

Agriculture and Resource Management Council of  
Australia and New Zealand

Australian and New Zealand Environment and  
Conservation Council

## WASTEWATER AND STORMWATER MANAGEMENT

A National Framework For Improved Wastewater  
Reuse and Stormwater Management in Australia

Policy Position Paper

Task Force on COAG Water Reform

Sustainable Land and Water Resource Management Committee

Occasional Paper Number 3  
December 1996

© COMMONWEALTH OF AUSTRALIA 1997

[ISBN 0 642 27116 X]

[printed by Goanna Print Pty Ltd]

## **AGRICULTURE AND RESOURCE MANAGEMENT COUNCIL OF AUSTRALIA AND NEW ZEALAND**

The Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ), established in 1993, is one of a number of Ministerial Councils set up by the Commonwealth and State Governments to further co-operation and collaboration in particular fields of mutual concern. ARMCANZ consists of Australian Commonwealth/State/Territory and New Zealand Ministers responsible for agriculture, land and water resources, and rural adjustment policy issues.

The Council is a non-statutory body. It provides a forum for the exchange of views on the development of policies, guidelines and programs to assist the beneficial and orderly assessment, development and management of Australia's resources. It is supported by a permanent Standing Committee, the Standing Committee on Agriculture and Resource Management (SCARM). Membership of the Standing Committee comprises relevant Departmental Heads/Chief Executive Officers of Australian Commonwealth/State/ Territory and New Zealand agencies as well as representatives of CSIRO and the Bureau of Meteorology.

## **AUSTRALIAN AND NEW ZEALAND ENVIRONMENT AND CONSERVATION COUNCIL**

The Australian and New Zealand Environment and Conservation Council (ANZECC) is a non-statutory Commonwealth, State, Territory and New Zealand Ministerial Council. It was formed in 1991 by amalgamation of the former Australian and New Zealand Environment Council (ANZEC) and the former Council of Nature Conservation Ministers (CONCOM).

ANZECC provides a forum for member governments to exchange information and experience and develop coordinated policies in relation to national and international environment and conservation issues. Its members are the Commonwealth, State, Territory and New Zealand Ministers responsible for the environment and conservation, with the relevant Minister from Papua New Guinea as an observer.

The Council is supported by two Standing Committees of senior officials nominated by the Ministers, the Standing Committee on Environment Protection (SCEP) and the Standing Committee on Conservation (SCC). The Standing Committees are advised by specialist working groups, task forces and networks set up for specific purposes.

## **FURTHER INFORMATION**

Inquiries concerning COAG Water Reform publications should be directed to:

Secretariat, Task Force on COAG Water Reform  
GPO Box 858  
CANBERRA ACT 2601 Australia  
Tel: (06) 272 5216; Fax: (06) 272 4526

# A NATIONAL FRAMEWORK FOR IMPROVED WASTEWATER REUSE and STORMWATER MANAGEMENT IN AUSTRALIA

## TABLE OF CONTENTS

TABLE OF CONTENTS .....	i
PREFACE .....	iii
INTRODUCTION .....	1
OVERVIEW ON WASTEWATER REUSE AND STORMWATER MANAGEMENT .....	2
OVERVIEW .....	2
RAMIFICATIONS .....	3
POLICY CONSIDERATIONS .....	4
1. COAG Water Framework Element: Pricing .....	4
<i>Issues</i> .....	4
<i>Discussion</i> .....	4
<i>Suggested Supportive Actions</i> .....	5
2. COAG Water Framework Element: Institutional Arrangements .....	5
<i>Issues</i> .....	5
<i>Discussion</i> .....	5
<i>Suggested Supportive Actions</i> .....	6
3. COAG Water Framework Element: Water Allocation and Entitlements .....	7
<i>Issues</i> .....	7
<i>Discussion</i> .....	7
4. COAG Water Framework Element: Environment / Water Quality .....	7
<i>Issues</i> .....	7
<i>Discussion</i> .....	7
<i>Suggested Supportive Actions</i> .....	8
5. COAG Water Framework Element: Consultation and Education .....	8
<i>Issues</i> .....	8
<i>Discussion</i> .....	8
<i>Suggested Supportive Actions</i> .....	9
6. COAG Water Framework Element: Research .....	9
<i>Issues</i> .....	9
<i>Discussion</i> .....	9

## PREFACE

The attached policy paper has been prepared by the Standing Committee on Agriculture and Resource Management (SCARM) Task Force on COAG Water Reform (Task Force) in response to a requirement under the 1994 COAG Water Reform Framework that ARMCANZ, ANZECC and the Ministerial Council for Planning, Housing and Local Government examine the management and ramifications of making greater use of wastewater in urban areas and strategies for handling stormwater, including its use, and report to the Council of Australian Governments.

On the basis of a CSIRO study commissioned by ARMCANZ to address this brief, the Task Force prepared the attached policy paper. In the context of the original COAL direction, the Task Force considers the paper, and the policy proposals arising therefrom, a reasonable response. However, it is now more generally accepted that the management of wastewater and stormwater needs to be considered firstly within the context of the overall urban water life cycle rather than as specific resources in isolation. When set properly within this primary context it is recognised that reuse of wastewater and utilisation of stormwater, the measures on which the 1994 brief focussed, will often remain important initiatives in making more efficient use of water resources.

It is the Task Force view that improving the overall efficiency of use of water resources, while maintaining (or regaining) appropriate environmental values, should be the fundamental guiding objectives in the resource management sense. The impact of large diversions of water from the freshwater environment and the effects of stormwater runoff and return of treated effluent to urban waterways, estuaries and coastal waters should be minimised.

In respect to wastewater, the Task Force considers that efficient use of water, is equally as important as reuse following inefficient use and is the first point of consideration in waste minimisation. Efficient use can often be a more cost effective and economic measure.

The Task Force notes that, despite the increasing commercial focus of the water industry arising from the COAG reforms, water is still underpriced. While urban water pricing now generally covers running costs and for most major metropolitan suppliers provides a return on assets few charges take into account the environmental costs of water (except in the case of wastewater treatment costs). The environmental costs are difficult to quantify and work to identify them is only just commencing.

In regard to the management of stormwater as a resource, the Task Force notes that large quantities of urban stormwater are generated at times when demands for second class water are minimal and that the storage of stormwater in significant quantities in existing urban areas for later use is generally expensive (except in the case of cities which are able to utilise their natural groundwater aquifers as a storage). However, possibilities for incorporating storages at the planning stage for new urban subdivisions should be given consideration (Canberra shows the benefits of this approach).

The Task Force is of the view that the first priority for stormwater management must be focussed upon impacts on receiving waters. A significant proportion of water quality problems in and around urban areas are due to stormwater impacts. Nevertheless, in managing the impact of poor stormwater quality, opportunities to utilise it as a resource will arise, and these should be maximised.

The Task Force notes that the recommendations in the attached paper provide broad policy positions as guidance for wastewater reuse and harvesting of stormwater. More work however, is required to put them in the context of an holistic approach to water resources management which would include evaluation of all options to achieve the water resource and environmental objectives.

There is a range of complementary measures and issues linked to wastewater and stormwater in the urban cycle which need to be addressed to improve the efficiency of resource use and protect environmental values in a cost effective way within the whole life cycle of water. These should include:

- making more efficient use of diverted resources through reform of water pricing and promotion of more efficient water using appliances and garden irrigation practices;
- quantifying the market for recycled water for varying uses over a range of water qualities;
- recycling of treated wastewater of secondary or potable quality (the subject of this policy paper). Recycling should range from local to large scale whole city schemes;
- improving understanding of the environmental effects of returning treated effluent and associated biosolids to the environment (either to land or water);
- measures to improve the quality of urban stormwater runoff to protect the receiving waters;
- measures for harvesting stormwater for consumptive use from its source, as well as from the drains, as a means of reducing total pollutant load;
- adoption of water sensitive design criteria in conceptualising, aligning, shaping and sizing stormwater provisions in new urban developments; and
- analysing the economics to enable the most cost effective solutions to the environmental issues to be identified from the full range of potential options.

The Task Force believes that moves to increase the proportion of reuse should be undertaken within the above context. The most significant factor in promoting the efficient use and recycling of wastewater will be pricing water at its true full cost.

The Task Force therefore proposes that ARMCANZ, ANZECC and the urban water industry (through WSAA) evaluate the economics of the urban water life cycle to identify opportunities for improving the sustainable management of water resources and the health of inland and coastal waters in cost effective ways while maintaining customer service and public health.

# A NATIONAL FRAMEWORK FOR IMPROVED WASTEWATER REUSE and STORMWATER MANAGEMENT IN AUSTRALIA

## INTRODUCTION

The 1994 report of the Working Group on Water Resources Policy to the Council of Australian Government (COAG) recognised the importance of environmentally sustainable management of wastewater and stormwater in Australia's metropolitan and country town areas.

Issues such as efficient and sustainable use of water resources (including those presently regarded as wastewater) full cost recovery and the provision of adequate water for the environment, were seen as areas of reform necessary to assist Australia's competitive position in the world.

On the fundamental premise that improved management of stormwater and wastewater is integral to the COAG Water Reform Framework Agreement, COAG requested that *ARMCANZ, ANZECC and the Ministerial Council for Planning, Housing and Local Government examine the management and ramifications of making greater use of wastewater in urban areas and strategies for handling stormwater, including its use and report to the first COAG meeting in 1995 on progress.*

COAG also requested *ARMCANZ and ANZECC in their development of the National Water Quality Management Strategy, to undertake an early review of current approaches to town wastewater and sewage disposal to sensitive environments, noting that action is underway to reduce accessions to water courses from key centres on the Darling River System.*

ARMCANZ, through the Standing Committee Agriculture and Resource Management's (SCARM) Sustainable Land and Water Resources Committee and Its Sub-Committee on Water Resources (SWR), commissioned Jon Thomas of CSIRO to work with a panel of State wastewater and stormwater management agency staff to report on wastewater reuse, stormwater management and the national water reform agenda. The project was undertaken under the supervision of a steering committee of ARMCANZ and ANZECC representatives.

The resulting CSIRO report entitled, *Wastewater Reuse, Stormwater Management and the National Water Reform Agenda* presents a detailed discussion of the issues surrounding the implementation of the policy principles of the COAG Water Reform Agenda in relation to the reuse of wastewater, improved urban stormwater management and adoption of superior practices regarding disposal to sensitive environments. Particular attention is given to current and potential practices, technical obstacles and opportunities, environmental and public health constraints, economic and incentive structures, the regulatory environment, the role of community involvement, catchment based resource management and development of institutional roles and responsibilities.

This policy position paper, which draws on the CSIRO report, has been prepared by the SCARM Task Force on COAG Water Policy Reform working with representatives of the SWR. The paper discusses the ramifications of making greater use of wastewaters and identifies the key areas of public policy which will, together, constitute an identifiable national approach, compatible with the Australian environment and social situation, to address wastewater reuse and stormwater management and also identifies a range of forums through which agreed actions could be progressed (ARMCANZ, ANZECC and NEPC). This paper provides recommendations of broad policy positions as guidance for wastewater reuse and harvesting of stormwater, consistent with the principles agreed in the Water Reform Framework, 1994 and the Competition Policy, 1995, but additional to the specifics of these agreements. Readers are referred to the CSIRO report for further reading concerning the issues. It should be noted that ARMCANZ/ANZECC endorsement of this paper does not imply endorsement of the recommendations contained in the CSIRO report.

# OVERVIEW ON WASTEWATER REUSE AND STORMWATER MANAGEMENT

## Overview

The fundamental importance of improved management of wastewaters (includes both wastewater and stormwater) for urban centres, irrigation, industrial domestic and stock uses across Australia cannot be over emphasised. COAG has endorsed a wide ranging framework of reform of the water industry. This framework recognises wastewater reuse and stormwater management in terms of its potential as a resource and major potential impacts on the wider natural resource basis. However, in many jurisdictions, some current practices for management of wastewaters are at odds with the intent of COAG water reform agenda, suggesting that effort will be needed in individual jurisdictions to ensure consistency with the water reform framework. It also suggests that there is a need for increased harmonisation of the outputs of wastewater management practices - which calls for national standards or guidelines established through forums such as ARMCANZ/ANZECC (the NWQMS) and NEPC (national measures). Any changes to improve harmonisation of standardisation must, however, take account of regional differences.

Volumes of stormwater and wastewater form a very large part of the urban water cycle. Their improved management offers potentially large environmental, economic and social benefits. The ability to achieve these benefits is increasing as new technologies, system design concepts and management methods are progressively introduced, however, there is little evidence of major moves towards more adoption.

While some agencies have adopted more innovative approaches, traditional approaches to water supply and waste management predominate in forward planning.

This is despite the estimated 1200 GL of treated sewage being discharged from town sewage treatment plants (STP) to coastal waters in Australia and the expected 50 percent increase in volume of effluent discharged to coastal waters by the year 2020.

In addition wastewater utilities expect the volume of treated sewage discharged to inland/fresh waters to increase by some 30 per cent to 350/400 GL by the year 2020. The degree of treatment varies substantially between major metropolitan cities and smaller country towns.

While the wastewater stream represents a significant volume of water, that represented by stormwater is even greater. The volume of stormwater generated by major metropolitan regions is in the order of 7100-GL and is expected to grow by similar proportions to wastewater. To put it into perspective the volume of urban stormwater and wastewater is equivalent to more than 80 percent of the total annual diversions in the Murray Darling Basin. Arguably, stormwater and treated wastewater offer a large potential resource for economic, environmental and social benefits.

The CSIRO report summarises knowledge of the current impacts of discharges of partially or untreated wastewater and of stormwater on aquatic environments. In particular, the *State of the Marine Environment Report for Australia* (1995) highlighted the fact that the state of the marine environment, including estuaries near urban centres, is a cause for concern. Better management of urban coast waters must include better management of the discharges of sewage and stormwater which are discharge into them.

The discharge of wastewaters from inland centres, whilst generally of lesser volumes, becomes of considerable concern when combined with subsidiary effects of polluted rural discharges and excessive upstream diversions. Studies are required to ascertain the conditions for making best choices for disposal of wastewaters to rivers, to land disposal schemes or possibly after additional treatment, to schemes providing positive economic returns.

Physical factors which have limited the use of wastewater and stormwater have included the temporal variability of flow, limitation on available storage and water quality. Moreover, the collection of sewage into a few centralised locations for treatment creates large effluent which often exceed any local demands for second class water. The centralised location also inhibits the economic retrofitting of reticulation pipes to return the treated effluent to satisfy smaller demands which might be distributed widely within the larger areas over which the effluent is collected.

However, there are also policy issues influencing management decisions which have constrained considerations about their use, and similarly can and need to be addressed. Other constraints to the use of these waters exist in regulations which limit choice in the standard or type of service received and in pricing and accounting systems which often underestimate the true direct costs of existing practices and avoid recognition of the many indirect or hidden costs associated with them. These include costs associated with bringing forward dates for system augmentation and costs associated with environmental damages. The failure to take these costs into account leads to situations where reuse often appears to have a high cost penalty when it is considered as a possible substitute for taking additional supplies from existing water supply infrastructure.

## Ramifications

Ramifications of making greater use of urban stormwater and wastewater are listed below under the headings of benefits and requirements.

The potential benefits include:

- opportunities for reducing costs. In some Australian towns and cities the future costs of augmenting water supplies will be high, if development continues to rely on traditional sources, particularly where additional long distance pipeline capacity is required and traditional approaches to infrastructure deployment and replacement;
- potential to encourage innovation in the industry given the wide range of potential reuse markets;
- improvements to economic and environmental well being through waste minimisation which
  - helps satisfy urban water demands by reducing the demands on more valued resources and reducing wastewater volumes returned to receiving waters
- achieves reduced discharge of pollutants to marine and inland waters;
- the local capture and treatment of stormwater in wetlands provides a range of benefits in flood peak reduction, lower costs for downstream drainage channels, higher values of adjacent properties and increased local biodiversity;
- reduced investment in end-of-pipe treatments (eg ocean outfalls) as well as a reduction in damage to the environment through associated cost savings; and
- some opportunities for improved urban design with higher levels of 'greening', recreation, aesthetics and attractiveness.

The requirements include the need to:

- give a clear perception to the community about the nature of the resource management problem and establish cooperative arrangements whereby the community can contribute to decisions about reuse;
- increase adoption and use of integrated catchment management as the primary water management tool, including the adoption a water-sensitive approach to urban design;
- establish regulatory structures, cost and price structures, allocation entitlements and property rights for the various potential applications for reuse of treated wastewaters and biosolids;
- identify the roles and responsibilities for urban wastewater management and formulate integrated catchment planning; and
- address the associated real and perceived public health issues.



## **POLICY CONSIDERATIONS**

ARMCANZ recognises that stormwater and wastewater management is an integral part of the COAG Water Reform Framework Agreement which contains the key elements of pricing, water allocation and entitlements, improved institutional arrangements, consultation and research. The policy issues arising from the CSIRO report can be considered in terms of the same COAG Framework elements. This will assist jurisdictions to integrate urban stormwater and wastewater management with other elements in the water cycle, consistent with the COAG Framework Agreement. Discussions on these issues follow below.

### **1. COAG Water Framework Element: Pricing**

#### **Issues**

- The adoption of COAG principles of full cost recovery and removal of institutional impediments could lead to the more efficient use of available resources including wastewater and stormwater.
- Greater consistency in costing formulas will enable full costs to be identified and improved planning decisions to be made.

#### **Discussion**

In the interests of minimising costs, water utilities will generally choose a system of supply which tends to equalise average and marginal costs across system components. Traditionally, water utilities have not had to pay compensation for any external costs that the water/wastewater operation impose. This distorts their decision making. The inclusion of these costs could have a significant influence in any financial comparison of reuse versus conventional water supply schemes.

Governments need to provide institutional arrangements and financial signals to ensure that water utilities are not inefficiently biased in their decisions. Thus, attention needs to be placed on the removal of inappropriate institutional impediments and cost distortions which inefficiently bias utilities away from socially optimal choices.

For example, even with the higher engineering costs of augmenting major cross city pipelines for non potable water supply and wastewater removal, these infrastructure proposals continue to be favoured over alternative supply/disposal schemes. This is due to a number of factors including the subsidisation of major augmentation by urban consumers as a whole, the failure to take into account the full external costs of supply and disposal and institutional arrangements which favour retention of the status quo.

In general, current institutional arrangements could place water utilities in a position where they are able to reject water supply including reuse proposals by other groups. This could be through contractual arrangements with related organisations such as suppliers, water retailers, build-own operators or water users, which exclude competitive supply activities involving reuse or denying access of other parties to the wastewater flows for legitimate reuse purposes.

## Recommendation 1

- (a) That the 1998 Water Reform Framework principles of full cost recovery, which it applied primarily to water supply and wastewater services, be applied generally to the total water cycle in relation to services and resource management, and specifically to embrace stormwater management.**
- (b) That measures be taken to ensure institutional and financial incentives encourage proper economic, social and environmental evaluation of alternative water supply, sewerage and drainage schemes.**
- (c) Licensing of water supply activities should ensure freedom of entry for reuse projects subject to the normal public interest conditions.**

### Suggested Supportive Actions

Water industry regulators, utilities and independent investigators should undertake system-wide environmental benefit-cost analyses to determine under what situations particular reuse schemes could be efficient. These analyses should identify the opportunity costs of water abstraction and wastewater discharge options, as well as the appropriate infrastructure costs, and lead to appropriate institutional responses.

To provide guidelines on the estimation of benefits and costs, a national study of the direct and external costs and benefits of conventional versus alternative water systems incorporating innovative approaches to stormwater, wastewater and groundwater systems as part of water supply systems could be undertaken under the auspices of the Urban Water Research Association of Australia and/or CSIRO.

## 2. COAG Water Framework Element: Institutional Arrangements

### Issues

- The need to adopt integrated whole catchment planning approaches to wastewater and stormwater management and reuse, with clear identification of roles and responsibilities consistent with institutional reform of the water reform framework.
- The need to provide regulatory structures to support environmentally and economically sustainable wastewater reclamation projects with more attention being given to the provision of continuous quality control.
- The need to reform institutional structures for stormwater management to complement the reform of water utilities and provide explicit roles for state and local government.

### Discussion

The COAG framework requires the implementation of institutional reforms which provide for an integrated approach to catchment management. However, responsibilities will need to be clarified, then institutional arrangements can be established whereby the customers of the services can be included in the drawing up of plans which embrace the management of the total water cycle within the catchment. This will include the management of stormwater and wastewaters and will recognise and take advantage of these waters as planned components of future water supply systems. This approach relies heavily on consultation with the community and local government in individual catchments.

Experience in the USA shows that an effective post installation quality control system is essential to ensuring public endorsement and consumer protection. The CSIRO report suggests that at present in Australia, insufficient attention is given to the provision of quality control regulation and monitoring of water quality in reuse schemes.

The CSIRO report suggests that current institutional arrangements work against the adoption of integrated approaches and that changes in institutional arrangements will be required if there is to be progress. Control of stormwater management, including reuse is generally fragmented (for example planning, construction, management and local water authorities) all have input at some time and there is a lack of clear accountability for various parts of the water cycle. The relationship between the various operators, regulators and councils is often blurred, and in many cases the operating agencies are also involved in standard or target setting.

In addition to the above control and regulatory issues, the geographic scale at which management decisions are made adds to the change inertia. Stormwater and wastewater planning is often undertaken at a scale which does not allow community involvement and is frequently dictated by short term investment decisions heavily influenced by existing infrastructure considerations and the boundaries of local government areas.

While opportunities in existing urban developments may be less immediately achievable, forward planning of asset replacement schedules could take advantage of the flexibility provided by small scale stormwater and wastewater reuse schemes to reduce requirements for refurbishment of trunk mains. Greater immediate opportunities do exist in new developments to replace traditional drainage design principles with integrated water cycle management and the related development of water-sensitive urban design guidelines.

As decisions on reuse and stormwater management will impact on catchments in terms of quality of discharges and environmental flows it is essential that whole catchment integrated approaches are adopted, in accordance with the COAG framework requirements.

## **Recommendation 2**

- (a) That the following COAG water reform framework principles be adopted for wastewater reuse and stormwater management. These are directed at the removal of inappropriate institutional impediments and include clear definition of roles and responsibilities, involvement of the community in the decisions process and the use of whole catchment management approaches.**
- (b) That jurisdictions develop and put in place regulatory structures which support successful reuse schemes with particular attention being given to the provision of quality control regulation of schemes.**

### **Suggested Supportive Actions**

Consideration should be given to supporting a case study in a newly-developing urban region in which concepts and prototype designs for integrated urban water resources management are demonstrated.

Jurisdictions will need to develop strategies to ensure that the full water cycle is able to be adequately addressed on an integrated catchment basis.

Water industry regulators and utilities should identify roles and responsibilities of relevant catchment bodies.

Catchment management plans should be prepared which (i) identify catchment conditions requiring attention, (ii) list possible management responses, (iii) specify a stormwater and wastewater and water supply management program identifying costs, timelines and the agencies which are to be responsible for carrying out each required action.

Governments need to adopt a range of policy instruments to address the management of wastewaters. These include: integrated environmental regulations, the provision of explicit standards for wastewaters and sewer overflows by governments; decision-making based on catchment areas; clear allocation of accountabilities and responsibilities; and region-based pricing. Before such practices are enforced in a catchment area, the relative merits (or otherwise) of the different approaches must be assessed.

### 3. COAG Water Framework Element: Water Allocations and Entitlements

#### Issues

- If stormwater and wastewaters are to be considered as a potential resource in a whole water cycle system there is a need to consider the property rights of the potential resources and in particular the impact that its increasing use may have on other property right holders.

#### Discussion

The CSIRO report indicated that a variety of potential markets exists for reclaimed water, for example: for urban water demands, either to potable or non-potable standard; for greywater for domestic non-contact use such as for urban irrigation; for industrial use and; for irrigated agriculture and woodlots, although further work is required in each market to be viable. However, the property rights and ownership of the captured stormwater and reuse of the reclaimed water are not necessarily defined and at the very least require restating in terms of the ARMCANZ principles.

Wastewater flows are relatively constant within and across years while flow rates in inland rivers vary significantly with the season and from year to year. Where effluent forms a considerable proportion of baseflows, any diminution of that flow by reuse must be planned in conjunction with other management decisions to restore adequate quantity and quality of environmental flows. Similarly stormwater is a vital part of the urban water cycle and needs to be managed to maintain its water quality.

There is concern among scientists regarding river health and environmental flows if less flow is contributed to our major river systems by treated effluent; as this is the main source of stream flow in many areas. The prolonged drought conditions have also forced water authorities, consumers and local councils to reconsider reuse.

#### Recommendation 3

- (a) **That comprehensive systems of water allocations and entitlements, developed and implemented by jurisdictions under COAG water reform framework, address the allocation of and entitlements to urban stormwater and the wastewater stream, particularly the impact of their use on the rights of others, including the environment.**

### 4. COAG Water Framework Element: Environment/Water Quality

#### Issues

- Current standards and guidelines do not specifically cover wastewater streams in relation to their various sources nor their reuse in its various applications (though revisions are proposed in the Draft NWQMS Guidelines on Sewerage Systems: reuse of wastewater).
- Regulatory structures need to provide for monitoring and control of wastewater reuse quality.
- Draft NWQMS Guidelines for Stormwater management are currently issued for public comment.

#### Discussion

A key aspect of providing and enhancing water quality relates to the public health implications of effluent reuse. Considerable effort is being invested in many countries to identify the nature and frequency of the risks associated with reuse and in a range of different circumstances. It is clear that the level of risk varies with the type of application and the nature of the exposure of the public to the effluent.

However, there is increasing confidence that improved treatment regimes and management practices will progressively increase the capacity to provide effluent safely and in an environmentally sustainable manner.

The National Water Quality Management Strategy (NWQMS) is being developed jointly by the Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) and the Australian and New Zealand Environment and Conservation Council (ANZECC). The National Health and Medical Research Council (NHMRC) is involved in aspects of the NWQMS which affect public health. The Strategy aims for a nationally consistent approach to water quality management by providing: policies; a process, and a set of national guidelines.

The COAG water reform framework recognises the role of the NWQMS plays in managing water quality and requires States to support the development of the NWQMS "...through the adoption of a package of market-based and regulatory measures, including the establishment of appropriate water quality monitoring and catchment management policies and community consultation and awareness." This is particularly applicable to the increasing adoption of wastewater reuse and stormwater management.

The issues of reuse are being addressed in the ARMCANZ and NHMRC NWQMS document *Guidelines for Sewerage Systems - Use of Reclaimed Water* which is currently in an advanced draft form. When released, this should facilitate increasing public confidence with effluent reuse, but it is important that any reuse proposal be approved by both the health and environment agencies in each jurisdiction.

#### Recommendation 4

- (a) That COAG note that action already underway in the development of NWQMS Guidelines will have a direct effect on the implementation and adoption of wastewater reuse programs.**

#### Suggested Supportive Action

The NWQMS *Guidelines for Sewerage Systems - Use of Reclaimed Water* should be completed and adopted as definitive National Guidelines. A review should be undertaken to extend the guidelines to encourage reuse from different sources and for different applications.

A set of Guidelines should be promulgated for artificial injection of urban wastewaters into groundwater aquifers for subsequent reuse, based on research recently conducted on behalf of UWRRA by CSIRO Centre for Groundwater Studies.

The approval of both the health and environment protection authorities in each jurisdiction should be required before reuse schemes can proceed.

The NWQMS Guidelines for Stormwater Management should be recognised as the basic standard for stormwater management arrangements in Australia.

## 5. COAG Water Framework Element: Consultation and Education

### Issues

- Public and institutional perceptions of wastewaters as a resource rather than as a commodity to be disposed.
- The need to involve the public in decision making in alternative approaches in integrated catchment management.
- The need to have open and transparent information exchange

### Discussion

In general, indications are that the community is in favour of reuse and there is considerable community resistance to disposal schemes, which are seen as wasting a potentially valuable resource and having potential environmental problems. Marine disposal was not favoured, being seen as not only wasteful but potentially polluting. There is a need to ensure that the public is informed about

current disposal systems and their impacts to enable them to be involved in decisions relating to the most acceptable disposal methods, including reuse.

Health concerns are raised by the public, particularly in relation to residential reuse schemes, but also about irrigation of urban parkland and crops for human consumption.

The behaviour of individuals can assist in addressing stormwater management objectives, particularly in the area of gross pollutants (eg. litter, pets, cleaning activities, and disposal of cut vegetation). A total catchment management movement which is successful in rural Australia could be adapted to urban areas. However, it needs to be recognised that an individual initiative can only work when it is accompanied by the clearer definition of institutional roles, and by public investment, technical advice and environmental policies.

### **Recommendation 5**

- (a) Governments need to actively encourage and publicise the use of wastewater and improved management of stormwater as a resource rather than as waste stream.**
- (b) Government support programs should actively encourage community involvement in catchment management decisions and financial planning.**
- (c) The adoption of an open and transparent information exchange, about public health implications associated with wastewater reuse should be encouraged by all governments.**

### **Suggested Supportive Actions**

Community education of reuse projects should be encouraged based on pilot demonstrations. Public education and public involvement programs should include schools programs, visitor programs to treatment facilities, general public information provisions and community involvement in decision making about new reuse schemes.

Water utilities and governments should also ensure that the public is well informed about reuse schemes and involved in decisions to undertake them. Treatment schemes should include the necessary precautions to ensure that the potential risk of disease transmission is within acceptable limits.

A national survey of community attitudes and knowledge of issues relating to water reuse is needed as a basis for planning further community involvement in water reuse planning and implementation.

## **6. COAG Water Framework Element: Research**

### **Issue**

- High priority should be given to the research necessary to further progress the adoption of wastewater reuse and stormwater management into the COAG water reform framework.

### **Discussion**

COAG agreed that member governments would give higher priority to the research necessary to progress implementation of the strategic framework.

The CSIRO report acknowledges that the application of the principles for institutional development agreed by COAG are necessary. However, the principles are not sufficient alone to improve the adoption wastewater and stormwater reuse, there is research that needs to accompany them.

The report identified a range of research needs, namely:

- on urban water cycle management;



- to examine options for improved urban water cycle management and infrastructure cost reduction;
- to facilitate the environmental detection of and persistence conditions for Australian microbiological species that may be associated with water reclamation projects;
- the hydrological and ecological implications of effluent and stormwater discharges in sensitive environments;
- methods of storage and of seasonal demand equalisation for reclaimed water;
- the environmental economics of (i) the community's willingness to pay for improved water quality in urban regions, (ii) estimates of environmental damages associated with the degradation of sensitive environments and (iii) indicative estimates of the cost schedule for ascending levels of abatement;
- the community's perceptions of the advantages and risks associated with reuse of wastewater; and
- models to enable rapid comparison of different system designs.

They have been forwarded to the relevant research agencies such as UWRAA and LWRRDC for consideration. However, the immediate need is the effective integration of the consideration of wastewater reuse and stormwater management within the contexts of the total water cycle. In this, the implementation of appropriate resource pricing policies is essential along with identifying the cost effectiveness of the full range of options for improving the sustainable management of water.