

# Strategic Water Planning, allocation and assessment: Sharing Australia's experience with the Indo-Pacific Region

## May 2019 Workshop Report

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A Workshop Report for the Australian Water Partnership (AWP), held 2–3 May 2019 in Canberra. Convened, facilitated and reported by Alluvium Consulting (David Winfield, Tony Weber, Advait Madav), with the Institute for Sustainable Futures, University of Technology Sydney (ISF-UTS; Melita Grant) and Access Water Management (David Harriss).

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### **Disclaimer**

This Workshop Report presents the diverse views of many workshop attendees. These do not necessarily represent the views of the Australian Water Partnership, Australian Government or Alluvium Consulting.

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## Executive Summary

Australia is recognised internationally for its innovation and implementation of strategic water planning. Australia has a rich knowledge and expertise base in the area of water allocation planning, basin planning, community engagement, and water policy reform; and is regarded as a trusted partner in the Indo-Pacific region; hence there have been an increasing number of requests for assistance, advice and support from partner countries and multilateral organisations.

This document highlights key points made by participants who were part of a workshop on Strategic Water Planning, Water Assessment and Water Allocation. The document has drawn together a range of contributions, structured around six key themes and questions emerging from the workshop:

1. **Who needs to be involved?** People, communities, stakeholder engagement and leadership: a conversation and planning process that includes all who value and use water;
2. **Who makes decisions, and who is responsible for what?** - Governance, policy and legislation;
3. **Where are we now?** - Situation assessment, information, data and modelling;
4. **How do we do water planning?** - Options, strategies, tools, trade-offs, decisions towards the vision and objectives;
5. **How do we make it happen?** Implementation of water plans and ongoing management; and
6. **How do we adapt and learn, using effective monitoring and evaluation processes?** Monitoring, evaluation, reporting, adaptive management and learning.

Distilling the key elements and key stages or steps of a water planning process necessarily involves simplification. Many or most elements can be seen as stages in a water planning and implementation process. However, some elements (e.g. community and stakeholder engagement) are essential at all stages, but may be more important at some stages (such as when irreversible decisions are to be made). In addition, water planning as a policy, governance, social and economic process never starts with a completely blank page and will need to build on (or transition from) what is already in place. Urgent issues may need to be addressed without waiting for a comprehensive situation assessment.

The key elements presented in this report, which emerged from the workshop, can therefore be seen loosely as stages in a process, but all elements must also be viewed as being continually important to a greater or lesser degree. The key is to understand water resources planning and management as an ongoing cycle of adaptive management, engaging with risk and decision making with current knowledge, while building knowledge over time, in order to review and adapt.

# 1 Introduction

## 1.1 Background

Australia is recognised internationally for its innovation and implementation of strategic water planning. There is growing demand for Australia's expertise in water planning, allocation and assessment, including the use of market-based instruments. Several activities are currently funded and facilitated by the Australian Water Partnership (AWP) including:

- India River Basin Planning Guide
- Myanmar National IWRM Long-term Strategy and Plan
- Lao PDR National Water Resources Management Strategy
- Nepal Governance and Policy of Basin Planning

Australia has reached a stage in our international engagement where it is appropriate to reflect on joint Australian messaging and common understanding of water planning, so that it can be communicated more consistently and effectively to international audiences and partners.

## 1.2 Objectives of the Workshop

AWP engaged Alluvium Consulting, Access Water Management and the Institute of Sustainable Futures, University of Technology Sydney (ISF UTS) – the 'AWP India River Basin Planning team' – to convene and facilitate a workshop on strategic water planning, allocation and assessment, which was held 2-3 May 2019 in Canberra, Australia.

The workshop objectives were:

- To discuss different approaches, methodologies, key considerations, principles, elements, learnings, terminology, and perspectives of Australia's experience of strategic water planning, allocation and assessment;
- To discuss different experiences of developing strategic water planning, allocation and assessment in the Asia/Indo-Pacific region, points of difference and similarity within Australia and within the region;
- To reflect on joint Australian messaging to the Asia/Indo-Pacific region and different understandings of requisites for river basin planning, water resources assessments, water resource planning, integrated water resources management etc originating from the region; and
- To distil and frame key principles and elements of Australia's experience to inform communication with partner countries and stakeholders in the Asia/Indo-Pacific region.

## 1.3 Workshop Attendees

Workshop participants reflected a cross-section of Australia's domestic and international experience in the domain of strategic water planning, allocation and assessment. A full list of attendees is provided in the annex to this report.

## 1.4 Scope and Terminology:

The workshop title was "Strategic Water Planning, Allocation and Assessment". The discussion centred around this theme, but ranged far and wide, including river basin planning, integrated water

resources management, broader policy and reform, community engagement, ensuring momentum in implementation, adaptive management and other related matters. This workshop report aims to be faithful to the discussion in the workshop, while also maintaining a focus on the original scope and objectives.

Necessarily, the report makes many references to “water planning”, which should be read as a shorthand for the whole planning and implementation process (see below). Both good planning and maintaining implementation are important, as is every part of the process.

## **1.5 Context**

### **1.5.1 Drivers and benefits of water planning**

Water planning may be driven proactively to head off anticipated issues or responsively by an acute crisis or ongoing dispute. The fundamental driver and benefit is usually to address conflicting needs for water across society. The assumption is that assessment of the status of water resources, the values held for them and the demands upon them, engagement with stakeholders and development of appropriate institutional arrangements to develop and implement a water plan, will enable a society, region or nation to make clear decisions about the most appropriate distribution and management of the water resources.

While a holistic, integrating overarching assessment and plan is usually advocated, in some situations it may be appropriate and effective to develop a targeted response to a specific, urgent issue. Several of the more successful examples have been developed in such circumstances. Australia has often made most progress in water planning and policy when responding to crises (for example, droughts, algal blooms and salinity).

Importantly, if the fundamental challenge is to be addressed of finding the best way to distribute water resources (which may be scarce in quantity, quality, spatial distribution or timing), implementing the decision made may well mean not everyone gets what they want. Some who benefit from previous arrangements, may not benefit from decisions adopted in the water planning process. This is one of the key reasons why water planning is difficult.

It is important therefore to clearly identify and communicate early, why the water planning process is occurring and to identify all values and benefits of water resources. It is also important to develop mechanisms for those impacted to adjust over time.

Workshop participants discussed that strategic water planning is often most successful when there is a common agreement amongst stakeholders on the need and the drivers for planning – even if there is not agreement on the solutions. It is also more successful when planners start by listening to communities and stakeholders on what the common issues, needs and drivers are.

## **1.6 Australia and the Indo-Pacific region**

Australia’s context for water planning has some similarities and some differences from developing and low-income countries in the Indo-Pacific.

Australia’s key differences from many developing and low-income countries in the Indo-Pacific include its high income per capita, application of advanced technologies, political and governance systems, cultural and linguistic background (noting however that Australia is strongly multicultural and includes immigrants from many countries in the region). Australia is relatively dry (the driest inhabited continent), water is scarce in large parts of the country, subject to climate extremes and extreme variability, has high competition for water, a population concentrated in urban and coastal areas,

strongly differentiated urban conurbations and sparse rural populations and has predominantly large farm sizes. Australia addressed some key aspects of water management early (for example, reticulated supply & sanitation, public health), but has significant environmental issues resulting from historical development processes.

Some context for some water planning in Australia is similar to many developing and low-income countries in the Indo-Pacific. These similarities include a tropical climate in Australia's north, arid and semi-arid areas with high evaporation, significant development of water infrastructure and overallocation of water in some systems.

However, many of the approaches used in Australia may be applicable in a range of contexts that may differ from Australia. Participants at the workshop related experiences in the Indo-Pacific that showed strong interest in Australia's experience in recognising and making explicit the key values of water, engaging with stakeholders, establishing governance structures and decision process, assessment of scenarios, options and trade-offs, and establishing and maintaining momentum and accountability for implementation. In addition, participants discussed that "water scarcity" may be about more than aridity or drought. Scarcity may present as a disconnect between supply and demand for finance, the result of mismanagement, as a scarcity of water quality suitable for domestic, agricultural or other aspects of water values.

## **1.7 Who are the 'actors' in Strategic water planning, assessment and allocation?**

A strong message from the workshop participants was that government agency policy makers, economists, technicians and scientists were not the only "actors" in the process of water planning and implementation. In Australia, community leaders and community engagement played a significant role in various parts of initiating, leading, developing, assessing, planning and implementing water management. Strong community engagement in Australia has included indigenous people, water dependent industry stakeholders, local government, scientists and other professional disciplines.

Simultaneously, many of the elements of water planning and management require legislation, institutional arrangements, resources and the authority to enforce rules. These requirements normally mean a strong degree of leadership and action is required from government and government agencies.

This workshop report is intended to be useful to all "actors" in the development and implementation of water planning, water assessment and water allocation. Some points will clearly apply more to community and stakeholders and others to government. However, awareness and consideration of all the points highlighted here should assist all actors in water planning and management.

## **1.8 The process of integrated water planning and implementation**

Distilling the key elements and key stages or steps of a water planning process necessarily involves simplification. Many or most elements can be seen as stages in a water planning and implementation process. However, some elements (e.g. community and stakeholder engagement) are essential at all stages, but may be more important at some stages (such as when irreversible decisions are to be made). In addition, water planning as a policy, governance, social and economic process never starts with a completely blank page and will need to build on (or transition from) what is already in place. It may be necessary to address an urgent issue without waiting for a comprehensive situation assessment.

The key elements presented in this report, which emerged from the workshop, can therefore be seen loosely as stages in a process, but all elements must also be viewed as being continually important to

a greater or lesser degree. The key is to understand water resources planning and management as an ongoing cycle of adaptive management, engaging with risk and decision making with current knowledge, while building knowledge over time, in order to review and adapt.

## 2 Key Elements of the Framework

This report is not a full transcript from the workshop, but has drawn together a range of thematic contributions emerging from the workshop. Six themes are used to structure the subsequent sections of the report; they are summarised in Figure 1.



**Figure 1. Key elements of the Framework describing Australia’s experience in strategic water planning, allocation, and assessment**

### 2.1 Element 1: Who needs to be involved? - a conversation including all who value and use water

■ A strong message from the workshop participants was that Australia’s experience in water planning aims to involve people and communities that value, use and depend upon water resources (it’s a “social issue”, even where it may be driven by economic or environmental issues). Community engagement and leadership are critical, and are a key part of the Australian story and skill set.

■ Engaging people and communities early in the planning and management process can ensure that all values, uses and objectives are considered, help to guide the technical, policy and planning work, and reduce the risk of negative reaction when plans are released.

Communities are drivers and initiators of the process and not just passive stakeholders. Genuine engagement is required with all stakeholders (including minorities, women and marginalised peoples), with a focus on transparency, genuine consultation and fairness. While engagement must be ongoing and genuine, it is also important that legislation formally requires planning processes to provide an opportunity for communities to contribute to the process. Experience in Australia has shown that this is a precondition for success.

- Indigenous/First Nations communities across the world and in Australia hold a deep connection to water sources of all types, with knowledge based on tens of thousands of years of experience. Water planners and communities are encouraged to “dance together with inclusion, trust and respect, and remember how interconnected we are”. Free, prior, and informed consent is a basic principle to uphold. This means consultation with indigenous people that is self-directed, free of coercion, seeks consent in advance of the activities proposed, provides adequate time for consultation and provides sufficient information for indigenous peoples to make a decision on consent.
- Well informed gender analysis and stakeholder mapping processes need to be undertaken to inform community engagement plans and ensure that women and marginalised groups are not excluded from decision-making processes. In Australia, as well as in the Indo-Pacific, many individuals and sectors of the community are excluded from decision-making forums related to water management as a result of broader societal norms. It is incumbent upon the water resources management sector as a whole to ensure that inequalities are not perpetuated through our activities, and that we aim at the very minimum to “do no harm”, and ideally, positively support moves towards gender equality in the countries that we work in. This is best done by creating space for all stakeholders to be part of water planning processes, and for opportunities for engagement, learning and career development, not to be limited to those who already have agency, power and influence.
- Workshop participants discussed that it is important to provide a safe environment for discussion and disclosure. All parties (community members, people of any gender or social group, stakeholder representatives and water resources officials) need to be able to discuss issues, options and information, without fear.
- It is important to be able to clearly make the case for change and to be able to demonstrate “what success looks like”. In principle, reform should be fair and seen to be fair. However, some reforms or improvements embedded in water plans may be tough and there will often be perceived winners and losers. Explaining clearly why the proposed approach is necessary, engaging with community and stakeholders on the options and their consequences, political support and leadership and providing a mechanism for those who lose to adjust are all important. For example, Australia has implemented several water planning processes that involved reduction in water allocations for agriculture, in order to return allocations to sustainable levels. These have been most successful where there were mechanisms available to allow those impacted to adjust to the sustainable plan. In some cases, these adjustments were facilitated by direct financial payments, in other cases they were facilitated by providing water users with increased flexibility and control in managing their own water allocations (such as by introduction of the ability to ‘carryover’ water allocations from one year to the next).
- Clear communication is essential. Careful, plain language articulation of the problems, issues and priorities is important. Linking this to values helps to connect with people’s everyday priorities. Too often, the issues are articulated in overly technocratic jargon. Workshop participants discussed framing explanations of how to plan in simple generic terms that are easily translated into different languages (such as “Where are we now?”, “Where do we want to be?”; and “How can we move towards that?”). Once a vision for planning is established, it is

important to maintain and continue to re-articulate the vision and reasons for planning and for implementing the plan.

- Starting the conversation by listening and developing a common understanding of all parties' values, will help to develop a wider ownership of the vision and objectives of water planning. Participants reflected on how we can use language to draw people into conversations, long-term, making these concepts accessible and useful, inclusive and outcomes focussed. This helps it make sense not just to the planners and officers doing the work, but also to the leaders, decision makers and stakeholders more generally.
- Joint discovery of the information and the ideas is a successful technique. Don't bring all the modelling pre-made, but do joint analysis of data together which will build trust. This is what makes the good plans last. Building trust and ownership takes time, but if it isn't owned, then it will fail. The workshop participants heard "You're not going to save time by skipping steps". Timeframes shouldn't drive water planning. Building ownership is the key. An example was discussed where a water plan was developed by officials before it was presented to the community. The community rejected the plan. Officials then started again by developing the information assessment and water modelling with community and industry and representatives. Scenarios were developed, options developed and assessed, and decisions made by working with the community and industry representatives. This second water plan took much longer to develop than the first, however was accepted by the community and lasted much longer.
- It is important to be respectful of local leaders and influencers, and work within the political/cultural paradigms of the particular country. While the Australian approach seeks to explain and encourage a depth of consultation and engagement based on the above principles, it may be that the leaders and/or the community may not be ready to do this fully at this time. Australia's approach is to recognise how engagement is being conducted and looks for opportunities to improve. Workshop participants discussed the value in the "nudging"<sup>1</sup> approach, and being strategic, in terms of introducing key lessons learnt.
- In many countries in the Indo-Pacific, the pathway to engagement will operate differently to Australia. While government will need to be part of the picture, in some contexts it may not be the entity that can assist engagement with local communities, it may have frequent changes in leadership and may not be able to participate in open discussion. It may be that key influencers, academics or thought leaders can enable engagement within the political and cultural parameters, and it is important to identify these champions. One example was given where an international non-government organisation (NGO) was best able to facilitate engagement. Another example was given where the Women's Union provided a valuable link between government and local communities.

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<sup>1</sup> "Nudge" is a concept in behavioural change theory, political science and policy. "Nudging" means influencing behaviour by positive reinforcement, indirect suggestions and encouraging certain choices. The approach contrasts (but may co-exist) with legislation, compliance and mandating approaches. See Thaler, R. and Sunstein, C. (2008), Nudge: Improving Decisions About Health, Wealth and Happiness, Yale University Press.

## 2.2 Element 2: Who makes decisions and who is responsible for what? - governance, policy and legislation

- Context is everything was a dominant theme across the workshop. Understanding the context clear early was an important factor in success. This included the social, economic, environmental and cultural context within which the planning is taking place, as well as the drivers and constraints for water planning and management.
- It is important to be aware of where a country/region/town is in relation to their own water management journey, and what foundations they need to lay to establish good water governance. It will be different in every context.
- Participants reflected that in Australia, Aboriginal and Torres Strait Islander peoples have a wealth of customs, law and culture related to water for over 50,000 years. Indigenous Australians continue their connection to country, and have immense knowledge about water resources. Participants called for water planning processes to value all kinds of knowledge – cultural, traditional, local, technical scientific and local water practitioners such as farmers.
- Participants reflected that Australia is a federal constitutional democracy. Australia is an active democratic society where many (but not all) stakeholders feel confident to express their views, although some may feel excluded from decision-making processes. When working in other countries, participants noted that understanding (and documenting where appropriate) the legal, political and economic environment is key to working with different governance structures and contexts. This helped to understand the political motivations of water decision-making, to identify constraints, opportunities and pathways forward.
- The authority and legitimacy for decision-making and institutional arrangements were discussed by workshop participants, along with the relationship to the level of engagement with community and stakeholders. It is important to establish the case for change, the basis and criteria for decisions, the responsible organisations for decision-making and, critically for implementation.
- Workshop participants discussed that it was important to understand each country's jurisdictional arrangements for water resource management. In some countries there is a strong level of distrust and disconnect between state or provincial governments and the national government, as well as between states. This disconnect often leads to diversity in approaches. In other countries, once an approach to water resource management is agreed centrally, it is very rapidly and uniformly implemented across different jurisdictions. It is important to establish the level of interaction needed between levels of government and between government agencies to achieve strategic water planning and management, and what the incentives are to achieve that over time, in each context.
- There was reflection by workshop participants that in recent years in Australia, the water planning and river basin planning discourse has focussed almost exclusively on the water quantity issue of water allocation and sharing between the environment and users, as well as allocation between users. However, while this has been the recent focus, it was built on many years/decades (and a strong foundation of) public health, water quality/pollution management and broader catchment and natural resources management. In developing / low income countries in the region, river basin planning is taken to mean a broader spectrum of issues including pollution control, water quality management and hydropower development.

- Subsidiarity was seen as a key principle of governance: decisions should be taken at the lowest appropriate level possible, noting that the lowest appropriate level is not necessarily the local level. For example, in the Murray-Darling Basin Plan, while diversion limits are a central feature, they are being given effect through State instruments in the form of water resource plans developed in consultation with local communities.
- It is important that the governance framework is based on 'good' governance principles such as transparency and accountability.
- Some developing / low income countries in the region are less regulatory, less regulated and less legalistic than Australia. Different governance mechanisms will be required to foster sustainable water management based on each context.
- Participants reflected that in many developing / low income countries the governments and officials held a strong interest in water resources planning, but when plans were created, they were often not implemented. Governance advice may therefore be more effective if focussed on how to achieve momentum in implementation, rather than only establishing plans and organisations. Australia has been successful in this respect (see Chapter 7 of this workshop report), although there are also good examples in Europe and North America.
- One important component of governance is to influence the linking of the planning process (particularly when externally funded) with the in-country budget process.
- Australia's water planning context is framed by the establishment of legal rights or entitlements to access water, that are registered, tradeable on a permanent or temporary basis, and may be used as security for financial arrangements. This framework provides a very specific context for Australia's water planning experience, and the often-cited success of the water market, that may not be readily transferable to developing / low income countries (nor to all areas of all states in Australia). Australia needs to be careful with the water trading message, as it is dependent on a range of very well-resourced governance structures, institutions and compliance mechanisms; as well as property rights, which are not necessarily in place or within reach of most developing / low income countries in our region. However, interest in water trade is growing in the Indo-Pacific region, for example in China and India. Some of the underpinning constructs can be useful in many situations, for example at a local "village" level.
- These principles could be used at the start of a water planning process to get a clear understanding of the local institutional context for planning and where there are important gaps to be addressed:
  - What means are available for engaging with affected/interested persons and groups?
  - Are there stable and influential leaders who will champion the work? Who are they?
  - What level of support is there from government and law to allow the planning to be done and implemented?
  - What financial and human resourcing is available for development and implementation of plans?
  - What local skills and capacity are available for all the various aspects of planning and implementation? Where are the gaps?
  - What information is available on the resource and its beneficial uses, and what are the means to access that information?
  - What are the mechanisms for making hard decisions, and how should planning processes be shaped to fit into those processes?

- What are the means available for coordinating with related sectoral agencies and connected jurisdictions?
- What physical or decision-making boundaries/rights/obligations are there that are not negotiable?

## 2.3 Element 3: Where are we now? – Situation assessment, information, data and modelling

It is important that water planning is informed by a “situation assessment”, telling us “where are we now?”. These can be a “state of basin assessment” or a description of resources and the related social, economic and environmental context that these water resources support, and are part of.

A common framework used for the assessment is called “STEEPL” (social, technological, environment, economic, policy, legal). Conduct a situational analysis of the available resources, their status, trends, characteristics and the risks to those resources, to inform a baseline for the basin. Understand current and future water demands and supplies. Identify issues of common concern and potential management options using risk assessment, and multi-criteria analysis, including “triple bottom line” considerations (economic, environment, social). Understand and model climate change-related impacts, and design mitigation and adaptation strategies to address them.

Whilst collection of information and modelling are important, it is essential to have a clear objective and process in place for analysing and using the information and results produced, as well as making it available for basin planners and other stakeholders.

Participants reflected that decisions should draw on the best available science and other sources of knowledge, but that science alone won’t deliver the answer. Community and stakeholder engagement to build common understanding of the information is important, as are principles for decision-making, a governance framework that includes processes for trade-offs and decision-making and sound consideration of capacity (including tools) to manage and implement the decisions.

Decisions should be made on the best available information, but given the pressing need in many water management contexts to start acting, there is no need to wait for “perfect information”, but to work with the best available information at the time. A key theme raised was that providing environmental water doesn’t have to wait for perfect data, but that water could start to be saved and delivered for (or left in) the environment immediately if the political will was there, and systems in place to manage this process.

Discussion revolved around the human dimensions of presenting and using information, data and assessment, as well as modelling. The workshop participants discussed the importance of communicating modelling outcomes to tell a story. In doing so, it is critical to be honest and transparent about assumptions and uncertainties in the models and data. Models inform the debate and are important as inputs to decision-making, but don’t provide solutions or make the decision. Participants agreed that modelling should not be regarded as an end in itself.

Australia has developed sophisticated water resource modelling tools, but our point of difference is in how we apply those tools as an input in decision-making. Australia has good experience in using models in decision support frameworks.

■ The assessment of information needs to be linked to monitoring, evaluation and review, to support decision-making and adaptive management.

■ The workshop participants discussed assessment and decision making in the context of uncertainty. Participants urged being clear and frank around assumptions and vulnerability. Be frank with stakeholders so they can help fill the gaps and make sense of it, and/or help to manage risk accordingly. For example, various Australian water assessments have been communicated with a clear statement of the level of confidence in the information.

■ Participants discussed that a range of communication methods will be needed for different purposes and audiences and that reports may not be the best form of communication in every case. Rather, a range of methods need to be employed to communicate resource assessment, including tangible and practical guides.

■ Water data is not gender neutral, and so when identifying data to be used in the situation assessment, gender and social inclusion need to be considered. The way in which different people use and manage water resources are important inputs in modelling scenarios. What information is already available, and what needs to be collected to inform the modelling process? For example, will diverting water from one area/context, have impacts on water users (such as female small-scale farmers) who are invariably overlooked in water management planning? Gender analysis processes at the start of the process not only inform stakeholder engagement, but also who needs water for what purpose and where. These inputs are critical for modelling that is comprehensive, and that will inform good decision making.

■ Participants discussed the notion that “Data is power”. The question is how can we support transparent and available data? By asking this question, and setting up systems to support transparent and readily available water data for all users, is important to support context specific and fit for purpose water planning.

## **2.4 Element 4: How do we do water planning and allocation? Options, strategies, tools, trade-offs, decisions towards the vision and objectives**

■ It is important to clearly make the case for change towards strategic water planning. This needs to be underpinned by a shared vision for the future developed with the community. Australia had greatest success when options were clearly and transparently canvassed and explicit (transparent) trade-offs made. Planning and allocation present a process and opportunities to identify values, address competition and negotiate trade-offs.

■ Participants reflected that water planning is an iterative process. Water planners need to be prepared to work with stakeholders and communities through several cycles of considering a range of values, a range of sources of information, a range of options and compromises. For a plan or process to be effective and sustainable, it needs community ownership and it needs to be able to be adapted in response to the latest and best available evidence. Monitoring, evaluation and learning processes are key to this adaptive management process, while keeping the ultimate vision in sight at all times.

■ Participants discussed that Australia needs to better communicate the lessons learned (including recovery from failures) during the ‘development phase’, mainly from the early 1900s to the 1980s, as this was more relevant to most developing / low income countries in the region given their stage of water resources management, data availability, and experience with river basin planning. For example, Australia has built some smaller headwater storages

where the capital and maintenance costs have over time outweighed the social and economic benefits, and in recent years some uneconomic irrigation areas have been closed because the cost of operation far outweighed the benefits. By being honest and open about failures, mistakes and challenges, Australia can support developing / low income countries in the region to “leapfrog” to take on board good practices from the start, rather than learning only by trial and error. Participants agreed to contribute to examples of failures/lessons learnt for us to share with stakeholders internationally, so that we can provide concrete examples of where Australia has adaptively managed its river basin planning processes, and learned from mistakes.

One part of this experience and a ‘lesson learned’ is the application of economic tools to identify which development (or water policy) option offers the greatest value (i.e. utility) to society. Earlier in Australia’s development story, these tools were not necessarily applied, and projects were initiated and built purely on political initiative or engineering feasibility. More recently, most infrastructure projects in Australia are selected and approved on the basis of cost-benefit analysis, distribution of benefits analysis, environmental impacts assessment and development of a business case for investment. Even more recently, Australia has increasingly applied multiple tools to assess scenarios (such as climate change, catchment land use change), options and plan impacts, which go beyond traditional “cost-benefit” analysis, to include social impacts and environmental costs and benefits and draws in benefits such as ecosystem services, liveability, and cultural values. However, it is worth observing that politicians may not have faith in these tools and the political process may circumvent the results.

When it comes to economic modelling, it is important to have all values explicit so that we can work out ways to talk about them, negotiate trade-offs and consider a range of outcomes together.

Water resources need to be understood within a broader context of natural resources management, economy, human rights, and cultural rights. Additionally, the interrelated nature of water resources within a catchment calls for water infrastructure to be planned at a catchment/river basin scale. For example, planning dams in isolation from upstream and downstream dams and infrastructure, is likely to result in over-allocation.

Workshop participants heard that environmental water and water requirements for water quality, fisheries and critical human needs, must be considered from the beginning and throughout the process.

Water resources planning needs to be coordinated with land-use planning, energy planning, flood management, water quality and pollution management. The “water-energy-food” nexus is rarely considered in Australia. However, for many developing and/or low-income countries in the Indo-Pacific, the nexus is highly relevant for countries that are simultaneously seeking water, food and energy security, and where hydropower and water use for coal-fired power stations may be in direct conflict with water for irrigated agriculture or for fisheries.

Water justice was raised as an important principle. This includes inclusive engagement to identify a range of values, priorities to inform water allocation decisions, taken with inclusive community and stakeholder engagement.

Participants discussed that when engaging in the Indo-Pacific region, we needed to use accessible language - much of Australian water planning and water resource management nomenclature is only used in Australia not universally understood.

■ In Australia there is often a separation between rural water allocation planning, urban water planning, water quality planning, infrastructure investment planning, and flood management planning. However, most of these different areas of water planning are required to consider the other areas. For example, a water sharing/allocation plan that includes an urban area, will accommodate relevant elements of the urban water supply system. In the Indo-Pacific region, sectoral industry plans (e.g. irrigation, power, urban water) are often not integrated. A more integrated approach for urban-rural water planning in high population contexts is likely to be more appropriate.

■ In planning for urban water supply, workshop participants reflected on Australia's experience in managing through water shortages, successful use of staged water restrictions, water pricing and a range of supply options. Many urban areas in Australia have considered alternative sources of water (such as treated re-used water for non-drinking applications), but community acceptance has taken time and sustained education campaigns.

## **2.5 Element 5: How do we make it happen? Implementation of water plans and ongoing management**

■ Australia has on the whole been reasonably successful at moving from development of plans, to implementation and management according to water plans. Workshop participants discussed Australia's experience with water reforms since 1994 and the implementation of the National Water Initiative since 2004, as well as the Murray-Darling Basin Plan since 2012.

■ While Australia at national and state level has had numerous challenges and some gaps remain, a significant "critical mass" of water planning and management has been implemented. This includes assessment of available water resources, establishment of limits to extraction, rights and entitlements to water, the ability to trade water, environmental water and flows, water accounting, frameworks for regulation, compliance and enforcement, operational management arrangements, institutional arrangements and water metering and monitoring.

■ Successful implementation has required adequate resourcing, institutional arrangements, accountability and reporting, as well as ongoing engagement with community and stakeholders. In Australia, the Murray-Darling Basin Plan and various state legislation or policy arrangements require periodic reporting and/or auditing of implementation status.

■ From time to time, Australia has experienced failure in adequate implementation, or unanticipated circumstances or outcomes have required review of implementation arrangements. In most cases, public reporting of these issues and the community response has triggered a review of management and/or institutional arrangements and this has led to a response to address the issues identified. In one Australian example, significant deficiencies were identified in compliance and enforcement arrangements. Following a public review, these were addressed by establishment of a new regulatory body independent from political decision-making, increased resourcing, as well as a range of public reporting.

■ Workshop participants discussed the value of exchange visits of water resources managers between Australia and countries of the Indo-Pacific. Specifically, visits to Australia (mainly to the Murray-Darling Basin) by Indo-Pacific countries' water resources officials have proven to be very successful in giving the participants the opportunity to meet face to face with Australian water resources managers, to see Australian water resources management in practice and to foster relationships and ongoing dialogue. It was also suggested that study tours include on-country experience with first nations representatives.

## 2.6 Element 6: How do we adapt and learn, using effective monitoring and evaluation processes? - Monitoring, evaluation, reporting, adaptive management and learning

- Participants discussed that planning is a cycle (Figure 1) rather than a linear process. The cycle starts with initiation (through the drivers discussed in Chapter 1), assessment, then planning, then implementation and monitoring, leading to evaluation, review, learning and revision, and then back around all or part of the cycle.
- It is important to consider an evaluation framework right at the beginning of the process of strategic water planning, including while developing a vision, objectives and targets.
- Capacity building and training need to be in place to enable monitoring, evaluation, reporting and learning (MERL).
- Genuine stakeholder engagement is needed and must be incorporated in the planning cycle and MERL.
- Participants were encouraged to not wait for “perfect information”. It is important to start doing what is feasible as soon as we have basic knowledge. For example, environmental water management need not have complex modelling and assessment. It may be as simple as identifying that fish need a fresh in spring to breed. Another example given was for groundwater: Very few groundwater systems have comprehensive knowledge and data. In many systems management has meant taking an educated guess, but based on good scientific principles and conceptual understanding. This has worked, by also taking an adaptive approach, testing and adapting over time. However, irreversible decisions (such as building a dam) need to have a higher threshold of information considered by all affected communities and sectors before action is taken.
- In many contexts, maintenance of existing infrastructure is a challenge and systems to maintain ongoing asset management may be needed, rather than large investments in technology to acquire and manage data, or in other infrastructure.
- Monitoring, evaluation and reporting needs to reinforce the narrative of the water plan, including the vision, objectives and targets and the ongoing engagement of stakeholders. It can also be drawn on to support champions to continue their work in implementing the plan by providing evidence for outcomes achieved.
- An important aspect of monitoring, evaluation, reporting and learning, is the metering and measurement of extractions, supported by robust arrangements for regulation, compliance and enforcement. While education and encouragement on how water users can comply is also important, ultimately the effectiveness of limits and allocation arrangements depends on effective compliance and enforcement.
- Another important aspect is ongoing reporting and publication on the implementation of the water plan. This helps to reinforce momentum, resourcing and institutional commitment to implementation.
- Early in the planning process, planners, community and stakeholder need to identify the objectives and outcomes sought from the water plan, the indicators to be used to assess progress towards achieving these objectives and outcomes and relevant targets or thresholds of concern.

Public reporting and feedback into the decision-making process (adaptive management) are also critical elements of the monitoring, evaluation, reporting and learning framework. For example, the Murray-Darling Basin Plan establishes reporting requirements for state and national water management agencies, at annual and five-yearly intervals. The Plan requires this reporting to be considered in evaluation and consideration of amendments to the Plan.

Effective monitoring, evaluation, reporting and learning arrangements will support and enable ongoing community and stakeholder engagement, improve accountability of implementation and effectiveness of governance arrangements, enhance periodic re-evaluation of the situation assessment and support evaluation and review of the key policy decisions and trade-offs of the strategic water plan, its allocation and other arrangements.

### 3 Speaker insights on development and implementation of strategic water planning, allocation and assessment

#### 3.1 The Murray-Darling Basin Plan

Speaker: Russell James (MDBA)

#	Reform principle	Key Ingredients (interrelated)	Tips
1	Enduring reform / sustainable resource use  Incremental not 'big bang' reform	<ul style="list-style-type: none"> <li>• A Plan for Sustainable Water Resource Management</li> <li>• Make the case for change – why do we need to do this?</li> <li>• Set out a vision for the future</li> <li>• Canvass options, make explicit trade offs</li> <li>• Ability to adapt in light of experience / knowledge</li> </ul>	<ul style="list-style-type: none"> <li>• A simple plan is a good plan</li> <li>• Don't make perfect the enemy of the good</li> <li>• Reform should be fair and be seen to be fair</li> </ul>
2	Decisions made on <u>best available</u> information	<ul style="list-style-type: none"> <li>• Adequate information base</li> <li>• Water resource management should be underpinned by good science, economics and social/cultural information</li> <li>• Importance of monitoring, evaluation and review</li> </ul>	<ul style="list-style-type: none"> <li>• Science won't deliver the answer</li> <li>• Avoid data blizzards</li> <li>• Develop strong conceptual basis for understanding and communicating systems</li> </ul>
3	Support the institutions that propose and deliver reform  Subsidiarity – decisions at lowest appropriate level possible	<ul style="list-style-type: none"> <li>• Legal and Institutional Framework</li> <li>• Strong enabling framework is fundamental</li> <li>• Australian entitlements system is a good model but not always possible (alternatives – e.g. village scale entitlements)</li> <li>• Encourage trade and other incentives for efficiency</li> <li>• Good governance – transparency, natural justice, ethics</li> </ul>	
4	Transparency, consultation and fairness	<p>Community Engagement</p> <ul style="list-style-type: none"> <li>• <u>genuine</u> engagement with all stakeholders</li> <li>• expectations management / adequate time</li> <li>• special requirements for Indigenous consultation – prior informed consent</li> <li>• active engagement with range of media</li> </ul>	<ul style="list-style-type: none"> <li>• Do not underestimate importance</li> <li>• Expect opposition – not aiming for unanimous support</li> </ul>
5	Tools should be fit for purpose	<p>Well stocked management toolkit</p> <ul style="list-style-type: none"> <li>• tools for planning, management, operations and compliance</li> <li>• structural adjustment assistance</li> <li>• adequate resources</li> </ul>	Look for opportunities to 'leapfrog' technologies
6	Good policy is good politics	<p>Operating Environment</p> <ul style="list-style-type: none"> <li>• Reform will not succeed without political support</li> </ul>	Crises may provide momentum for reform

## 3.2 Overview of Australian water allocation planning

Speaker: Mark Hamstead

#	Principle theme	Summary of principle
1	Australian legal/institutional context	Water Allocation Planning in Australia occurs within a highly developed and stable legal system that specifies rights, responsibilities and methods. Stakeholders have very strong legal and political rights to appeal against processes and decisions that adversely impact them. This is not the case in many Indo-Pacific developing / low income countries, where laws are often more like guidelines, government particularly at local levels is often defined more by tradition and culture than law, and decision-makers at various levels have a high degree of discretion.
2	Strong culture of engagement	Planning in Australia has a strong focus on engagement with stakeholders, driven by the political and legal power of affected parties, and the lessons of past failures to adequately engage. We have lots of experience in different methods and processes for engagement within our culture for gathering of information and for involvement in decision making and implementation.
3	WAPs focused on reducing environmental risk	The vast majority of Water Allocation Plans developed in Australia have been focused on reducing the environmental risks in the management and use of existing well used water resources. Few plans address the expansion of water use for agriculture and industry and the development of new water infrastructure. By contrast in most Indo-Pacific developing / low income countries most plans are focused on development of water resources.
4	Information rich	Compared to most Indo-Pacific developing / low income countries, most Water Allocation Plans in Australia are based on extensive data and research on water availability, water use and risks to values. We have sophisticated models and funds for ongoing research and investigation. We do however have several examples where Water Allocation Plans have been developed with relatively low levels of information and no models or very basic models.
5	Adaptive management	Water Allocation Plans in Australia have a built-in regular review cycle so that Plans are updated typically every ten years or so. This recognises that knowledge and needs are continually changing and that strategies in plans may not always work as expected. Associated with this is protections for rights to water through Water Allocation Plan reviews to provide a degree of certainty for investment.

### 3.3 Community engagement

Speaker: Leith Bouly

#	Principle theme	Summary of principle
1	Water reform is a social process supported by technical knowledge and tools.	Water is essential to lives, livelihoods and landscapes and this means that people must be engaged in understanding why change needs to happen and shape how it happens to meet multiple needs. Sufficient time must be allocated for the process based on the complexity and level of conflict involved in the reform.
2	Establishing a shared purpose and values for the reform.	Establishing a shared purpose (a why) amongst stakeholders (government, society, local communities, industry etc) based on an agreed understanding of what the problems are that need to be solved enables people to find solutions that meet their shared values.
3	Treat all forms of knowledge as legitimate.	Ensure that all knowledge can be brought to the table and considered by all stakeholders. Develop a process to determine the level of confidence that can be assumed for any models, tools and scientific data used.
4	Take no option off the table but develop clear and transparent criteria for success.	Allow all of the interests to test options against the criteria and jointly work towards identifying the workable options that meet most of the values and needs of the range of stakeholders.
5	When there is sufficient consensus on the need to act and what that encompasses, provide the means to make the necessary change.	Sufficient consensus does not mean that all stakeholders get what they want – it does mean that the majority agree that change is necessary. There will be winners and losers in any reform and the change process must allow for those who 'lose' to adjust in a dignified manner.

### 3.4 Indigenous water rights

Speaker: Phil Duncan

#	Principle theme	Summary of principle
1	Respecting Cultural Knowledge	Indigenous Australian's are recognised as Australia's first scientists and we need to incorporate this into processes to ensure we Respect the Past as it can assist in guiding us going forward. Creating two-way learning – Cultural Knowledge & western Science do co-exist.
2	Capacity Building	Working with Indigenous people and key stakeholder groups to build knowledge around Water Resources Plans and Water Sharing Plans, Indigenous people want to be involved but simply don't have the intricate understanding of water language.
3	Decision Making	Indigenous people being involved in the planning and decision-making processes with Water Resources Plans and Water Sharing Plans.
4	Representation	Having Indigenous representation on Boards and Committees.
5	Cultural Heritage	Recording & Protection of Indigenous sites of significance in our great systems and water planning.

## 3.5 Victoria

Speaker: Chris McAuley

#	Principle theme	Summary of principle
1	Engagement with water users	Water planning and management is most effective when there is clear input of the needs of the users of water. As water planning and management develops in Victoria, there is an increasing number of recognised values of water. In Victoria, Traditional Owner values, recreational opportunities and other cultural values are now recognised. Gaining an understanding of these values and the requirements to plan and manage is critical.
2	Clear government direction	In consideration of water needs, both current and in the future, government has an important role in Victoria in providing a future vision for water management. Within Victoria, there are state-wide “policy” documents (such as Water for Victoria) which outline the State government priorities for water planning and management. The broad policy sets the direction for investment in water planning and management by both the government and stakeholders.
3	Capacity to discuss and make trade-offs	There are planning tools in Victoria, such as Sustainable Water Strategies, that allow for communities and stakeholders to discuss and determine an approach to water management. This enables trade-offs between competing interests to be discussed and where possible resolved. This is an important process to get actions that have a strong commitment for implementation.
4	Accountable implementation	Implementation of actions in a water policy documents and water strategies include implementation plans outlining responsibilities and timelines. For Sustainable Water Strategies, progress is reported through the DELWP Annual Report each year.

### 3.6 Queensland

Speaker: Tom Vanderbyl

#	Principle theme	Summary of principle
1	=> Local stakeholder-led planning and implementation that reflects the unique needs, aspirations and nature of the specific river basin	<ul style="list-style-type: none"> <li>• Recognise then build bridges between the technical/community/political water worlds;</li> <li>• Need to look for ways to maintain / replace / improve local enterprise, business, livelihoods;</li> <li>• Need to make underpinning the prosperity of the region and communities as a whole a key priority;</li> <li>• Identify and leverage local passion for achieving environmental outcomes in their patch;</li> <li>• Creating an environment that encourages "joint discovery" of information and ideas is important - inherent asymmetry between technical agencies and local stakeholders' access to information undermines collaborative development;</li> <li>• This takes time... when you hear that "time constraints" as a main driver of process then this is usually an indicator that the plan will be a failure (not owned, not effective, unnecessarily hurtful).</li> </ul>
2	=> Transparency of process that is developed and agreed with key stakeholders up front	<ul style="list-style-type: none"> <li>• Taking risks: creating space for nurturing and exploring innovation within the engagement process;</li> <li>• Get out of the office: ideation with stakeholders at grassroots.</li> </ul>
3	=> Strong and sustainable governance through planning, implementation, monitor, review cycle	<ul style="list-style-type: none"> <li>• Clarity of, and strong governance over roles: especially separation of regulator/operator</li> <li>• Legislation, transparency of measurement, reporting, enforcement, penalties;</li> <li>• Strong local involvement in planning and implementation.</li> </ul>
4	=> Technical systems/data/models should input to, and support decisions, not make them	<ul style="list-style-type: none"> <li>• Modelling is important but ultimately is the tail, not the dog... with added complexity comes risk of losing people... translating/communicating complex information into what is materially important is a gift (Cullen).</li> </ul>
5	=> Continuous improvement and adaptive management approach	<ul style="list-style-type: none"> <li>• Being clear and frank about assumptions, uncertainties and vulnerabilities e.g. climate change, model inputs/limitations, imperfect linkages to other aspects.</li> </ul>

### 3.7 New South Wales

Speaker: David Harriss and Vanessa O’Keefe

#	Principle theme	Summary of principle
1	Establishment of Individual Water Rights	<p>Up until 1886 in Victoria and 1888 in NSW, access rights to water was based on the ‘prior rights’ British system that enabled riparian landowners unfettered access to water passing their properties. Victoria and NSW then introduced statutes that vested the right to use and control water in the Crown. This required each Colony (later state) to develop a system of water rights, and conditions to the use of water.</p> <p>This remains the basis of water management in the states. Some ‘basic landholder rights’ still exist that provides for some stock and domestic use for riparian landholders and to groundwater, but these volumes are not sufficient to be commercial. Individual water rights for irrigation were attached to specific parcels of land and non-transferable.</p> <p>Over time irrigation development expanded, water for irrigation became over-allocated, and limits to water use were introduced. It then became necessary to introduce policies that enabled water to be separated from land and transferred to enable new development and new water use industries.</p> <p>This has resulted in the:</p> <ul style="list-style-type: none"> <li>• Separation of water from land</li> <li>• Creation of High Security and General Security volumetric entitlements</li> <li>• Government registers of entitlements</li> <li>• Transferability of entitlements</li> <li>• Establishment of environmental rights</li> <li>• Provision for cultural entitlements</li> </ul> <p>All these are policy instruments in their own right but all part of individual water rights.</p>
2	Establishment of diversion limits	<p>There was recognition since the 1970s that there are limits to water use for consumptive use, mainly irrigation, and policy instruments that limit growth in use have been part of water planning in NSW since then.</p> <p>Surface water:</p> <ul style="list-style-type: none"> <li>• 1970s embargo on the issue of new entitlements for irrigation (this didn’t prevent the activation of entitlements that were previously unused or only partially used – known as “sleeper” and “dozers”, respectively)</li> <li>• 1995 Murray-Darling Basin Cap on diversions</li> <li>• 1996 NSW – Reduction in consumptive use by up to 10% from existing use</li> <li>• 2004 Water sharing plan limits: on average 5% less than MDB Cap up to 3% extra after 10 years</li> <li>• 2012 Basin Plan Sustainable Diversion Limits</li> </ul> <p>Groundwater:</p> <ul style="list-style-type: none"> <li>• Entitlements as a proportion of recharge</li> <li>• 2009 Entitlement reduction to sustainable entitlements in major groundwater systems (ASGE)</li> <li>• 2012 Basin Plan Sustainable Diversion Limits</li> </ul>

#	Principle theme	Summary of principle
3	Water trade	<p>Since the 1980s with increasing restrictions on the issue of new entitlements and limits to use, governments had to introduce arrangements that would enable new industries and new participants into water use, without increasing extractions.</p> <p>Subsequently, NSW introduced policies that would enable transfer of individual water entitlements. This ultimately resulted in the development of an efficient market in the permanent trade of entitlements and the temporary (annual) trade of available water.</p> <p>In the development of interstate water trading because of differences in states entitlements, 3 different mechanisms were considered:</p> <ul style="list-style-type: none"> <li>• Conversion to a common water right (the Murray-Darling Basin water equivalent of the Euro). NSW argued that each state had established rights, in collaboration with industry, that suited their respective water use needs and that a common currency would not suit some of the different industries.</li> <li>• Exchange rates that were based on average reliability of entitlements: again, NSW disagreed. If a Victorian user bought a NSW Murray general security entitlement, converted to 70%, then they would expect that volume in each year. In a year like 2018-2019, when NSW general security allocation is 0%, there is no water available whether it has been converted by 70% or not. The water is not there.</li> <li>• Interstate trade of interstate entitlements finally agreed. There is nothing to stop the transfer of an entitlement, or allocation for use in another state where it is hydrologically connected.</li> </ul>
4	Demand management	<p>a. Tradeable water rights (entitlement and allocation). This has established a market value for water entitlements and available water that has led to increased water use efficiency.</p> <p>b. Moving from annual accounting to continuous accounting.</p> <p>Has got rid of the 'use it or lose it' paradigm. Continuous accounting has been introduced at both the state and individual levels in NSW that provides for a state or individual that has not used all of their allocation in one year, to save that for use in the following year. At the state level, this has enabled Victoria to use less water, on-average, in the Murray Valley than NSW and have greater reliability. NSW uses more water on-average but has less water available in sequences of dry years.</p> <p>To accommodate this variability, in NSW individual carry-over of unused entitlements has been allowed since the early 1990s but limited so that it doesn't reduce water availability to other users. At the individual level, NSW users can carry-over unused allocation. In this year when NSW Murray general security allocation is zero, users have still had access to 31 percent of their entitlement, on-average, because of carry-over from the previous year. In practice, a water user can use, choose not to use, permanently trade some or all of their entitlement, or temporarily trade some or all of their available water.</p>

### 3.8 New South Wales groundwater

Speaker: Vanessa O'Keefe

#	Principle theme	Summary of principle
1	3 groundwater policies	NSW Introduced 3 groundwater policies – for quality, quantity and dependent ecosystems. Developed between 20 and 10 years ago, these are still in place.
2	Sustainable Yield	The key policy instrument has been to establish a sustainable yield for groundwater systems.
3	Difficult adjustment	Some groundwater systems were heavily overallocated and some of those heavily overused. Adjusting entitlements to a sustainable level was a difficult process. Some entitlements were cut by up to 90% over a ten-year period. This was assisted by structural adjustment funding to entitlement holders.
4	Adaptive management	Very few groundwater systems have comprehensive knowledge and data. In many systems management has meant taking an educated guess, but based on good scientific principles and conceptual understanding. This has worked, by also taking an adaptive approach, testing and adapting over time.
5	Basic data to underpin management	Basic data are needed to underpin subsequent management of groundwater resources - delineation of groundwater sources, sustainable yields (as above), where is groundwater being taken and how much (this can be estimated), groundwater levels, and baseline groundwater quality if possible.

### 3.9 Western Australia

Speaker: Susan Worley

#	Principle theme	Summary of principle
1	Context matters	A generic water planning approach provides an excellent framework, but each situation is different and local factors need to drive the form of the product. First, work out what is needed. Sometimes a water management plan isn't needed. Context that informs a water management plan includes history of use and management, type of water system and type of water access, quality of information, climate projections, community objectives, demand and capacity (or tools) to manage.
2	Planning needs science as a platform and a scope, and then decisions are based on social, political factors – and capacity to make the decisions.	Science determines the spectrum of the decision-making opportunities rather than provides an answer. Decisions made at one end of the spectrum create different risks and require a different management approach to decisions made at the other end of the spectrum. It would be useful to have as much expertise for decision making as we have for science.

#	Principle theme	Summary of principle
3	Adaptive management embeds good practice.	No one wants to put all of the work into a plan and see it sit on a shelf. Building in a regular plan evaluation cycle enables learning by doing. It supports small improvements and adjustments to management without straying from the overall objectives of the plan. Once evaluation is embedded as a regular cycle people see how they can use it to adapt management to be better. Adaptive management can be empowering and help build a strong sense of responsibility for place.

### 3.10 South Australia

Speaker: Ian Reid (ICEWARM)

#	Principle theme	Summary of principle
1	Don't forget there is always someone downstream	Effective basin management considers the upstream and downstream issues within planning processes and implementation. Upstream stakeholders typically have more choices within basin planning than downstream stakeholders, and special considerations need to be made for this fact. For basin planning to be effective, downstream stakeholders need to have an effective voice in planning forums and their particular needs need to be included in a comprehensive and collaborative planning framework.
2	All basin stakeholders come to basin management with a particular history	No basin plan starts with a blank page. All stakeholders come with a particular history of water management. For example, in Australia it is often forgotten that South Australia halted the provision of new licenses well before the 'cap' was introduced, and all States came to the Murray-Darling Basin Planning process with entrenched practices and assumptions which had to be challenged and assessed through rigorous science and information sharing. Previous water sharing arrangements significantly shape the conversations and options considered in planning discussions.
3	Basin planning stakeholders need access to good science.	Basin planning stakeholders come to the planning process with different agendas and aims. In order for them to contribute to basin planning from an evidence-based perspective, it is necessary for them to have access to good science which addresses their needs. For example, the South Australian Government is greatly assisted by the work of the Goyder Institute for Water Research in contributing robust and reliable evidence to the Murray Darling Basin planning processes.

### 3.11 Irrigation water users

Speaker: Karen Hutchinson (Murrumbidgee Irrigation)

#	Principle theme	Summary of principle
1	Understand there are competing interests	Perception of irrigators has changed from the historic view that irrigators were “opening up” productivity in Australia. Farmers can feel blamed for decisions beyond their control. In NSW water planning and with the Murray-Darling Basin Plan, champions in the community who were invited to be part of the process was key.
2	Certainty and reliability	Irrigation water users seek certainty and reliability. While water resources availability varies with climate, irrigation water users seek certainty and reliability in the policy settings and in their entitlements to access water.
3	Respect – there are different views	Focus on co-creation of plans. This might lead to a complex water plan, but it works. The ultimate Murray-Darling Basin Plan was the “least worst” plan. The community had to fight to be heard. What success looks like will be different for different users.
4	Sustainable future	Strategic water planning should aim to support a sustainable future for communities dependent on water resources.
5	Community Voice	The Murrumbidgee Valley Stakeholders Group formed a community voice, beyond water licence holders. It provided a catalyst for change towards “triple bottom line” (social, economic and environmental) outcomes. This made a contribution to materially changing the Murray-Darling Basin Plan.

### 3.12 Environmental water and environmental flows

Speaker: Jody Swirepik (Commonwealth Environmental Water Holder)

#	Principle theme	Summary of principle
1	A social process	<p>Development and implementation of plans and arrangements for environmental flows is firstly a social policy process. Technical and scientific input is essential but should come after a discussion on the objectives of the process.</p> <p>In Australia, we are now very focussed on building connections back to community for environmental water following some periods of predominantly technical and government activity and decision making. Having the link at the local level and harnessing the passion of people to look after their own environment is the most powerful outcome. Environmental flows can support intrinsic values for the community like being able to swim or fish in the river. It can also support spiritual and cultural use. We are currently on a journey to better incorporate indigenous knowledge into water management including environmental watering activities.</p>
2	Environmental water is part of the cake, not the icing	We need to think about environmental water the whole way through water planning and implementation. It is not the “icing on the cake” to be thought about after everything else is done. It needs to be integrated into water access frameworks, and dam & river operations.

#	Principle theme	Summary of principle
3	Range of ways to go about environmental water and flows	Australia has over the last decade acquired water entitlements to allocate water to the environment. This allows real time management of water (versus fixed rules) and a high degree of transparency and confidence in the environment's "right". However, this approach may not be the best or most feasible approach for other water resources. Where systems are not yet over-committed, providing for the environment through water planning could be a simpler solution.
4	Perfect can be the enemy of the good	It is important to start doing what is feasible once we have basic knowledge about the environmental needs. For example, if we know that a fish needs flows in spring to spawn and migrate, we can start providing some flows without waiting for full data or perfect modelling, and then learn as we go.
5	Objectives and governance are fundamental	Knowing what you want to achieve and establishing the governance and decision-making processes that enable that to occur is key. Action can often be catalysed by studies which find 'business as usual' to contain unacceptable risk or be an ineffective /unsustainable use of the water resource.

### 3.13 Water quality and salinity management

Speaker: Barry Hart (Alluvium)

#	Principle theme	Summary of principle
1	History: Australia has been addressing water quality for at least 50 years	<ul style="list-style-type: none"> <li>• 1970s <ul style="list-style-type: none"> <li>○ Environmental legislation in most Australian states</li> <li>○ EPAs established with focus on WQ and pollution control</li> <li>○ First WQ criteria/guidelines produced for fresh and marine waters (1974)</li> </ul> </li> <li>• 1980s <ul style="list-style-type: none"> <li>○ WQ guidelines for heavy metals and pesticides (1982)</li> </ul> </li> <li>• 1990s <ul style="list-style-type: none"> <li>○ Australian &amp; New Zealand WQ guidelines for fresh and marine waters (1992)</li> <li>○ First National Water Quality Management Strategy (1992)</li> </ul> </li> <li>• 2000s <ul style="list-style-type: none"> <li>○ National Water Initiative established (2004)</li> <li>○ Incorporated NWQMS</li> <li>○ Further upgrading of NWQMS</li> </ul> </li> <li>• 2010s <ul style="list-style-type: none"> <li>○ Murray-Darling Basin Plan (2012) – used NWQMS</li> <li>○ Further upgrading of NWQMS</li> <li>○ Further upgrading of WQ guidelines for fresh and marine waters</li> </ul> </li> </ul>

#	Principle theme	Summary of principle
2	Current best practice through the National Water Quality Management Strategy (NWQMS; 2018)	<ul style="list-style-type: none"> <li>● Provides nationally agree policies, guidelines and tools to assist governments (and others) to manage WQ</li> <li>● Used by states and territories, but non-mandatory</li> <li>● Provides guidelines on: <ul style="list-style-type: none"> <li>○ Drinking water</li> <li>○ Aust and NZ WQ guidelines for fresh &amp; marine waters</li> <li>○ Guidelines for managing risks in recreational waters</li> <li>○ Guidelines for water recycling</li> <li>○ Rural land use and WQ</li> <li>○ Guidelines for urban stormwater management</li> <li>○ Guidelines for sewage systems</li> </ul> </li> </ul>
3	Water Quality guidelines for fresh & marine waters	<ul style="list-style-type: none"> <li>● Guidelines for: <ul style="list-style-type: none"> <li>○ Aquatic ecosystems</li> <li>○ Agriculture</li> <li>○ Cultural and spiritual values</li> <li>○ Recreation and aesthetics</li> <li>○ Industrial water</li> </ul> </li> <li>● Aquatic ecosystems <ul style="list-style-type: none"> <li>○ Biological indicators</li> <li>○ Toxicants <ul style="list-style-type: none"> <li>▪ Heavy metals, organic compounds</li> <li>▪ Levels of protection (3 types of systems: high conservation, slight to moderate disturbed, highly disturbed)</li> <li>▪ Now on the web</li> </ul> </li> <li>○ Physio-chemical stressors (pH, DO, salinity)</li> <li>○ Sediments</li> </ul> </li> </ul>
4	Salinity (Murray-Darling Basin)	<ul style="list-style-type: none"> <li>● 1988-2001 – Salinity &amp; Drainage Strategy</li> <li>● 2001-2015 – Basin Salinity Management Strategy</li> <li>● 2015-2030 – Basin Salinity Management 2030</li> <li>● Approx 30% reduction in salinity over 27 years</li> </ul>

### 3.14 WaterGuide

Speaker: Will Fargher (Aither)

#	Principle theme	Summary of principle
1	Value-based decision-making	The value of water is the benefit that people receive from water. Often those who invest in, allocate and use water do not know the value of water for different users, and so cannot reflect those values in their decisions. Explicit valuation of competing uses of water provides a more objective means for decision makers to manage water resources and optimise results. Good valuation practices will equip governments, communities and individuals to make better decisions about water investment, allocation and use.
2	Inclusion of central agencies in decision-making	One of the most challenging tasks for leaders in water reform, including for the responsible Minister(s), is to make and enforce decisions that require trade-offs between different water uses and users. Including central government agencies at the decision-making table is critical to inform appropriate water policy and planning decisions based on a sound understanding of the costs and benefits of policy options (i.e. the trade-offs involved in decisions) across economies and societies as a whole.
3	Communicating Australia's experiences and lessons	Australia has significant practical experience in working with a range of stakeholders to respond to water challenges. Substantive reform of water management policies and planning processes has occurred over many decades (particularly the last 30 years), and efforts are ongoing today. As Australia reflects on and communicates this journey, it is clear there is deep expertise and practical experience to share. Practical lessons in particular seem to be of significant interest to water policymakers in developing / low income countries as they seek to improve water management and use in their contexts over coming years and decades.
4	Context-specific solutions while recognising need to adapt and adopt experiences of others	The challenge for the international water community is to establish pathways for achieving improved outcomes from water management in a wide range of developing / low income countries facing diverse pressures on surface and groundwater resources. Starting with a blank slate every time is not an option. However, though it must be recognised that local contexts differ, it is possible to build on the work that others have done. It is evident that there are many common challenges and barriers faced in most contexts, and there are also common features that constitute the fundamentals of good water management. Decision makers can and should adapt and adopt the successful efforts that others have made to overcome these challenges and build on the fundamentals.

#	Principle theme	Summary of principle
5	Start with quick wins and obvious pressure points	The challenges in many developing / low income countries demand urgent solutions, as the crises being faced in many basins and aquifers are already severe and are rapidly increasing in severity in many others. There is not always a need, or time, for a long-term scoping study before implementing fundamental improvements to respond to emerging or current crises. In many contexts, the acceleration of practical action is required. This can be achieved by identifying strategic priorities for each context and developing and piloting solutions to address them based on where there is existing political will for action. This should start with easily achievable, practical efforts to address highest priority water management pressure points before building up to more complex, contested priorities and solutions.

### 3.15 Gender equality and social inclusion (GESI)

Speaker: Melita Grant (ISF UTS)

#	Principle theme	Summary of principle
1	Conduct gender and inclusion analysis throughout the project cycle	Quality GESI analysis is necessary to ensure that equality outcomes are pursued. Analysis should include the current gender and equality context (to identify issues of exclusion) as well as the projected impacts of any intervention on all members of the community (women and men, boys and girls, sexual and gender minorities, people with disabilities, and socially and economically marginalised people). The analysis must then influence project and program design, legal frameworks, monitoring and evaluation indicators and processes. It is also important to identify GESI experts and organisations within the country the water resources management project will take place in.
2	Meaningful and inclusive participation in decision-making and partnerships	Adopt a ' <i>nothing about them without them</i> ' approach. To include people who will be affected by a water management decision is about more than just numbers, it is about meaningful participation. This includes training, deliberation, listening, financial support, long-term engagement, and working in partnership with organisations such as women's, Indigenous groups, and disabled people's organisations. Research across 15 countries showed that water supply projects designed and run with the full participation of women (compared with non- or partial participation) were more sustainable <sup>2</sup> .
3	Support equal access to and control of resources including land and water	Women are more than 43% of the agricultural labour force globally, yet ownership of and access to land and water resources is not equal to that of men <sup>3</sup> . Decisions about water allocation, sharing and management can deepen these inequalities unless GESI is genuinely considered. Given the sensitivity of issues related to land and water ownership, marginalised peoples and their representative organisations are best placed to inform strategies around unlocking these barriers to equality, and ensure that water resources projects do not inadvertently deepen inequalities.

<sup>2</sup> Gross B., van Wijk C., and Mukherjee N. (2000) Linking sustainability with demand, gender and poverty: A study in community-managed water supply projects in 15 countries. Delft: Water and Sanitation Program. Accessed at: [https://www.wsp.org/sites/wsp.org/files/publications/global\\_plareport.pdf](https://www.wsp.org/sites/wsp.org/files/publications/global_plareport.pdf)

<sup>3</sup> de Jong, E., Sagardoy, J. A. and Sisto, I. (2012) Passport to mainstreaming gender in water programmes: Key questions for interventions in the agricultural sector. Food and Agriculture Organisation. <http://www.fao.org/docrep/017/i3173e/i3173e.pdf>

#	Principle theme	Summary of principle
4	GESI is not new, but commitment to uptake has been slow	While the global integrated water resources management (IWRM) community have acknowledged GESI issues since 1992 (the Dublin Principles <sup>4</sup> ) if not before, genuine commitment and update to building GESI considerations into programs has been slow. It's time for the water resources management sector to shift towards meaningful engagement with GESI, beyond tokenism, so that the social dimensions of water management are adequately considered and addressed, and knowledge is not overlooked and lost.
5	Become very familiar with the guidance and suggested resources from the AWP	The AWP has developed a range of resources and tools to support organisations to meaningfully consider GESI in their projects and programs <sup>5 6</sup> .

### 3.16 China

Speaker: Tom Vanderbyl (Badu Advisory)

#	Principle theme	Summary of principle
1	Complexity of issues/planning (systems thinking) & capacity to mobilise	<ul style="list-style-type: none"> <li>• Water allocation</li> <li>• Water quality / pollution management</li> <li>• Environmental flows, ecological zone development plan and ecoregion action plan</li> <li>• Estuary plans</li> <li>• Sand dredging plans</li> <li>• Flood management</li> <li>• Water transportation</li> <li>• General Institute of Water and Hydropower Plan</li> <li>• Drainage management</li> <li>• Groundwater management</li> <li>• Porpoise conservation plan</li> <li>• Land use plans</li> </ul>
2	Support processes/people that will need to make tradeoffs	<ul style="list-style-type: none"> <li>• Trade-offs are real <ul style="list-style-type: none"> <li>○ Processes, applied well, will involve making choices and trade-offs</li> <li>○ Outcomes are real, directly affect lives, and sometimes confronting</li> </ul> </li> </ul>
3	Criticality of role of in-country partner to facilitate conversations between the players	<ul style="list-style-type: none"> <li>• Government needs independence in role of bringing people / agencies together <ul style="list-style-type: none"> <li>○ Private conversations with senior govt emphasize the criticality of this circuit-breaker role</li> <li>○ Success relies on cultivating relationships and trust between government and other stakeholders; takes time but pays dividends</li> </ul> </li> </ul>

<sup>4</sup> Dublin Principles (1992) <http://www.wmo.int/pages/prog/hwrp/documents/english/icwedece.html/>

<sup>5</sup> Gender Equity and Social Inclusion, AWP website [https://waterpartnership.org.au/gesi/?mc\\_cid=196339429c&mc\\_eid=d77e67ac64#1559727454568-6fea08de-f56e](https://waterpartnership.org.au/gesi/?mc_cid=196339429c&mc_eid=d77e67ac64#1559727454568-6fea08de-f56e)

<sup>6</sup> AWP, GESI Guidance for Partners <https://waterpartnership.org.au/wp-content/uploads/2019/04/AWP-GESI-Guidance-for-Partners.pdf>

#	Principle theme	Summary of principle
4	Centre planning conversations around what is important to people	<ul style="list-style-type: none"> <li>Assuring sustainable environmental outcomes and impact is dependent on framing a river's needs around what is important to people</li> <li>A healthy environment emerges as a critical human need <ul style="list-style-type: none"> <li>China: evident that this is a key driver at every level of stakeholder engagement</li> </ul> </li> </ul>
5	Identify where the champions are	<ul style="list-style-type: none"> <li>Champions might not be someone with a political title though – often “leaders of influence” lie elsewhere (they are gold!) <ul style="list-style-type: none"> <li>Champions with a passionate local connection are diamonds</li> <li>Respected academics in China outlast people in political positions</li> </ul> </li> <li>Leverage political leadership where you can... <ul style="list-style-type: none"> <li>Speech by President Xi in early 2016 specifically supported a conservation agenda for the Yangtze Basin</li> <li>This means that measures put in place during the programme will be further supported (rather than undone) by future Government action</li> </ul> </li> </ul>

### 3.17 Myanmar and Laos

Speaker: Tarek Ketelsen

#	Principle theme	Summary of principle
1	There needs to be an integrated plan	In both countries (and many developing / low income countries in the region), there has been a lack of an integrated plan or integrated management of water resources. Separate Ministries and separate private sector players propose individual projects (e.g. hydropower proposals) without any consideration of how they interact with each and the water resource. An example was provided where the projects when put together could not all be practically viable.
2	Value vs valuation	While it is important to identify all economic values for water resources, it is also important to recognise that some values are priceless. For example, rivers and aquatic sites are frequently held in strong spiritual value.
3	Learning from success or failure?	In articulating Australia's experience, we can be confident in our successes, but also need to be frank about our failures and the lessons we learned.
4	Integrated Water Resources Management is the new kid on the block	Even where integrated water resources management is supported by governments and by legislation, it is newcomer to the planning scene and must engage with and come to terms with the established industry sector-based planning. This throws up sector challenges, opportunities, priorities and sector-based development objectives. Water planners must find a way for this to engage with IWRM objectives and trade-off decision processes.
5	Responding to water scarcity? Or trade-offs	The “water scarcity” paradigm that Australia is experienced in and often articulates internationally, does not always translate to developing / low income countries and regions with significantly higher rainfall, flows and floods. However, perhaps a more useful way to communicate and apply Australia's experience is to describe our approach to identifying values and objectives and negotiating trade-offs between objectives.

#	Principle theme	Summary of principle
6	Demand driven?... yes but... (the value of “nudging”)	Australia’s assistance to the Indo-Pacific region does need to be demand driven. However, it is also appropriate that we respectfully ask the questions about sustainability. There is value in the “nudging” approach, and being strategic, in terms of introducing key lessons learnt. This is about balancing acts of influence and persuasion.

### 3.18 Viet Nam

Speaker: Nigel Hayball

#	Principle/Insights theme	Summary of principle
1	Clear regulatory framework and institutional arrangements are in place.	A national water sector assessment was undertaken over 2008--2009 and over 60 challenges were identified. It led to the establishment of a modern Water Law (2012), and supporting instruments, that mandates water allocation, water protection, water disaster risk planning and other important IWRM related activities. Vietnam also has separated out ministry functions for water resources management, water resources development and water services, and departments/agencies functions for water allocation planning, compliance, trans-boundary management and other aspects - critical for reducing conflicts of interest and a more balanced approach.
2	Focus so far has mostly on been on planning, less on management of water resources.	Early days in establishing government systems/processes for on-going management of water resources. For example, no seasonal/annual operational plans for dam water releases aligned to (river basin) water allocation plans are in place. There are not many good examples of water planning type activities underway at this stage, limiting understanding of the value of water planning for supporting sustainable development.
3	Mixture of human resource capacity.	Vietnam has good technical depth, especially in hydrology, meteorology, engineering but less so on skilled and experienced water planners ('integrators'). Partly related to planners being less needed in the past as the country developed its water resources. With increasing developments and demands for water, however, especially during the dry season, skilled water planners are needed to help balance out the different commercial, social and environment water use needs.
4	Value of integration is generally understood but not well implemented.	Importance of an integrated approach to achieving sustainable water resources development is accepted and embraced in regulations. In practice, however, bringing key people (managers, technical, operational etc.) together, and the smooth exchange of data and information, is often challenging within departments/agencies within and between Ministries with water-related responsibilities. Partly related to national finance reforms and Ministries having to find ways to finance their activities.

### 3.19 Cambodia/Laos

Speaker: Paradis Someth (eWater)

#	Principle theme	Summary of principle
1	Data and information	Adequate water data and information for water resource modelling is critical for basin planning. People cannot manage water when they cannot measure it through time and space. Integrated water database is not yet available. Advancement of satellite technology will play a major role in the area where the ground data is scarce.
2	Tools and decision support system	Tool and decision support systems are foundational for the basin planning cycle, which has four main elements: state of river basin, scenario assessment, development strategy and plan, and application and implementation. We cannot plan if we cannot model.
3	Cooperation and communication between agencies	A mechanism for water data exchange between relevant agencies is urgently needed. Formation of this mechanism will reinforce data and tool sharing at national and sub-national level.
4	Implementation of policy, regulation and laws	Water resource laws and other policy and regulation are usually available in Indo-Pacific developing / low income countries, but their implementation is not always effective and efficient.
5	Human resources and capacity building	Capable human resources are main element to sustain the above-mentioned. Human resources in hydrology, meteorology, modelling, water resource engineering are very limited in the developing / low income countries. Australia through eWater and AWP are delivering short training and on-the-job training in water resource modelling and basin planning in national research institutes and university. Cambodian Water Resource Modelling Community is a place for people having interest in modelling to exchange and share their knowledge and experience.

### 3.20 Thailand

Speaker: Simon Tilleard (AWP)

Thailand was the one of first countries in the region to set a requirement for development of basin plans. In 2002 river basin organizations (RBOs) were set up to decentralize the basin planning and adopt river basins as planning units. But progress of the RBOs and their mandate to develop and implement basin plans has been slow.

Taking a look at the Thailand situation, there are five key lessons that are relevant to our conversation at this workshop:

#	Principle theme	Summary of principle
1	Capacity	Capacity is critical and often needs to be the starting point. Capacity at the provincial offices (and therefore RBOs) level in Thailand is relatively low and doesn't work to decentralise the work if the responsible teams don't have the capacity. Need to target capacity building to the right level depending on who has responsibilities that trying to influence.
2	Process for prioritisation	Lack of process for prioritisation – Basin plans were just long shopping lists, no assessment and analysis of scenarios and options. Process for prioritisation needs to be one of the tools in the Australian offering.

3	Community involvement	In Thailand, membership of RBOs was primarily government, and boards had limited community involvement. Although Thailand has a strong government emphasis on community engagement, guidance is needed on how to do.
4	Planning needs to link to government budgeting processes	Planning needs to link to government budgeting processes - absolute key. Key issue for RBOs in Thailand was they were meant to pull together a plan for the basin but: i) they only had the budget for two meetings a year; and ii) where there was a plan they still had no say in the government budgeting process for projects in the basin. The sector agencies go straight to Ministry of Finance for funding and don't need to show alignment/compliance with the plan. So the plan has no power.
5	Overlap of roles and responsibilities	Overlap of roles and responsibilities of sector agencies impedes progress. In Thailand, the issue is Royal Irrigation Department and Department of Water Resources for which the split was not clear. Being addressed now with creation of Office of Water under the Prime Minister's Office, to bring together the different sector agencies.

### 3.21 India

Speaker: David Harriss

#### Background

River Basin Management with AWP in India has been contributing to the National Hydrology Project Phase III, with funding from the World Bank, and includes 4 components aimed at improving water resources planning and management.

- A. Water Resources Data Acquisition System
- B. Water Resources Information System
- C. Water Resources Operations and Planning
- D. Institutional Capacity Enhancement

Our initial Terms of Reference were to review national and state-based policy and regulatory frameworks and to draw on Australia's experience in the Murray-Darling Basin to consider possible reform options for planning and governance of water resources, at a basin scale.

At the start of the project in 2016, we were requested by the Central Government (Ministry of Water Resources) to develop a 'User Guide for Basin Planning' and to road test this in the Krishna Basin, that includes 4 states; Maharashtra, Karnataka, Telangana and Andhra Pradesh.

#	Principle theme	Summary of principle
1	Governance and government relations	India has a well-developed legal framework. Commitment to the project by the Government of India Ministry of Water Resources has varied with the priorities of each Secretary of the Ministry of Water Resources. Initially, we had difficulty engaging with the States as engagement was being managed by the Central Government, and to a lesser extent the World Bank. States, typically, will do their own thing independent of the Central government and adjacent states: <ul style="list-style-type: none"> <li>• At a technical visit by Indian state engineers and officials to the Murray-Darling Basin, they told us that this was the first time they had met together to discuss water planning and management issues.</li> </ul>

#	Principle theme	Summary of principle
		<p>There is limited trust and goodwill between the states and the central government:</p> <ul style="list-style-type: none"> <li>At our most recent meeting with the Secretary of the Ministry of Water Resources he commented that the Australian delegation knew more about some aspects of states water management than did the Central government.</li> </ul>
2	Where is water planning up to in the Indian states	<p>We were told that the Krishna Basin states were typically more advanced than other Basins.</p> <p>Each of the Krishna states are at different levels of planning.</p> <ul style="list-style-type: none"> <li>Maharashtra has recently released a comprehensive water plan and has a water regulatory authority.</li> <li>Karnataka is developing catchment plans and are a bit more advanced</li> <li>Telangana and Andhra Pradesh are newly defined states that are still trying to come to grips with their state share of water resources.</li> </ul> <p>Water management in all jurisdictions, state and central is divided among many agencies, who tend not to share data. All states that we have dealt with are extremely keen on planning and water management within their own catchments, but not at a river basin level, and without much (if any) consideration of downstream states, or downstream water needs and issues.</p> <p>There remains a culture of water management by male engineers who are focussed on providing more water for irrigation through engineering solutions including dams and water supply canals (not dissimilar to Australia up until the 1980s).</p> <ul style="list-style-type: none"> <li>The current Secretary of the Ministry recognises there is limited potential to increase supply, there is no new water, competition for water is increasing and that demand management is necessary in future water management. However, this view is not widely reflected.</li> </ul> <p>In the states, there is little interest in managing demand. Stakeholder engagement is seen as working with other government agencies, which is limited. There appears to be limited engagement with water users, although we have found some examples. Capacity building appears to be regarded as employing more engineers.</p> <p>An increasing number of men are leaving the land to get work in the cities, with an increasing number of women left to work the farm. There is a limited presence of women in government.</p> <p>When we started the project there was no talk about environmental flows. Now there is some discussion about maintaining river health, importantly for religious and cultural values.</p> <p>There is a lot of effort going into developing monitoring programs and information systems to support planning and management but, like many developing / low income countries, there is a reluctance to develop and introduce policies that address the issues.</p>

#	Principle theme	Summary of principle
		There is a lot of interest in the concept of entitlements, no interest at all in water trade which couldn't work anyway until limits on extractions are considered.
3	What is the way forward?	<p>We will complete the 'User Guide for River Basin Planning' that will be used but it may be some time before this is fully implemented at a river basin scale for some time. Central government and state governments all want to continue a relationship with AWP and draw on and share experiences. There is an understanding of the need to understand better water use and, over the past 4 years we have seen increasing interest in our entitlement systems, and data management and sharing arrangements. There remains a lot of scope for Australian partnerships in India, in the short-term developing information systems, modelling and irrigation modernisation and in the long-term progressing water planning, but this will require a long-term involvement.</p> <p>The most significant part of the engagement so far has been the technical visit by state officials to the Murray-Darling Basin in November 2018. They were particularly interested with water distribution systems, irrigation and water supply technology and non-government ownership of irrigation areas (the equivalent of their 'command areas'). All participants in the technical visit to the MDB got a great deal out of it, and similar visits would be beneficial, particularly if attended by less senior water managers, rather than the department secretaries or chief engineers.</p>

In addition, Advait Madav from Alluvium briefly described Indian cultural and spiritual flows to workshop participants. He described the importance to Hindu followers of certain water levels (in relation to waist, chest and head height) and certain flow velocities (enabling offerings such as flowers to be carried to the ocean). Cultural flow requirements have been developed for various rivers using an adaptation of the "building block methodology" often used for environmental flows. Cultural flow requirements for the Ganges (Ganga) River have been mandated by the Central government in the form of dam release requirements. Cultural flow requirements are not homogenous across India, as there are regional variations in how the spiritual requirements are observed as well as with the rivers themselves.

### 3.22 Nepal

Speaker: Shahriar Wahid (CSIRO)

#	Principle theme	Summary of principle
1	Constitution of Nepal	The constitution was made in 2015 and established a rights-based approach.
2	National water resources policy	A draft national water resources policy was established in September 2018. National standards and guidelines will sit with the policy (for example, water quality standards). The policy, standards and guidelines have been influenced by Australia-Nepal cooperation, including a high-level delegation in 2014, which built mutual trust and partnership. An early understanding of the political economy of water management in Nepal was crucial.

#	Principle theme	Summary of principle
3	National Water Act and regulations and Provincial water acts and regulations	A National Water Act is in preparation. Provincial (and local) water acts and regulations draw on a model version. This will lead to organisational restructuring that is in preparation. Recent changes to the constitution and governance in Nepal offered a rare opportunity to establish policy, acts and organisations at the same time.
4	Basin Plans	Basin Plans are in preparation, under the national policy and the national and provincial acts and regulations.
5	Water issues are a means to an end: Other thematic plans	Other thematic plans are under development, such as environmental sustainability, development, risk reduction. Water issues are a means to an end. Politicians are mostly interested in the ends. Water stories must be told in terms of - social and economic development, poverty alleviation, job creation and improved quality of life for citizens. The IWRM approach will assist coordinated investment (rather than a haphazard infrastructure development promoted by donors and investors earlier), safeguard the environment and secure social equity.
6	State of the basin assessment and basin development options - Kamala	For Kamala, a state of the basin assessment is underway and will lead to development options. Evidence is key for reform. Action research in Kamala was initiated as such.

### 3.23 Indonesia (and other experience in the Indo-Pacific)

Speaker: Clive Lyle

#	Principle theme	Summary of principle
1	The planning process involves all water managing and impacting agencies and levels of government	Institutional arrangements in Australia are fairly straight forward as the Water Resource Department regulates other departments and sectors and mostly only one level of government is responsible for water management. In developing countries, usually there are multiple levels of government involved, often with overlapping responsibilities, and separate sectors undertake their own water planning and regulation. Water in river basins is often used by a more diverse range of significant users than in Australia and the Water Department is often quite weak relative to some of the other departments. For this reason, extra care and effort is required to understand the responsibilities and activities of the different water using and impacting (e.g. through pollution) sectors and departments, the levels of government, their policies and plans for water resources management, and to then involve them in water planning and implementation.
2	Planning and management should be developed around the laws, policies and prevailing culture and political conditions of the country partner	Water laws and policies vary considerably between developing / low income countries ranging from some with very detailed laws and decrees for water planning, river basin organisation, community participation etc which need to be followed through to some developing / low income countries that have no or a very limited water law. Additionally, the political drivers of the laws and policies are usually very divergent from those in Australia where only about 1% of the population is directly involved in farming and 25% live outside the main cities compared to typically 50% and 75% respectively for many developing countries.  Also, some developing / low income countries are democratic, while some are one-party based, and intervention by local politicians can also play a defining part in plans and water sharing. Water planning is best based on an initial recognition, assessment and integration of these risks and their implications.
3	Strategic planning should be problem driven with consideration of the social, economic, and environmental impacts. Plans need to be monitored and revised.	The foundation of planning in Australia's MDB has been to focus on the major prevailing issue of the time. Major phases have included better harnessing and sharing the southern MDB's water resources between states particularly to manage drought; later, the management of land and water salinity; and in recent decades adjusting the water shares between economic uses and the environment.  Associated economic, social and environmental impacts were considered at the time. This focus on the '80% issue' enables a practical, time-bound and problem driven planning approach. The advantage of a problem driven approach is that although it is reactive, engagement and commitment from stakeholders is probable. Inevitably knowledge is incomplete, and implementation of plans needs to be monitored and revised at regular intervals.

#	Principle theme	Summary of principle
4	Reliable measurement and analysis of water is an (the) important foundation of water resources planning and management.	<p>Historically, in the southern Murray-Darling Basin runoff, storage, and abstractions from river to the farm have been measured, recorded and used for planning and management. River and river basin models have been developed over many years. This has enabled reasonable water sharing plans, regulation of rivers and diversions, control and enforcement of deliveries to farms and volumetric water charging. These procedures and quality control have been progressively improved.</p> <p>Good information enables assessments of future scenarios (e.g., climate change impacts, changing land use), specific options for projects as well as assessment of the impacts of policies, projects and the cumulative impact of the overall plan.</p> <p>Often water data in developing countries is unreliable due to lack of networks, failure to maintain equipment or limited data management and quality assurance. Poor data leads to poor planning and water resources management. New technologies for data collection and assessment potentially offer an opportunity for partners to leapfrog existing, labour and skills intensive, requirements.</p>
5	Rules based water sharing using a transparent and regulated system of 'real' water entitlements is the foundation of water security for water users	<p>Australia captures water user entitlements in law, and this is essential to protect the water security of water users and forms the foundation of the water allocation system. Such a system includes a continuum of assessment through to enforcement.</p> <p>Experience in many developing / low income countries is that without entitlements, inequitable sharing of water between uses and along waterways develops. It is also common to undertake water efficiency programs (e.g. via better irrigation) to save water for other uses, however this often fails to recognise that the water 'saved' is already being used downstream or via the groundwater. As this water is 'saved' the security of downstream users is reduced.</p>
6	Financing of water resources management is critical to the water resource plans and their implementation.	<p>Implementation of water resources plans and management of infrastructure requires substantial funding particularly during the early part of the development curve. Once constructed, infrastructure needs to be operated and maintained to ensure a suitable level of service. As a developed country, Australian governments are able to make substantial investment in water resources development and modernisation. River basin and water sharing plans are used to direct government funds to priority works and measures. Some developing countries have found it necessary to decree that such plans are the main instrument to be used for identifying investment projects to avoid ad-hoc projects.</p> <p>Revenue for financing of operation, maintenance and infrastructure renewal is collected from water users through volumetric water charging. This is difficult in partner developing / low income countries due to low water user incomes, nevertheless, at least part volumetric charging highlights the value of water and encourages efficiency. It also encourages water users to engage with water service providers on maintenance and service levels as well as encourages transparent cost sharing with government.</p>

### 3.24 Pacific and groundwater

Speaker: Vanessa O'Keefe

#	Principle theme	Summary of principle
1	Integrated water resource management	Much of water planning and management in the Pacific is about the whole natural resources system – it is integrated water resources management, often in the context of climate change adaptation and resilience.
2	High reliance on groundwater	Developing countries and particularly the Pacific have a high reliance on groundwater for drinking water, often decentralised and at a village level. Managing groundwater dependent ecosystems and groundwater quality (in particular wellhead protection) is often closely related to managing sources of drinking water.
3	Land issues and access	Land is mostly in short supply and much of it is customary land tenure, so space for infrastructure is limited.
4	Funding is not limiting, but maintaining continuity of skills and capacity is.	Pacific island nations are mostly recipient to high levels of funding. However, the key issue is maintaining continuity of capacity and skills. Small populations mean that specialist roles are rarely maintained, and everyone must be a generalist. In this environment, it is important to maintain support until knowledge is embedded beyond the project. Embed specialist expertise to see things through over several years. Trust, completion and follow-through are essential. Twinning is a useful way to do this.
5	Link to government budget process	Planning needs to be linked to government budgeting processes and include ongoing maintenance and operations.

## Annex 1. List of Participants

Participants at the Workshop on Strategic Water Planning, Allocation and Assessment, Canberra 2–3 May 2019.

Name	Institution	Area of expertise	Global experience
<b>Adam Sincock</b>	Commonwealth Department of Agriculture and Water Resources	Water policy program, environment, statistics	Australia, China
<b>Advait Madav</b>	Alluvium Consulting	Water engineer	Australia, India
<b>Ashleigh Rhind</b>	Australian Water Partnership	Water program officer	Australia, India, Myanmar
<b>Barry Hart</b>	Alluvium Consulting	Water planning, water quality science and management, Murray-Darling Basin Plan	Australia, Indonesia, Papua-New Guinea, Mekong countries
<b>Belinda Wilson</b>	Murray-Darling Basin Authority	Water resources plans and evaluation, state water planning	Australia
<b>Carl Daamen</b>	eWater	Water resources modelling	Australia, India
<b>Chris McAuley</b>	Victoria DELWP	Hydrogeologist, catchment management	Australia
<b>Clive Lyle</b>	Clive Lyle and Associates	Integrated Water Resources Management, River basin planning, salinity and irrigation management, water resources policy and governance, capacity building	Australia, China, India, Indonesia, Laos, Cambodia, Mekong River Commission, Uzbekistan, Vietnam
<b>David Harriss</b>	Access Water Management	Water allocation and assessment, river basin planning, stakeholder engagement	Australia, India
<b>David Winfield</b>	Alluvium Consulting	Water and river basin planning, monitoring and evaluation, policy, compliance and regulation	Australia, India
<b>Ian Reid</b>	ICEWARM	Capacity building	Australia, Nepal, India
<b>Jody Swirepik</b>	Commonwealth Environmental Water Holder	Environmental flows, environmental water management, water planning, clean energy	Australia
<b>John Dore</b>	Department of Foreign Affairs and Trade	Water governance, water partnerships and programs, international relations.	Australia, Thailand, Mekong countries
<b>Julie Hart</b>	Department of Foreign Affairs and Trade	Water policy framework, water partnerships and programs	Australia, Pacific
<b>Karen Hutchinson</b>	Murrumbidgee Irrigation	Stakeholder engagement, irrigation management, water planning	Australia
<b>Kate Hayes</b>	Partnerships Brokers Association	Water partnerships and programs, aid broker	Australia
<b>Leith Bouilly</b>	Warragal Pty Ltd	National water initiative, Murray-Darling Basin, water planning, environmental flows, community leadership	Australia

Name	Institution	Area of expertise	Global experience
<b>Marian Neal</b>	Australian Water Partnership	Water governance, water justice knowledge and partnerships management	Australia, southern Africa, SE Asia, MENA
<b>Mark Hamstead</b>	Hamstead Consulting	Strategic water planning, water trading and entitlements	Australia, Laos
<b>Melita Grant</b>	University of Technology Sydney, Institute of Sustainable Futures	Political science, integrated water resources management, international development, gender equality and inclusion.	Australia, India, Vietnam, Timor-Leste, Cambodia, Lao PDR, Nepal
<b>Nick Schofield</b>	Australian Water Partnership	Water resources management, global water partnerships and programs	Australia, Indo-Pacific
<b>Nigel Hayball</b>	Nigel Hayball	Water policy frameworks, water assessments	Australia, Laos, Cambodia, Mekong
<b>Paradis Someth</b>	eWater	Water data and water resources modelling	Australia, Cambodia, Laos, Thailand, Vietnam and Mekong
<b>Phil Duncan</b>	Macquarie University, Traditional Owner Gomeroi Nation	Indigenous water rights and participation	Australia
<b>Russell James</b>	Murray-Darling Basin Authority	NRM policy framework, National Water Initiative, Murray-Darling Basin, Water Act and Basin Plan	Australia, Thailand, Myanmar
<b>Russell Rollason</b>	Department of Foreign Affairs and Trade	Water partnerships and programs, geology	Australia, India
<b>Shahriar Wahid</b>	Commonwealth Scientific and Industrial Research Organisation (CSIRO)	Water engineer, water planning	Australia, Nepal
<b>Simon Tilleard</b>	Australian Water Partnership	Hydrology and policy framework	Australia, Myanmar, Nepal, India, Vietnam, Thailand
<b>Susan Worley</b>	DWER, Western Australia	Water resource and supply planning	Western Australia
<b>Tarek Ketelsen</b>	Unlimited Energy Australia	Water engineer, hydrologist, mining environmental management	Australia, Vietnam, Laos, Mekong, Myanmar
<b>Tom Vanderbyl</b>	Badu Advisory	Water planning	Australia, China, Kenya, Tanzania, Brazil
<b>Tony Weber</b>	Alluvium Consulting	Water resources modelling, water quality management, urban water management	Australia, India, China, Myanmar
<b>Vanessa O'Keefe</b>	NSW Department of Industry	Water planning, groundwater	Australia, Vietnam, Mekong, Pacific Islands
<b>Will Fargher</b>	Aither	Water trade, National Water Initiative, water strategy, water policy	Australia, Jordan, Uzbekistan, Iran, Senegal, Mexico, Philippines, USA