

THE SECOND SIR JOHN QUICK BENDIGO LECTURE

The Murray Darling Basin Initiative:

A Case Study in Integrated Catchment Management

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It is a pleasure to be here tonight presenting the Sir John Quick Memorial lecture. Sir John Quick made many substantial contributions to Australian public life but from my point of view probably the most important is the way he brought the community into the political process leading up to the formation of the Australian Commonwealth nearly one hundred years ago.

Quick described his work with the Federal movement in an important series of articles that appeared in the Melbourne Herald through 1926. Although he had been an active proponent of federation for a number of years previously, it was at the 1893 Corowa Conference that he came into his own. That conference was convened after the first serious attempt at drafting a national constitution in Sydney in 1891 had failed. Quick, a conference delegate, re-energised the federal movement with his proposal that the future national constitution be drafted by a convention made up of directly elected representatives, and that the results of their work should be submitted to some form of referendum to allow the voters in the six colonies to make the final decision.

The proposal to introduce a referendum, an American innovation, was a dramatic break with British and Australian political tradition but aided by Quick's drafting of a suitable enabling bill for submission to each of the colonial parliaments, and his energetic lobbying, it was rapidly accepted. The spirit of Quick's democratic intervention received further recognition in the preamble to the Constitution with the statement that the union was agreed to by the people, rather than the colonies or their parliaments as in the earlier drafts.

In their great work *The Annotated Constitution of the Australian Commonwealth*, Quick and his fellow author Robert Garran, understandably gave a prominent place in their introduction to the part played by the Popular Movement in achieving federation. This recognition of the role that an informed and active community can and should play, in deciding the big questions of their time, brings me to the theme I wish to discuss tonight. Just as Sir John Quick placed his faith in the judgement of the community of the 1890s, I see today's community as the key to achieving a sustainable future in the Murray-Darling Basin.

Covering one-seventh of the continent, the Murray-Darling Basin has a population of nearly two million people. Another million people outside the Basin depend on its resources. Containing over twenty major rivers as well as important groundwater systems, the region is an important source of fresh water for drinking and other domestic purposes, agricultural production and industry.

The Murray-Darling Basin is the heartland and the economic powerhouse of inland Australia. It supports one quarter of the nation's cattle herd, half of the sheep flock, half of the cropland and almost three quarters of its irrigated land. In the pre-drought financial year 1991-92, the Basin's agricultural production was worth \$8.56 billion per year which is more than 41 per cent of the national total.

A significant proportion of this agricultural production is from irrigation. The Basin has nearly seventy five per cent of Australia's irrigation, worth an estimated \$3 billion. Its economic importance is even greater than this figure suggests. Irrigated crops have a major flow-on effect on employment in many urban areas and are a significant export income earner. Food processing is the largest secondary industry sector in Australia and it depends heavily on irrigation to provide a steady supply of high quality raw material. In addition in 1991-92, the most recent year for which figures are available, production from manufacturing industry in the Basin was worth \$10.75 billion per year. Of this at least 70 per cent was dependent on agriculture.

The water of the Murray-Darling Basin is also important for many people living outside the region. Adelaide takes more than 40 per cent of its water supply from the Murray in normal years, and up to 90 per cent in very dry years. Manufacturing production in Adelaide for 1991-92 was worth \$12.3 billion. Without water from the Murray the volume available for industry on a reliable basis would be a small fraction of what it is now. Consequently we can safely assume that the manufacturing sector in Adelaide would be much smaller in size if it had to depend on water from the surrounding catchment.

In the same year industrial production in the Iron Triangle - Whyalla, Pt Augusta and Pt Pirie - was worth more than a billion dollars. That region is almost totally dependent on Basin water.

Another important industry is tourism; an industry heavily dependent on the maintenance of high quality riverine environments. Basin-wide, tourism was worth \$3.44 billion in 1993-94. Breaking that down, it is estimated that tourism along the New South Wales and Victorian section of the Murray, in the same year, was worth \$676 million. At a more local level, figures supplied by the Greater Shepparton Development Corporation show that for the city of Shepparton alone, tourism was worth more than \$60 million in 1993 and was estimated to generate the equivalent of at least 1500 full time direct and indirect jobs.

The figures above do not take into account values which cannot be expressed in financial terms. These include the preservation of the bio-diversity of the region, both for its own sake and because it is a major contribution to the quality of life of many residents and visitors.

Many of the Basin's natural resources are of high environmental value. Its wetlands are extensive and perform essential hydrological, biological and chemical functions which support and maintain the productivity and health of the river systems. Approximately 30 000 wetlands occur in the region. A number of these are recognised under the Convention on Wetlands of International Importance (otherwise known as the Ramsar Convention). These include Chowilla, Barmah-Millewa Forests, the Coorong, Gunbower Forest, Hattah-Kulkyne Lakes, the Kerang Wetlands, Lake Albacutya and the Macquarie Marshes.

As we all know the resources of the Murray-Darling Basin water are now the subject of a wide range of disputes. Among many members of this generation of Basin inhabitants there is a growing feeling that they may not be able to pass on to coming generations, the same opportunities to make a living and enjoy life, which they inherited themselves.

Ever since the algal bloom on the Darling in 1991/92 blue green algae has been in the news. Vegetation clearing in catchments has become a major issue in Queensland and New South Wales. There are also court actions going on against upstream pollution. The future management of the Lake Victoria storage is under intense discussion and the demand for water in the northern part of the Basin has resulted in a push to redirect the Clarence River back across the Great Divide to the west.

Graziers who have traditionally used wetlands as drought reserves are in open conflict with irrigators in a number of regions. There are also court battles between aspiring irrigators, and existing irrigators who do not want more competition for the limited supplies of water available.

At a more detailed level, within the irrigation industry there are disputes over water caps, water pricing, proposals for bulk water entitlements, the sale and transfer of water rights, possible mergers of water delivery bodies, water security, proposals for changing the nature of water rights, shortages of land to irrigate, the Council of Australian Governments' water reforms and the development of a national competition policy.

These contentious issues are the product of both environment and history. In some cases the causes go back to the mid nineteenth century. Border problems were an important factor in causing towns like Corowa to be active in their support for federation and the administrative structure that exists throughout the Basin today was in part shaped by the State structures that developed while the colonies were still separate and independent.

By the time that federation was being seriously discussed it was clear that effective management of the Basin, particularly along the Murray, required cooperation across State borders. However the writers of the constitution discussed the management of the River Murray for a number of weeks without result. In the end, as it became clear that there would be no resolution to the debate, convention members let it lapse rather than torpedo the push for national union.

However the severe drought of 1895-1902 once again focused community and government attention on the need for interstate cooperation in order to make the most effective use of a scarce resource. After many years of discussion, agreement was finally reached in 1915.

Two years later the River Murray Commission was established. This organisation was controlled and funded in equal parts, by the governments of New South Wales, Victoria, South Australia and the Commonwealth. Decisions made by the River Murray

Commissioners required unanimity. The unusual nature of this organisation is shown by the provisions placed in the *River Murray Waters Agreement* to deal with deadlocks. In such circumstances the matter at issue was to be submitted to an arbitrator appointed by the Chief Justice of Tasmania. The same provisions still apply to its successor, the Murray-Darling Basin Commission.

The deadlock provisions have never been invoked but until recent years cooperation between the governments in the Basin was relatively limited. This narrow part-of-catchment approach was not only evident at the inter-governmental level. Within each government the traditional departmental structures did little to encourage an integrated perspective on matters related to water management.

The River Murray Commission was responsible for administering the collection and distribution of water only. Until 1982 when a number of minor changes were introduced, it had no brief to concern itself with water quality which initially was not seen as a problem. However by the 1980s it was clear that the agricultural practices which had been introduced over the last one hundred and fifty years were having impacts on water quality which could not be ignored.

Land degradation was widespread and growing. The problem included soil structure decline, erosion by wind and water, waterlogging, dryland and irrigation induced salinisation, and soil acidity. The causes were a variety of inappropriate management practices, including overgrazing of semi-arid and arid pastoral areas, cropping of marginal lands, over cultivation of some croplands, inappropriate irrigation practices, inadequate pest management, and extensive native vegetation clearance, particularly in upland areas where recharge to underground aquifers occurs.

This degradation has lowered significantly the productivity of large areas of land in the Basin. It has also had negative impacts on the water coming from those areas and caused a marked decline in the health of the Basin's river systems and in water quality.

These changes happened with the support and encouragement of governments. Much of the irrigation industry in the southern part of the Basin was established during the first half of the twentieth century by governments anxious to attract population into the empty hinterland. In many cases policy was influenced by popular beliefs about the virtues of rural communities. Other factors were the popular demand for land, the high priority given to the resettlement of soldiers returning from the first and second world wars and the campaign to expand Australia's population for defence reasons. These social and political

factors largely determined the nature and distribution of the irrigation industry within the southern part of the Basin.

In order to provide opportunities to the greatest possible number of new settlers legal and local planning constraints were imposed. These now hinder the development and profitability of the irrigation industry. An example is the limitation on the size of blocks in some irrigation districts. This restriction was originally introduced to keep large companies out of districts designated for settlement by new farmers with small resources.

Many irrigation areas opened up under these policies now have large numbers of people on small uneconomic blocks. In many cases family incomes, particularly in older government areas in the southern part of the Basin, are below the generally accepted poverty line. This causes financial stress for the people concerned and means they are not in a position to reinvest in their farms. Investment, to replace existing capital equipment and introduce new technology is essential to gain better profits and reduce the volume of excess water allowed to go to the rising water table.

During the same period, through the construction of dams, locks, diversion works and regional supply systems, a large public investment of capital was made into irrigation infrastructure. However in comparison with a number of countries, such as Israel and the United States, investment in irrigation in Australia has provided a very low rate of return; in part because the bulk of irrigation water within the southern Basin is used to support mixed farming.

The engineering infrastructure of head works, pumping stations, channels and delivery systems has been in place for many years and now needs renewal if it is to continue to supply the irrigation industry in the future. A review of infrastructure within the southern part of the Basin indicates that expenditure of some \$600m will be required over the next 15 years for maintenance and replacement. In the current economic climate, both at a Commonwealth and State level, it is felt that a significant component of the funds required for this reinvestment program should come from the irrigation industry.

Consensus that we need major changes in the way we treat the natural resources of the Basin, has been building for a number of years. In 1985 the three State governments in the southern part of the Basin and the Commonwealth Government, agreed to be part of *The Murray-Darling Basin Initiative* and formed a Ministerial Council to implement its principles. The Initiative gained its formal structure through the Murray-Darling Basin Agreement which has been approved by the Basin State Governments and the

Commonwealth Government. That Agreement states that its purpose *is to promote and co-ordinate effective planning and management for the equitable, efficient and sustainable use of the water, land and other environmental resources of the Murray-Darling Basin.*

In 1988 the Murray-Darling Basin Commission replaced the River Murray Commission with an extended brief which included much greater emphasis on water quality. This change reflected growing concern for the catchments as well as the water bodies of the region.

The Murray-Darling Basin Ministerial Council is the policy making body for The Initiative and normally consists of 12 ministers holding portfolios for land, water and environmental issues within the Commonwealth, New South Wales, Queensland, South Australian and Victorian Governments. Unlike most such bodies the Council is required by legislation to meet at least once a year. The Ministers on the Council are responsible for key policy areas in their respective governments. This means that the unanimous decisions taken by the Murray-Darling Basin Ministerial Council represent a consensus of governmental opinion and policy across the Basin.

A Community Advisory Committee has also been set up to act as a "sounding board" for the Council. The Committee is made up of 21 community representatives from the main river catchments in the Basin, as well as representatives from the National Farmers Federation, the Australian Conservation Foundation, the Australian Local Government Association and the Australian Council of Trade Unions.

Working to the directions of the Ministerial Council the Murray-Darling Basin Commission is responsible for coordinating the construction and operation of storages, weirs and locks, administering the distribution of water to New South Wales, Victoria and South Australia and developing the policy framework shaping the management of all land and water resources in the catchment of the Murray-Darling Basin. This includes the management of agricultural and pastoral properties, towns, national parks, forests, deserts and water courses. The Commission also provides advice to the Ministerial Council. To do this it draws upon an extensive system of more than 20 working groups, made up of experts drawn from government departments, universities, private and community organisations, which bring together the best expertise available. The Commission is equally responsible to each of the governments represented on the Council and is not a government department or a statutory body of any one government.

Murray-Darling Basin Commissioners are senior officers or heads of the departments represented on the Ministerial Council. Many of the Commission's projects are

administered through their departments. This encourages cooperation between the various Government departments, and the office of the Commission, which has a staff of about 40.

The early years of *The Initiative* focussed on encouraging participants to become more aware of the principles of integrated catchment management and the development of the joint community and government structures. Involvement in this process has produced growing acceptance of the need to move away from an approach which divides the available resources equally between all regions to a new more strategic approach that concentrates resources on the areas where investment will produce the best results for the Basin.

These developments have made possible a rapid evolution of *The Initiative*, which from 1995-96 will see funding support shift substantially away from individual projects towards the development and implementation of strategic, large scale integrated catchment management plans which address priority issues in those areas of the Basin requiring most attention.

The key to *The Initiative* is the *Natural Resources Management Strategy* (NRMS) which was prepared in 1988 to provide a philosophical and organisational structure within which governments and communities can co-ordinate their work together. Through the NRMS community groups at the regional and sub-regional level are now centrally involved in the major issues that confront the Basin.

One of the most fundamental questions requiring the attention of governments and communities in the Basin is how best to determine the appropriate balance between water retained in the rivers and water taken out for domestic consumption, industry and irrigation. Throughout most of this century water managers had the task of encouraging development to make use of the cheap water available in the newly constructed storages. The water distribution system was designed to promote distribution - not restrain consumption. By the early 1990s water diversions had increased to the extent that nearly 80 per cent of the water flowing through the Basin rivers was being diverted for off-stream use.

In 1993, concern about the environmental impact of the increasing rate of water diversions and the prospect of increased water trading, caused the Murray-Darling Basin Ministerial Council to request a study into the potential extent of surface water diversion throughout the Basin.

The Ministerial Council considered the results of that study in mid 1994. It concluded that the existing system of water allocations acts to restrain water use only during periods of drought. Under normal non-drought conditions it was not effective in controlling water use.

This conclusion was reinforced by the results of the water audit which the Ministerial Council requested as a result of the initial study into the potential extent of diversions. In non-drought years it is factors such as limitations of the delivery systems and the undeveloped market for trading water entitlements, rather than the water allocation system, which determine how much water is taken out of the Murray-Darling system.

However many of these limitations are now being removed: in particular the growth of water trading is making it more likely that an irrigator's un-used allocation will be taken up by someone else, rather than being left in the river.

It was because of concern about this changing situation that the Ministerial Council commissioned the water audit. The audit was to discover:

- what changes had occurred since 1988;
- what was likely to happen in the future if the existing system was maintained; and
- what the impact of these changes has been, and will be, on the riverine environment and communities dependent on the system.

The basic aim was to ensure that we had a sustainable system of water use in the Basin.

The water audit was carried out by a team drawn from the natural resources management agencies of the five governments that deal with the Basin. It was delivered to the Ministerial Council, composed of representatives of those governments, in July this year.

The water audit found that water diversions from the Basin's rivers had increased by approximately 8 per cent since 1988 and had the potential to increase by an additional 14.5 per cent above 1994 levels, if the existing management regime continued unchanged.

The audit also found that the current system of water regulation and diversion had markedly changed the seasonal pattern of flows so that the previous pattern of winter/spring flood and autumn dry had been reversed. In addition the drought conditions that occurred in the lower Murray once every twenty years in the period before water diversions became a significant factor, now occur in 61 per cent of years. It concluded that all these changes were causing a significant deterioration in the environmental health of the Basin's waterways.

As an immediate response the Council imposed an interim cap on any increase in diversions beyond existing levels. Between now and when Council next meets, detailed discussions are to take place aimed at defining the appropriate level of diversions and the management regimes needed to achieve that target. These discussions are taking place within governments, between governments and with the public throughout the Basin.

One of the many environmental problems which have been intensified by the increasing rate of water diversions is salinity which initially had most impact on irrigation areas in the southern part of the Basin. *The Salinity and Drainage Strategy* was introduced in 1987 to ameliorate this problem.

The strategy was a response to rising salinity levels in the Murray river and rising water tables within irrigation regions. A number of studies predicted that sometime during the years 2010-20 all irrigation regions within the southern part of the Basin would have water tables within 2 metres of the surface. This will reduce the sustainability of agricultural production within those areas, particularly where the water tables are highly saline.

Through the *Salinity and Drainage Strategy* improved land management techniques are being introduced to minimise the amount of irrigation water going to the water table. Engineering works are also being constructed to intercept saline groundwater before it flows into the main river system.

The saline groundwater interception schemes at Waikerie and Woolpunda in South Australia, and Mallee Cliffs in New South Wales, are good examples of the *Salinity and Drainage Strategy's* Basin-wide approach. As part of the strategy the southern Basin States contributed substantial funding for the construction of these projects. In return they are permitted to flush an agreed amount of saline water out of their agricultural areas into the river. This trade-off protects large areas of prime agricultural land in the upper and middle part of the Murray River catchment and produces a net reduction in the amount of salt flowing down river, towards the pumping stations which supply Adelaide and other cities and towns.

More recently concern about salinity has broadened to include its impact on dryland farming areas where the problem is occurring as a result of the movement of groundwater. At the Commission's workshop on groundwater held at Wagga Wagga in September, dryland salinity was revealed to be a much greater threat than previously thought.

Studies of the groundwater systems underlying the Basin have been going on since the 1970s. One of the most important results of this work is that we now know that groundwater throughout the southern part of the Basin has been rising steadily for most of the last twenty five years. There is also no indication that this process is likely to slow down or be reversed within the foreseeable future.

At the Wagga Wagga workshop the first stage of another major study was presented for discussion. This study is analysing trends in salt concentrations and salt loads in stream flow in the Murray and Darling drainage basins. The aim is to detect the historical trends of salt loads in streams throughout the Basin and then, in the second phase, predict what the trends will be the future.

Work done in Victoria had already identified widespread increases in stream salinity and related it to dryland salinity and a paper by Allison and Schonfeldt, published in 1989, had suggested that the continuation of existing trends in the Victorian uplands of the Riverine Plains would eventually cause a very substantial increase in salinity of 140 EC units at Morgan, unless remedial actions were taken.

Using water quantity and quality data dating back to the 1970s the first phase of this new study has given support to Allison and Schonfeldt's prognosis. However their prediction was based on recharge from the non-irrigated uplands of the Victorian riverine plains only, so the study's findings for New South Wales streams cause even more concern. In the Lachlan and the Murrumbidgee rivers for example, salt loads and salinity are both rising for the entire length of both rivers.

Extrapolating historic trends into the future is not the recommended procedure for making predictions, but it provides a simple initial perspective. The team leader of the salinity in streams project, Dr David Williamson, has described as conservative, the assessment that it will take 25 years for the increase of 140 ECs at Morgan to occur. The estimate that it might take 50 years is, he thinks, very conservative. In either case the consequences are serious.

This increase in salinity will have a major impact on agriculture and the environment in the Basin. It also has serious implications for the three million people who are dependent or partially dependent on water supplied from the Murray-Darling system, as well as the billions of dollars worth of industrial activity currently based in the Basin and South Australia.

The Commission's *Salinity and Drainage Strategy* was designed to achieve a net decrease of between 60 to 70 EC units at Morgan. If it is correct that recharge from dryland sections of the Basin will produce a counter trend resulting in an increase of 140 EC units, then that hard won improvement will be swamped.

We also have the preliminary results of another study into the possible future extent of dryland salinity in New South Wales. It indicates that if present land management practices continue, up to five million hectares of that State could be at risk.

What are these studies telling us? The fundamental conclusion is that we are in a period of major change - moving from the equilibrium that existed when Europeans first arrived in Australia to a new equilibrium which we will reach at some time in the future. At this stage we do not know what that new state will be. However we can be sure that salt will be a much more important part of the landscape, and will have a greater impact on people's decisions, than has been the case in the recent past.

In response to the salinity problem the Commission is concentrating its support on those communities which are accepting their fundamental responsibility for planning and implementing the measures that will give them a long term future.

The key to managing salt is to manage the water which mobilises the salt. Excess recharge to groundwater is the driving force in salinisation. At the micro level - the individual farmer, grazier, urban planner, builder, road maker and backyard gardener will have to get very smart in the way they work with soils and plants to maximise water use. Many of the aquifers causing dryland salinity are shallow local systems which can be dealt with by local actions so developing a wide range of new management skills at the community level is crucial.

Dealing with groundwater problems effectively will require a major long term effort, but we have already achieved substantial progress. The projects which revealed the broad hydrogeological scope of the groundwater problem in the Basin are the product of serious commitments made, in some cases, over a decade ago.

This research has been part of the systematic effort to build up the knowledge base needed to implement the aims of the NRMS. The NRMS is based on the principle that it is the responsibility of individuals and communities who own and manage the land, to implement sound resource management practices suited to their own localities. The role of Governments is to support, encourage and coordinate community activities. Government

activity will be directed to issues requiring inter-governmental cooperation, Basin-wide policy and a long-term perspective. However Governments have neither the resources nor, in most cases, the authority to implement resource management programs on land managed by individuals or private companies.

The NRMS establishes a framework in which both Community and Government based actions may be implemented in a coordinated way across the Basin. It is sufficiently flexible to cope with the complexity of natural resources degradation, management and the time scale over which changes are likely to occur and broadly defines the roles and responsibilities of the various Governments, agencies and communities. In summary, the Strategy has a dual thrust whereby complementary actions are developed by both Governments and communities.

The Community component of the NRMS is based on regional groups for each of the 19 identified management regions for the Basin. These groups are responsible for coordinating natural resource management within their regions. They coordinate the action of sub-regional groups, landcare groups and other community groups to ensure the best outcomes for the region as a whole.

Each regional group in the Basin has developed a regional strategy which broadly identifies desired outcomes. These strategies include statements of the priority issues, locations requiring attention, and actions which are needed to achieve those outcomes. More detail on actions to be undertaken and specific outcomes to be achieved for a priority location is then developed as part of an action plan. These regional groups and sub-regional groups bring together all interested parties to develop these action plans with assistance from technical specialists.

Action plans are the primary vehicle for achieving the goal and aims of the NRMS. They are the strategic building blocks which coordinate community and government action at the catchment scale, and which provide information for determining the priorities for the Basin. Developing these action plans involves an exhaustive process of community decision making taking into account environmental and social values as well as economic.

Action plans are being developed for locations in the Basin where natural resources management problems are particularly severe and need to be addressed urgently. The plans deal with a comprehensive range of concerns including bio-physical processes; the identification of stakeholders roles and responsibilities, and cost sharing arrangements.

They also aim to quantify the economic, environmental, social and regional and off-site benefits of implementing the recommended priority actions.

The NRMS provides funding for projects and activities through three main programs, the Integrated Catchment Management Program (ICM) the Investigations and Education Program (I&E) and the Drainage Program. The ICM program assists local and regional communities to develop and implement integrated catchment plans while the I&E program works to eliminate knowledge gaps that are impediments to achieving sustainability.

Government funds, actions and support services are intended to be catalytic only. Community resources, which are expected to be added to the process, greatly exceed these inputs. A good example of this strategic role is provided by the *Algal Management Strategy*, the product of an intensive process of consultation with all the major stakeholders, which defines the appropriate roles for the different levels of government and the community. As the coordinating body, the Commission supports government agencies and community groups by funding research and the preparation and implementation of integrated catchment management plans.

Similarly with the *Sustainable Rivers Program* which we are developing with the intention that it will provide the cornerstone for a strategic long term approach to the Basin's rivers. The program will use data on stream flow rate, depth and width, riparian vegetation, adjacent wetlands, water quality, areas of inundation and floodplain flora and fauna, which is being collected from a wide range of different sections of the Murray-Darling river system.

The information which will be provided by the *Sustainable Rivers Program* will be crucial for the developing debate about environmental flows - that is the provision of water for the specific purpose of gaining environmental benefits such as the encouragement of fish and bird breeding or improving the health of wetlands. It will make it possible to predict the likely impact of changes to flow conditions resulting from variations to irrigation allocations, the revision of water release policies, the construction of new structures, returning water to the environment, and other such events. As a result water agencies and community groups will be able to consider their options in a much more informed manner.

These efforts are targeted to deal with the practical problems that have to be solved if large scale active community involvement in the effort to achieve sustainability, is going to be a practical goal. For example the Commission is funding a range of projects aimed at improving our ability to predict the effects of changed land management practices in areas threatened or already confronted by dryland salinity.

This will provide communities and governments with a much better indication of what can be achieved with the various available remedial options, before they commit the funds and effort needed to put them into practice.

Improved understanding of what the real costs of dryland salinity are, is coming from another Commission-supported project which is being organised by ABARE. In an attempt to quantify the total costs of salinity ABARE is conducting a number of regional studies throughout the country. The Commission is funding the Bendigo area study where ABARE is preparing an estimate of a comprehensive range of market costs, or direct financial costs, resulting from the impact of dryland salinity. In addition to costs related to lost productivity or increased production costs on farm, this includes costs resulting from damage to roads, buildings and other infrastructure - both public and private.

Better information about the full extent of the costs of salinity will assist the discussion about who should pay the costs of implementing the solutions to the problem. One of the most promising of these solutions is strategic tree planting. In recognition of the potential of this activity the Commission is funding a consultancy on farm forestry in the Basin. This information will then assist stakeholders in both the private and public sector to decide whether it is worth their while to invest in this activity.

The funding of farm forestry projects is being widely discussed. As with a number of other activities, many of these projects will have both private and public beneficiaries. In some cases the beneficiaries will only be a few people, for example the tree planter and his neighbours just down the hill. In other cases the beneficiaries could be entire urban communities which have to use increasingly saline river water for their water supply, or local and State governments responsible for the up-keep of roads and other public assets at risk from rising water tables.

Many sites affected by dryland salinity - be they wetlands, farms or urban buildings - are privately owned. Consequently many of the immediate financial benefits flowing from remedial actions designed to deal with hotspots, will go to individuals and commercial enterprises.

Public bodies such as the Commission do not have a role subsidising the commercial activities of private individuals. However there may be a case for funding the cost of works such as farm forestry, up to the level of public benefit arising from the works. There is also a role for the Commission in identifying and assisting in the elimination of factors which retard the growth of activities that could enhance the sustainability of the Basin.

This debate about cost-sharing is also significant for other initiatives being prepared to help decide who should pay for the on-ground works which are an essential part of the transition from unsustainable, to sustainable land management.

Because of the importance of this issue the Commission initiated a consultancy in January 1995 to develop cost sharing principles and frameworks for on-ground works. Matters to be considered include the principles being recommended for use in deciding how costs should be shared, and mechanisms to collect and deliver contributions.

The basic question being answered by all these projects is "What are the appropriate roles for governments and communities in the campaign to achieve sustainable management of the natural resources of the Basin?"

The history of the irrigation industry provides a useful illustration of the way the relationship between governments and the community has changed in recent years. Most of the early development of irrigation in the southern part of the Basin, was government sponsored and supported by large scale extension activities, tax concessions, import protection and subsidy programs. However, during the last two decades public attitudes about the role governments should play in relation to such development activities, have been changing. The need to encourage economic practices which are sustainable in the long term has become a higher priority.

One result has been progressive reductions in the budgets of agencies managing and maintaining water management systems. This has provided current irrigators with a legacy of irrigation infrastructure which, in many cases, is in a poor state of repair. Problems are particularly evident in some of the irrigation regions, as distinct from the major head works such as the Dartmouth, Hume and Lake Menindee storages.

Current government thinking has been shaped by a number of developments. One of the most important was the Industry Commission review of the water and waste water sector released in 1992. The Industry Commission was asked to consider what service and financial returns Australian governments should expect from the water and waste water industries. There was opportunity within the Industry Commission's review for all parties, rural, urban and industrial, to contribute. This inquiry resulted in the Commonwealth Government making a series of recommendations for the water industry and had major ramifications for the ongoing discussion about the entitlements of different types of water users, the introduction of a trading system in water rights, and water prices.

Since the release of the Industry Commission report there have been other developments with implications for the water industry. One of the most important is the Hilmer report, presented to the Council of Australian Governments (COAG) in 1993, which discussed ways to improve the efficiency of government enterprises, including those in the water industry. Subsequently in February 1994, COAG endorsed a series of water industry reforms, to be implemented by the Year 2000, which will make the sector largely self-funding.

These reforms have important implications for irrigation. To address the issues raised, the Murray-Darling Basin Commission has developed its *Irrigation Management Strategy*. The objective of this strategy is to produce an economically and environmentally sustainable irrigation industry in the southern part of the Basin by the year 2020.

The strategy aims to deal with the institutional weaknesses, and economic and social problems, which have hindered the development of the irrigation industry in the past. Although technical research will play an important role, the emphasis is on implementing knowledge we already have.

During the period of transition it will be the role of the Commission to coordinate efforts to define what "sustainable irrigation management" means in practice. The concept is now widely referred to, but still only partially understood. The aim will be to create a policy environment which provides practical parameters defining sustainable management practices but gives industry room to develop and self-adjust.

The *Irrigation Management Strategy* aims to place irrigation on a sustainable and profitable footing for the long term. This will mean changes and choices for many irrigators, some of whom will stay in the industry and some of whom will leave. The Strategy will provide benefits for both groups. Those who stay will benefit from being part of a profitable industry with a long term future. Those who elect to leave will be able to sell their water entitlements to other irrigators.

Through the *Irrigation Management Strategy* and the other associated strategies, agriculture will become more capital intensive. The greater complexity and profitability of associated businesses and industries will increase the demand for skilled managers and other service providers. Communities will become more prosperous and diverse, and over time the compounding effects of these changes will make it easier to attract additional infrastructure.

The two main components of the strategy are water market reform and a regional approach to implementation. Water market reform will deal with property rights, trade in those rights and water charges. Any water trading which takes place must take into account environmental constraints and policies being developed to assist with the management of the riverine environment.

The regional approach is possibly the most important aspect of the *Irrigation Management Strategy*. It will allow planners to focus on the particular characteristics of each region, identify what its needs are, nominate opportunities for future development and tailor a detailed program of measures necessary to achieve the objectives of the strategy.

In planning the *Irrigation Management Strategy* the Commission recognised that regional communities are best placed to determine for themselves how the strategy should be implemented in their areas. The first region selected to trial the strategy was Sunraysia. Subsequently the Shepparton region was selected for a second study. It was thought that using these contrasting areas as case studies would emphasise the strategy's regional and decentralised character.

Business plans, based on the sustainable management of the natural resources base, are a central part of these case studies. In May 1994 the strategy received a major boost when the Prime Minister's White Paper *Working Nation*, allocated \$8.5 million for use over the next three years to support the preparation and implementation of the regional plans for Sunraysia and Shepparton.

In addition to these resources, matching funds will be provided by the State of Victoria. Other funds will be contributed by the local community and those State and Commonwealth agencies which have specific responsibilities related to the irrigation industry.

These case studies are good examples of the integrated and community based regional approach being encouraged by the Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ). By improving the links between the Rural Adjustment Scheme, National Landcare, Agribusiness Programs and Rural Communities Access Programs, communities are being assisted to improve their productivity, sustainability and competitiveness. The south-west Queensland Regional Strategy demonstrates how this approach is meant to work. Initially proposed by members of the community, that project is a real partnership between the community and Governments at local, State and Commonwealth levels.

The regional development process is changing the focus of government activity away from the highly centralised model of the past. The new structures are bringing together the various agencies and community groups at the regional level and making them more responsive to the community. In broad terms some observers are describing this as the development of a fourth level of government.

A century ago the Australian community, led by visionaries such as Sir John Quick, had to decide whether or not to form a national union. The fundamental principle - that those affected by the results should be responsible for the original decisions - provided the justification for direct consultation with the entire electorate back in the 1890s. Now the descendants of that community have to decide how to organise their activities so that our presence in the Basin can be sustainable for the long term. The fundamental challenge is to manage the Basin's natural resources equitably, efficiently and sustainably. To do this, environmental and developmental concerns will need to be integrated to produce a dynamic and expanding economy which provides the Basin's inhabitants with the opportunity to enjoy a fair and just standard of living, while protecting the health, diversity and productivity of the environment for the benefit of future generations. That is a complex challenge which will require sacrifice and effort. Communities need to take responsibility for deciding how best to meet this challenge because ultimately it is their members which will pay the price of failure or reap the rewards of success.