid milk leaders National Foods, Parmalat and Dairy Farmers) across a range of dairy products. The companies have adopted different strategies to deal with the trade-off to their own respective businesses between security of milk supplies at controlled prices versus investment in milk balancing and storage facilities.

Accordingly, the industry has seen the use of the concept of the production plans or supply allocation by these groups in their contracts, coupled with the use of penalty prices to combat unplanned volumes. The use of these varies according to the overall supply and demand situation. When an over-supply of milk was feared upon deregulation, the used of tiered prices by several companies discouraged excess milk to plan. This quickly swung when milk shortages were apparent such that production over plan was actually rewarded in most cases.

Collective bargaining

Since the advent of a commercial marketplace, the peak industry body for dairy farmers has sought to remedy the position of the individual dairy farmer through authorized collective bargaining under Trade Practice law. Dairy companies have shown mixed interest in this concept. One company has embodied the principles into its dealings. Co-operatives largely feel this is redundant as collective bargaining is their main role. Other companies have rejected collective negotiation. The impact of the facility on the structure and dynamics of the farmgate market is uncertain but likely to be limited.

In my view, the greatest tools that producers have in ensuring that bargaining is broadly fair are:

- The existence of strong, viable integrated dairy co-operatives, and
- Knowledge of options they have for their milk and/or their enterprise.

With few to endorse intervention between farmer and processor the market will govern all other outcomes.

Transparency and information

The transparency of farmgate milk prices has always been relatively high in the dairy industry, although comparisons between company price offerings have been made increasingly complicated in recent years as supply competition between processors has intensified.

Transparency of pricing information in the hands of the wholesale and retail sector today affects the dairy industry in two major ways:

It allows the buyers to understand milk pricing and margin structures of processors when calling for bids on milk supply tenders, and

The landed world price for cheese effectively becomes the benchmark buying price for cheese into this domestic market, more so now that the NZ dairy industry has a major direct stake in the Australian industry at manufacturer level.

These changes give industry participants at farm and factory level less control over price setting for their businesses. While the absolute level of prices has become more transparent, the complexity of different pricing structures has made the comparison between company offerings much more complex.

In the background, one of the greatest challenges faced by the total industry is to communicate (in language that can lead to decision-making) the big picture and the market dynamics that surround the industry in the context of the world market. The future growth of the industry compels a clear view of the demands and expectations of the available markets.

Conclusion

Deregulation in 2000 has created a new Australian dairy market to which the industry is still adjusting. The UK dairy industry deregulated in 1994 and is still enduring the pain of transition through ongoing changes that are driven by the industry's inability to match supply with demand. Our strength in this regard is far greater as a total industry, but we are still very early into change for many participants.

Over time, we can expect to see more diversity in the devices that are used to manage the milk volumes and its cost, despite increasing pressure to consolidate our food sector for more effective global positioning. The pressures brought on by new forms of competition will be some of the drivers for ongoing change at corporate level.

The major impact of change in farm incomes in high-cost milk production areas will take several years to have its full and lasting effect on the industry. Future changes are not solely governed by the supply response of farmers to changes in market access, but also (and largely) by the ability of people to realise their available options, and to make and act on life choices. The culture in these affected regions has been shaped by a dependence on farming sustained by certainty of prices at regulated levels.

In the dairy industry, that will see greater use of signals in the pricing of milk to suit the business outcomes of processors, but also see the advent of risk management tools to enable prices and input costs to be managed by professional farmers and major processors.

The future will also see the need for greater responsibility to be taken by dairy farmers for the ethical standards of the product they supply in terms of animal welfare, food safety, environmental impact and service reliability. Today these elements are market differentiators. In future they will be basic business requirements and their commercial enforcement through business contracts is inevitable.

References

ABARE 2001, *The Australian Dairy Industry: Impact of an Open Market in Fluid Milk Supply*, ABARE Report to the Federal Minister for Agriculture, Fisheries and Forestry, Canberra, January.

Senate Rural and Regional affairs and Transport References Committee 1999, *Deregulation of the Australian Dairy Industry*. The Parliament of the Commonwealth of Australia.

Milk Development Council[5] (United Kingdom) www.mdcdatum.org.uk

[5] The MDC is an industry services agency that provides a contract reporting service to the UK industry. The agency offers a price transparency service to producers which illustrates milk prices accessible by producers, and provides a graphic illustration of a commercial farmgate market featuring both co-operatives and private companies. Many variations of contract structure are identifiable in the UK industry and the lead taken in the development of Australian models has borrowed heavily from the UK.