

# **REPORT ON THE OECD WORKSHOP ON IMPROVING THE INFORMATION BASE TO BETTER GUIDE WATER RESOURCE MANAGEMENT DECISION MAKING**

**Zaragoza, Spain, 4-7 MAY, 2010**

**Hosted by the Government of Aragon's  
International Center for Water and Environment  
(CIAMA-La Alfranca),  
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Please visit the Workshop website at: [www.oecd.org/agriculture/water](http://www.oecd.org/agriculture/water)

## REPORT ON THE OECD WORKSHOP ON IMPROVING THE INFORMATION BASE TO BETTER GUIDE WATER RESOURCE MANAGEMENT DECISION MAKING

### HIGHLIGHTS

**The origins of the Workshop** stem from the OECD (2009) report *Managing Water for All: An OECD perspective on pricing and financing*, which notes that gaps in knowledge remain, and that institutional structures to generate and organise water data are less well developed than have been advances in water policies across many countries. This disconnect risks undermining policy decision making, and impeding efforts to monitor and evaluate water policies.

**Under the OECD's 2<sup>nd</sup> Horizontal Water Programme** it was agreed OECD organise a Workshop on *Improving the Information Base to Better Inform Water Resource Management Decision Making*. The Government of Aragon hosted the Workshop, 4<sup>th</sup> – 7<sup>th</sup> May 2010, at the International Centre for Water and Environment, Zaragoza, Spain. The Workshop assembled world class experts across a mix of disciplines, representing some 80 participants from 16 OECD Countries, EU Commission, Estonia, Israel, South Africa, 13 International Organisations and the private sector.

**The main objectives of the Workshop** were to: identify decision makers priorities for policy relevant water data and information; review recent national and international experiences and future plans for water information systems (WIS); and provide recommendations to help countries, the OECD and other water system stakeholders to develop WIS and ensure more efficient and effective delivery of sustainable water resource management and policies.

**The Workshop's key recommendations suggest the need to:**

- Elevate the overall political value of water and water policy issues from being a low to a high political priority that requires the attention of Heads of State and relevant Ministers.
- Conduct a cost-benefit analysis of existing WIS at both national and international levels, to determine how current water information and data are used (or not used) by policy makers, and the costs and benefits of collecting, analysing and communicating this information.
- Adopt a flexible and pragmatic approach to implement a system of environmental and economic accounts for water to: respond to varying country and regional policy needs; allow feedback from country and regional experiences in using accounts; improve coverage and integration of social data; and to focus on repeatable and enduring data sets to populate water accounts.
- Undertake a substantial effort to improve understanding and science of hydrological systems to better guide WIS data collection efforts, for example, improving knowledge of the connections between groundwater and surface water, and determining sustainable environmental flows.
- Establish an informal high level group of experts to advance work on national and international WIS through forming a small group of stakeholders including data providers, users (governments, business, NGOs) and researchers. The group could interact with players, such as the UN World Water Assessment Programme.
- Encourage innovations in physical, economic, financial and institutional water data collection, such as using new technologies, voluntary initiatives to collect data, while public agencies may regulate, finance or charge for data collection, maintenance and analysis, taking into account that data can vary from a private to a public good.
- Increase efforts to communicate messages from the reporting and analysis of water data to policy advisors and the wider public, and not just among the research community.
- Strengthen the overall economic and financial information base of WIS, which remains relatively underdeveloped compared to physical water data, while also clearly defining the purpose of collecting and analysing economic and financial information to inform decision makers.
- Assess the institutional obstacles and opportunities for effective governance of WIS by: identifying areas of institutional overlap and synergies in water data collection; mobilising local stakeholders in designing WIS; fostering coordination between data producers and users; encouraging multi-discipline approaches in developing WIS institutions and governance; and supporting efforts to improve water information in Overseas Development Assistance (ODA) statistics to support improved water management in developing countries.

The Workshop also examined the **virtual water and water footprint concepts and indicators** as tools for decision makers. The Workshop consensus was that these concepts and indicators have raised awareness of water scarcity and allocation issues, and gained appeal with the public, governments, and industry. These indicators, however, have limited usefulness as a policy tool, as they do not take into account the: opportunity cost of water in production and alternative locations; other inputs used in production; distinction between the management of water resources and water quality; and by only focusing on water do not consider broader policy goals, such as reducing poverty.

## 1. WHY THE WORKSHOP

1. The OECD (2009) report *Managing Water for All: An OECD perspective on pricing and financing*, ([www.oecd.org/water](http://www.oecd.org/water)), recognises that the knowledge, science and monitoring of hydrology, environmental and water resource management linkages is less well developed than have been the advances in water policies in many countries. The continuation of this disconnect runs the risk that decision makers are poorly informed and that policies are inadequately implemented and evaluated.

2. These gaps in knowledge, science and monitoring are compounded as water resource management enters an era of uncertainty, greater variability and higher risks as a result of climate change, population pressures, increasing demand to meet environmental needs and other drivers.

3. Against this background it was agreed as part of the OECD's 2<sup>nd</sup> *Horizontal Water Programme* (2009-2010) that OECD should organise a Workshop on *Improving the Information Base to Better Inform Water Resource Management Decision Making*. An offer was made by the Government of Aragon to host the Workshop, which was held between 4<sup>th</sup> – 7<sup>th</sup> May 2010 at the International Centre for Water and Environment (CIAMA), Zaragoza, Spain.

4. This report describes the Workshop objectives, agenda and participation (*Section 2*); outlines the OECD context of work on water data and information to meet policy needs (*Section 3*); summarises the key messages that came from the Workshop papers and discussion (*Section 4*); and finally, a set of recommendations that emerged from the Workshop consensus (*Section 5*). Two annexes provide the Workshop Agenda (Annex 1) and List of Participants (Annex 2). For the complete Workshop documentation, including papers and powerpoints, background reports and weblinks, the reader is referred to the dedicated OECD website at: [www.oecd.org/water/workshop2010](http://www.oecd.org/water/workshop2010)

## 2. WORKSHOP OBJECTIVES, AGENDA AND PARTICIPATION

### 2.1. Objectives

5. The objectives of the Workshop were to:

- identify decision makers' priorities for developing and using policy relevant water resource management data and information;
- review the extent to which the current work in OECD and non-OECD countries in developing water resource management data and other related information meets the needs of decision makers;
- discuss possible areas of improvement in water resource management datasets and information, that can serve the future needs of decision makers; and,
- outline key ways forward for countries, the OECD Secretariat and other water system stakeholders that will be needed in order to make progress in future water resource management data collection and dissemination.

6. So as to ensure the focus and manageability of the Workshop over three days of discussion, the emphasis was on water resource management, rather than data needs related to water services (e.g. water quality, water treatment and sanitation). Moreover, while the Workshop largely concentrated on the national and international level aspects of water resource management information needs, consideration was also given in some presentations to implications at the sub-national and especially waterbasin levels.

## 2.2. Agenda

7. Taking into account the Workshop objectives outlined above, the Agenda over the first two days of the Workshop was organised around six themes (divided into nine Sessions, leaving aside the Introductory Session 1) as follows (see Annex 1 for the full Workshop Agenda):

*4<sup>th</sup> – 5<sup>th</sup> May*

- **Theme 1** (Session 2) *Overview and international perspectives and initiatives towards improving water information systems*: Presentations providing perspectives from the: private sector (McKinsey, Aquafed, BIAC), statisticians (UN, Eurostat, Australian Bureau of Statistics) and research community (Wits University, South Africa).
- **Theme 2** (Sessions 3 – 5) *Reviewing recent national and international experiences and future plans for water information systems*: Examination of a range of OECD countries; OECD Accession country (Israel); the European Union; International Governmental Organisations (e.g. UN), and International Non-governmental Organisations (e.g. International Office for Water).
- **Theme 3** (Session 6) *Developing the economic and financial data sets needed for water resource management*: Discussion of the range, scope and future plans for economic and financial information collection and reporting (e.g. water pricing, cost recovery, revenues and expenditures).
- **Theme 4** (Session 7) *The virtual water and water footprint indicators as tools for water resource management decision makers*: Examination of the extent to which the virtual water and water footprint tools can provide useful information to guide water resource decision makers.
- **Theme 5** (Session 8) *Meeting the information needs for agricultural water resource management*: Presentations examining a range of short and long term tools for monitoring water resource use in agriculture as supports for irrigation management decision systems.
- **Theme 6** (Session 9) *Meeting information needs of water resource decision makers through improving institutional coherence and management*: Discussion of the institutional challenges for capacity building in data administration to support national transboundary water resource management.

*6<sup>th</sup> May: Field Trip*

- A field trip was held on the 3<sup>rd</sup> day of the Workshop to Ordesa and Monte Perdido National Park in the High Aragon region. This was followed by a visit to the Irius vineyard of Aragon.

*7<sup>th</sup> May*

- **Session 10** *Concluding discussion, recommendations and closing addresses*: The final session included the discussion of four Rapporteur Reports covering Sessions 2 – 9. The discussion of these Reports were summarised into a set of Workshop Key Messages and Recommendations, as outlined in this Report, to be considered by water resource decision makers across OECD countries, non-member countries, international organisations and relevant OECD Working Parties.

## 2.3. Participation

8. The Workshop was attended by around 80 participants covering: 16 OECD Member countries, two OECD Accession countries – Estonia and Israel - and South Africa. Also, the EU was represented by the Commission and Eurostat, and there were 12 International Governmental Organisations (e.g. UN, FAO, UNEP) and Non-Governmental Organisations (e.g. Global Water Partnership, IWMI, WWF, Aquafed); and private companies (McKinsey). The Workshop participants encompassed a range of expertise from policy decision makers, statisticians, engineers, research scientists and economists, and representatives of the private sector and environmental groups (see Annex 2 for the list of participants).

### 3. THE OECD CONTEXT TO WATER DATA AND INFORMATION

9. A key role of the OECD is to provide economic and policy advice to support government efforts to improve the domestic and international performance of their policies, underpinned by comparative datasets and information. This is also reflected more specifically, in the area of OECD's water policy analysis and evaluation, which now extends over several decades and is supported by a multi-dimensional, multi-country, time series database.

10. The OECD's water information and database has both a benchmarking and policy analysis role across three main areas of OECD activities:<sup>1</sup>

1. **Country reviews**, with an environmental, economic and agricultural focus.
2. **Water policy reports**, such as those concerning water pricing, water sanitation and financing and the sustainable management of water in agriculture.
3. **Multi-topic reports**, for example, the *Environment Outlook* and work on the *Green Growth Strategy*.

11. The collection of water data and information essentially involves two strategies:

1. **Regular data collection**, covering<sup>2</sup>:
  - i. *Physical data*: use of water resources; wastewater and pollution loads, and water quality data.
  - ii. *Economic and financial data*: Pollution and abatement and control expenditures; environmental taxes; and Official Development Assistance (ODA) flows.
2. **Project based data and information collection**, including:
  - i. *Ad hoc data collection*, such as for water pricing across urban and agricultural water users.
  - ii. *Questionnaires*, which can be both quantitative and qualitative, including those recently conducted on water resource management in agriculture<sup>3</sup> and also on water institutional and governance arrangements.

12. **The plans for current and future OECD work** on water data and information are to:

1. Improve the quality of regular data collection: physical, economic and financial data.
2. Expand the coverage of regular data collection, especially for economic data (e.g. water pricing and cost recovery rates) and financial expenditures (e.g. on flood protection, ecosystem management).
3. Complement regular data and information collection, such as estimating the costs of achieving water policy objectives, and the benefits of ecosystem services.

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<sup>1</sup> For an overview of recent OECD policy reports related to water see [www.oecd.org/water](http://www.oecd.org/water)

<sup>2</sup> To see the OECD range of environmental datasets covering water see [www.oecd.org/env](http://www.oecd.org/env)

<sup>3</sup> The OECD agricultural water resources questionnaire is located at: [www.oecd.org/agr/env](http://www.oecd.org/agr/env)

#### 4. KEY MESSAGES FROM THE WORKSHOP

##### 13. *Across many countries water information systems (WIS) are impacted by four key drivers:*

1. Technical based (supply) policy paths to improving the economic, social and environmental efficiency and effectiveness of water resource management (WRM) are being complemented with greater emphasis on demand side economic and institutional/governance policy solutions.
2. Some countries have undertaken major changes in their national/waterbasin WRM policies or are in early stages of reform programmes. In many cases there is a legal requirement, as part of the package of water policy reforms, that requires the maintenance and improvements in water data collection and reporting.
3. With the rapid development in water policy reforms in many situations and growing emphasis on demand side policy solutions to WRM this has created an information imbalance. This imbalance can be characterised in terms of an inverted pyramid with implementation of many water policy initiatives supported by little data and information, especially related to economic and financial elements, to help guide decision makers toward more effective and efficient WRM strategies.
4. As stress and demands on water systems increase and water becomes a more valued resource, this tends to increase the value of water information both for water providers and users. But many countries are reporting that the capacity to collect water information is being undermined by a lack of resources, while expertise to collect, analyse and interpret water data for decision makers is being lost.

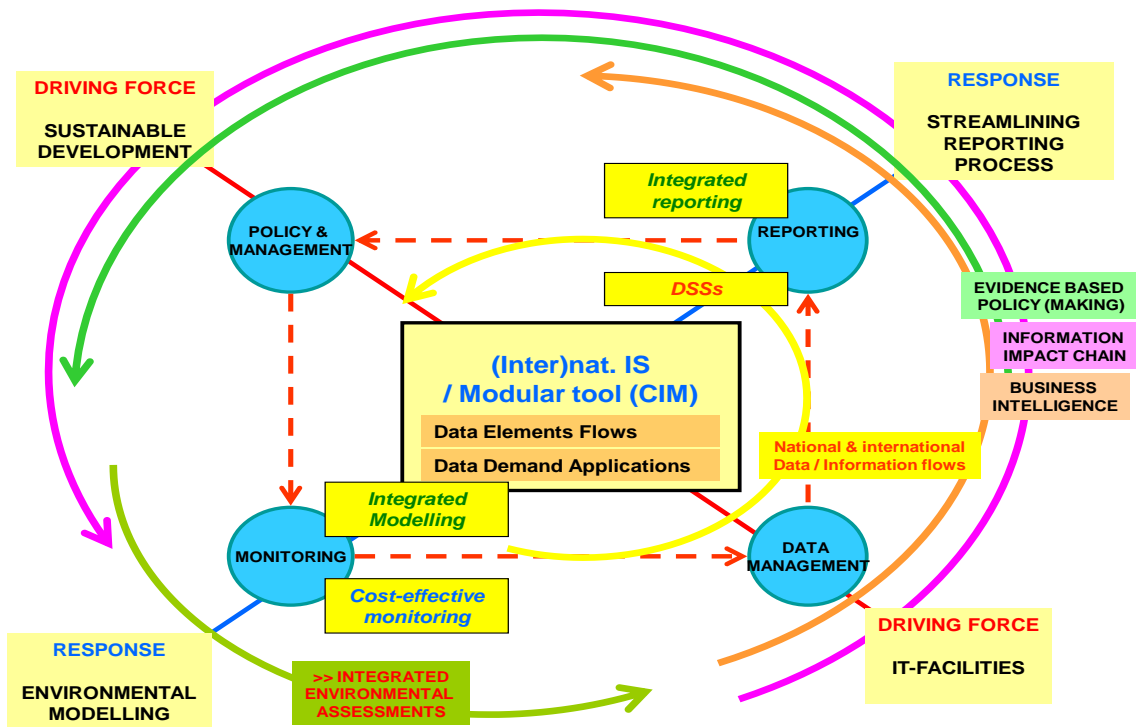
##### 14. *The linkages between WIS and needs of decision makers are complex*, but can be encapsulated in a *Driving Force (Policy Needs) – Monitoring – Data Management – Reporting* framework (Figure 1). WIS also operate from the global down to the national and local (waterbasin to an individual property) levels (Figure 2), involving a complex web of governance and institutional structures, including:

1. Many international organisations, with around 26 UN bodies and many other international agencies involved with water issues.
2. Multiple national and sub-national Ministries and government bodies.
3. A large community of business interests (Aquafed [The International Federation of Private Water Operators], the OECD Business and Industry Advisory Committee [BIAC], the World Business Council for Sustainable Development] McKinsey); non-governmental organisations (Global Water Partnership, WWF, IMWI); and other water system stakeholders (e.g. university researchers).

##### 15. *The demand for water data and information* comes from water system users and operators, resource managers, environmental agencies and public officials. WIS underlie successful efforts to understand, manage, allocate, utilise and protect water resources, in particular, to:

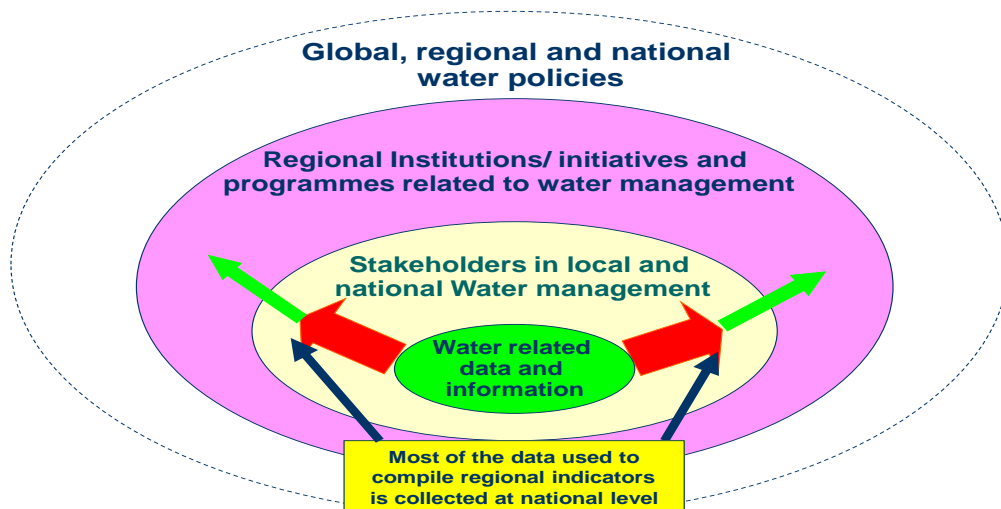
1. enhance scientific knowledge and technical understanding of water systems, stocks and flows;
2. promote the physical, environmental and economic productivity of water use;
3. improve water allocation (and its quality) decision-making between competing uses (e.g. urban, industry, agriculture) and for environmental needs;
4. address social, governance and institutional issues, paying particular attention to a territorial and regional approach with local relevance; and to,
5. contribute to long term anticipatory yet flexible planning (e.g. climate change and development scenarios) to guide future policy issues and priorities for water security and sustainable use, especially considering climate change and changing hydrological regimes.

**Figure 1: The complexity of Water Information Systems in meeting policy demands**



Source: Adapted from Rudy Vannevel, Flemish Environment Agency, Belgium

**Figure 2: Multi-scale stakeholders in the Water Information System**



Source: Adapted from Paul Haener, International Office for Water, France

16. **Recent and planned changes in water policy settings, priorities and demands** across many countries has highlighted that:

1. many international and national WIS are maintained without sufficiently addressing the policy relevance of the data and information being regularly collected;
2. deficiencies in the policy relevance of WIS applies not only to more highly structured systems (e.g. national and international systems of environmental and economic accounts for water), but also to those more pragmatic data collection efforts, such as those by OECD, Eurostat, Aquastat, many countries and non-governmental organisations (e.g. Water FootPrint Network); and that,
3. there is a need for clarity and determination of the fitness for purpose of the data and information generated by WIS.

17. **The Workshop discussion of national and international WIS**: examined their purpose and objectives; discussed their current limitations and constraints; reviewed the progress being made to improve WIS; and outlined the challenges and opportunities for the future of WIS.

18. In most national cases the main **purpose and objectives for WIS** is to provide the data and information for monitoring, reporting, and evaluating national water policies (Figure 1). At the international agency level WIS usually provide a benchmarking and policy analysis role, as described in the case of the OECD, for example, in Section 3 above.

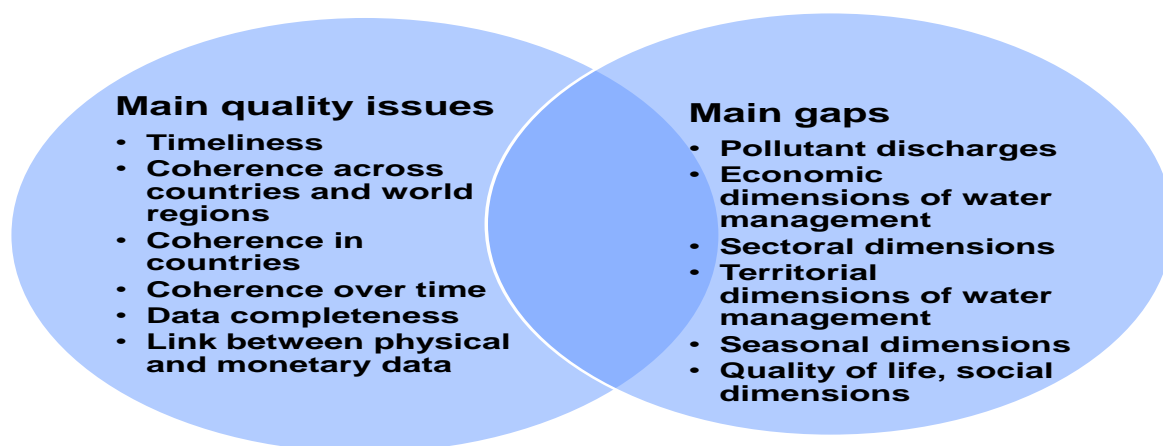
19. **The limitations and constraints of WIS** can be broadly summarized as follows:

1. Data concerning the economic and institutional aspects of water systems are much less developed than physical data and are only partially covered in the regular updates of most national and international WIS.
2. Current databases are not always adequate to support:
  - i. integrated water management;
  - ii. efficient implementation of water policies and related performance assessments;
  - iii. economic analysis of integrated water management and related pricing policies; and,
  - iv. international water policy monitoring, analysis and evaluation.
3. There is a need to highlight data gaps and identify deficiencies of data and data collection systems, especially with regard to the most pressing current and emerging policy issues.

20. Despite these limitations of WIS **progress is being made** in many countries to upgrade water monitoring systems and data collection efforts. These efforts are being supported, in part, through use of new information technologies, such as use of GPS, GIS, and web-based communication. However, the current severe fiscal constraints confronting many nations and international organisations could impede the progress being made with improving WIS.

21. **The key challenges and opportunities for WIS**, which were recognized at the Workshop, are summarized in Figure 3, in terms of data quality issues, and in Figure 4 in relation to different dimensions of WIS. An important challenge underpinning the data challenges identified in Figure 4 is to ensure precise definitions of the different dimensions (e.g. water prices) and also that historic time series datasets are retained.

**Figure 3: Challenges to improve water data quality and address data gaps in Water Information Systems**



Source: OECD Secretariat

**Figure 4: Challenges to improve concepts, methodologies and data across different dimensions of the Water Information System**



Source: OECD Secretariat

## 5. WORKSHOP RECOMMENDATIONS

### 5.1. Recommendations toward the overall improvement of Water Information Systems

22. The Workshop recognized that if significant progress was to be made in improving WIS, then the overall political value of water and water policy issues needs to be elevated from being a low to a high political priority that requires the attention of Heads of State and relevant Ministers. ***More specifically if WIS are to better meet the demands of decision makers the Workshop recommended*** the need to:

1. Improve the integration of social and economic dimensions with environmental data and indicators for policy guidance throughout the water sector.
2. Assist political priority setting for the water sector relative to other sectors by evaluating the costs and benefits of additional expenditure for water sector infrastructure investment, management and maintenance.
3. Assess how well current national WIS respond to policy needs, priorities and future plans, coupled with the identification of core water information and indicators common to all countries that would guide international water information and data collection efforts.
4. Undertake a cost-benefit analysis of existing WIS at both national and international levels, to determine how current water information and data are used (or not used) by policy makers, and the costs and benefits of collecting, analysing and communicating this information.
5. Achieve greater flexibility of WIS to respond to evolving and long term water policy demands, for example, developing information on the extent of inherent levels of risks in a water basin and using this in models to determine the impacts of extreme drought and flood events on the water basin.
6. Link the availability of improved WIS with strategic planning processes, such as “Strategic Financial Planning”.

23. ***A System of Environmental and Economic Accounts for Water*** (SEEAW) can provide a useful organising framework for water data collection, using a common and consistent terminology and structure to organise data. Many countries are now developing a SEEAW, with the United Nations having established a general SEEAW framework. The UN has derived from the SEEAW the *International Recommendations on Water Statistics* (IRWS) which provides broader statistical standards for water information and data collection. The Workshop recommendations as regards SEEAW suggest the need to:

1. Adopt a flexible and pragmatic approach to implement SEEAW in response to the varying country and regional (e.g. EU) policies needs and concerns.
2. Foster more feedback from country and regional experiences in using SEEAW, and further develop SEEAW specifically adapted to allow for river basin specific assessments.
3. Focus on producing repeatable and enduring long term data sets, both physical, economic and financial to populate SEEAW.
4. Improve the coverage and integration of social data (e.g. public values for cultural, landscapes, spiritual values linked to water) which are poorly (or not) represented in SEEAW, and very poorly covered in WIS more generally.

24. ***Building a robust WIS requires a solid scientific basis and knowledge of water systems***, and in this regard the Workshop recommended the need to:

1. Undertake a substantial effort to improve the understanding and science of hydrological systems to better guide WIS data collection efforts, for example, improving knowledge of the connections between groundwater and surface water, and determining sustainable environmental flows.
2. Develop a water data ladder approach that may provide the building blocks for more complete WIS, from basic hydrology of water systems to their monitoring and higher value insights through analysis, assessment and forwarding looking perspectives.
3. Establish an informal high level group of experts to advance work on national and international WIS, by building on the synergies at the Workshop through forming a small group of stakeholders including data providers, users (governments, business, NGOs) and researchers. The group could interact with players, such as the UN World Water Assessment Programme (the programme, membership, funding, and other logistical details are yet to be determined).

25. ***The Workshop's consideration of data collection to support WIS*** led to the following recommendations, including the need to:

1. Improve the use of existing data and to decentralise data collection where appropriate to the point of use, for example, water meters on farms.
2. Examine current collection of water data to identify areas of duplication and significant gaps.
3. Encourage innovations in physical, economic, financial and institutional water data collection. This may include using new technologies (e.g. remote sensing) and voluntary initiatives to collect data. Public agencies may also require those who generate economic rents through water use pay for data collection, maintenance and analysis. Agencies may also regulate or provide financial incentives to ensure that data are collected and maintained appropriately, taking into account that across different regions water data and information can vary from a private to a public good.
4. Harmonise data sets across international organisations (e.g. irrigated area) and across countries (e.g. variance in irrigation water application rates/ha irrigated) and continue to improve basic hydrological data by making a clearer distinction between information relevant for global water resource management and that data which is more locally relevant.
5. Consider among international organisations to develop poles of excellence, concentrating effort on a part of the international WIS. For example, OECD could further develop and work on methodologies, standard definitions and data related to water pricing, economics and financing.

26. ***Effective communication of water data and information*** was recognized by the Workshop as essential and recommended that further efforts in this regard should:

1. Increase efforts to communicate messages from the reporting and analysis of water data to policy advisors and the wider public, and not just among the research community.
2. Improve communication by gaining wider acceptance and understanding of terminology related to water systems, for example, water use, abstractions, and water withdrawals.
3. Explore ways to use water databases to better express temporal and spatial diversity.
4. Involve all water system stakeholders in indicator development, which will build relevance, legitimacy and ownership of data
5. Facilitate transparency in public access to data across institutions, while accommodating the variety of forms of access required by users from primary water data for researchers to more aggregated generalised indicators for the wider public.

**5.2. Recommendations to enhance the economic and financial data sets needed for water resource management decision makers**

27. Addressing the role for economic and financial information in effective water policy and management, the Workshop recommended the need to:

1. Strengthen the overall economic and financial information base of WIS (Figure 5), which remains relatively underdeveloped compared to physical water data, while also clearly defining the purpose of collecting and analysing this information to inform decision makers.
2. Express the economic values of water more clearly to improve water allocation decisions between competing uses and for environmental needs. This may include determining economic values in: producing goods through water use; providing ecosystems services; and in managing extreme flood and drought events.
3. Develop methodologies, definitions and standards for economic and financial data and demonstrate the value of improving this information for water management and policy decision making.
4. Identify priorities for benchmarking to guide regular data collection of economic and financial water data, according to their policy development, implementation and evaluation needs.

**Figure 5: Scope of coverage to improve economic and financial data for use in monitoring and evaluating effective water policies and management**

To improve the current coverage of regular data collection processes	To expand the coverage of regular data collection	To complement regular data collection
<p><b>PAC expenditures</b></p> <ul style="list-style-type: none"> <li>• Continuity of series</li> <li>• Reliability of aggregate data</li> <li>• Timeliness</li> </ul> <p><b>Environmental taxes and charges</b></p> <ul style="list-style-type: none"> <li>• Country coverage</li> <li>• Comprehensiveness of water levies</li> </ul> <p><b>ODA flows</b></p> <ul style="list-style-type: none"> <li>• Disaggregated data</li> </ul>	<p><b>Expenditure</b></p> <ul style="list-style-type: none"> <li>• Raw water supply infrastructure</li> <li>• Flood protection infrastructure</li> <li>• Ecosystem management</li> <li>• Water governance</li> </ul> <p><b>Water pricing</b></p> <ul style="list-style-type: none"> <li>• Pricing structures</li> <li>• Bill &amp; collection rates</li> <li>• River-basin level</li> <li>• Use of revenues</li> </ul>	<p><b>Costs</b></p> <ul style="list-style-type: none"> <li>• Estimates of costs of achieving policy objectives</li> </ul> <p><b>Benefits</b></p> <ul style="list-style-type: none"> <li>• Economic benefits of sound water management</li> </ul>

Source: OECD Secretariat.

### ***5.3. Observations relevant to Virtual Water and Water Footprint concepts and indicators***

28. In addressing whether the Virtual Water and Water Footprint concepts and indicators provide useful water resource management tools for decision makers and other stakeholders the censuses of the Workshop observed that:

1. Concepts and indicators of virtual water and water footprints have been helpful in raising awareness of water scarcity and water allocation issues. These concepts have gained wide appeal with private citizens, public officials, and members of the media. Several private companies have also adopted strategies that reflect efforts to reduce water footprints in their production processes.
2. Virtual water and water footprints concepts and indicators, however, have limited usefulness in policy settings, due largely to the narrow range of issues considered within these concepts, in particular they do not take into account the:
  - i. opportunity cost of water in production or the relative opportunity costs of water in alternative locations, hence, neither virtual water or water footprints is analogous to the economic theory of comparative advantage;
  - ii. other inputs in used in production (e.g. agriculture), such as land, labour, energy, and capital, and as a result, production or trading strategies and policy recommendations based on these concepts and indicators will not be optimal from a private or public perspective; and the concepts do not take into account the,
  - iii. distinction between the management of water resources and the management of water quality (pollution).
3. Optimal policies regarding agriculture, natural resources, and the environment will reflect careful consideration of several public goals, such as reducing poverty, enhancing food security, and stimulating sustainable economic development. The virtual water and water footprint perspectives, by focusing only on water endowments and water requirements, do not account for key variables that influence the achievement of these broader public objectives.

### ***5.4. Recommendations toward improving the institutional coherence and governance of water information systems***

29. In considering how to enhance the institutional coherence and governance of WIS toward more effective and efficient water management and policy decision making, the Workshop recommended the need to:

1. Encourage national and trans-boundary leadership and coordination to establish best practice principles to support effective regional and local decision makers for sustainable long term water resource management, and where appropriate underpinned by legal arrangements.
2. Adopt policy performance management principles to monitor and evaluate long term water policies and to ensure baseline water planning arrangements that balance social, economic and environmental needs. This takes into account that water governance needs to match long term planning cycles, both to avoid management by crisis (e.g. droughts and floods) and also to consider the impact of climate change.

3. Assess the institutional obstacles and opportunities for effective use of existing national or international WIS by policy makers, in particular, by identifying areas of possible institutional overlap in water data and information and possibilities for synergies.
4. Mobilise local stakeholders (river basin organisations, sub-national governments, etc.) in the design of information systems to enhance territorial and integrated water resource management approaches to water policies.
5. Foster dialogue and coordination between data producers and users and encouraging multi-discipline (e.g. economists, statisticians, engineers, ecologists, business) approaches in improving and developing WIS institutions and governance.
6. Support those collecting Overseas Development Assistance (ODA) statistics, including the OECD Development Assistance Committee, to improve water resource information in their data collection efforts in support of improved water management in developing countries, particularly those countries experiencing growing water stress.

30. ***The Workshop recognised the importance of addressing institutional water information and data “gaps” with a systematic approach***, and recommended the need to:

1. Identify the mutual interdependencies between different institutional (i.e. at administrative funding, management and policy levels) to address water information and data “gaps” and encourage more effective and efficient institutional sharing and water data and information.
2. Develop work on “institutional information” to meet physical, social, economic and financial information needs, in terms of:
  - i. Who does what at central and sub-national government levels in terms of water policy design and implementation?
  - ii. Where are the key governance “gaps” both horizontally and vertically across institutions?
  - iii. What are the major obstacles for effective coordination across ministries and other levels of government?
  - iv. What are the limitations and opportunities of existing governance mechanisms?

31. The OECD Secretariat also invited countries to join the OECD water governance survey.

## **6. NEXT STEPS AND KEY DATES FOLLOWING THE WORKSHOP**

32. The ***next steps*** in OECD work related to water data, indicators and information, includes:

1. Water data and core indicators in the biennial OECD *Environmental Data Compendium* (next edition 2011).
2. 2<sup>nd</sup> edition of OECD *Environmental Performance of Agriculture: At a Glance* (mid-2011).
3. Survey of water governance across levels of OECD government, end-2010.

4. OECD Programme of Work for 2011-12 decided by last quarter 2010, with implications for work on water, including:
  - i. Regular data collection and generation of indicators
  - ii. Policy analysis, evaluation, monitoring and projections, including:
    - a. Climate change and the OECD “*Green Growth Strategy*”.
    - b. Economics and financing, including the proposed OECD project on “*The Economics of Water Security – Pathways to Reform*”.
    - c. Institutions and governance
    - d. Country, sectoral studies and projections, including the OECD *Environmental Outlook 2012*.
  
33. The **key dates** following the Workshop are as follows:
  - **20-21 May**: Oral Report provided to the OECD *Working Party on Global and Structural Policies, the Working Party* that manages the OECD 2<sup>nd</sup> *Horizontal Water Programme*, including the Workshop.
  - **28-30 June**: This Report will be circulated and discussed at the OECD *Joint Working Party on Agriculture and the Environment*.
  - **23-25 November**: This Report will also be circulated and discussed at the OECD *Working Group on Environmental Information and Outlooks*.
  - **2<sup>nd</sup> Quarter to last quarter 2010**: Deadline for papers (11<sup>th</sup> June) and preparation of the public release of the Workshop Proceedings, including the website.