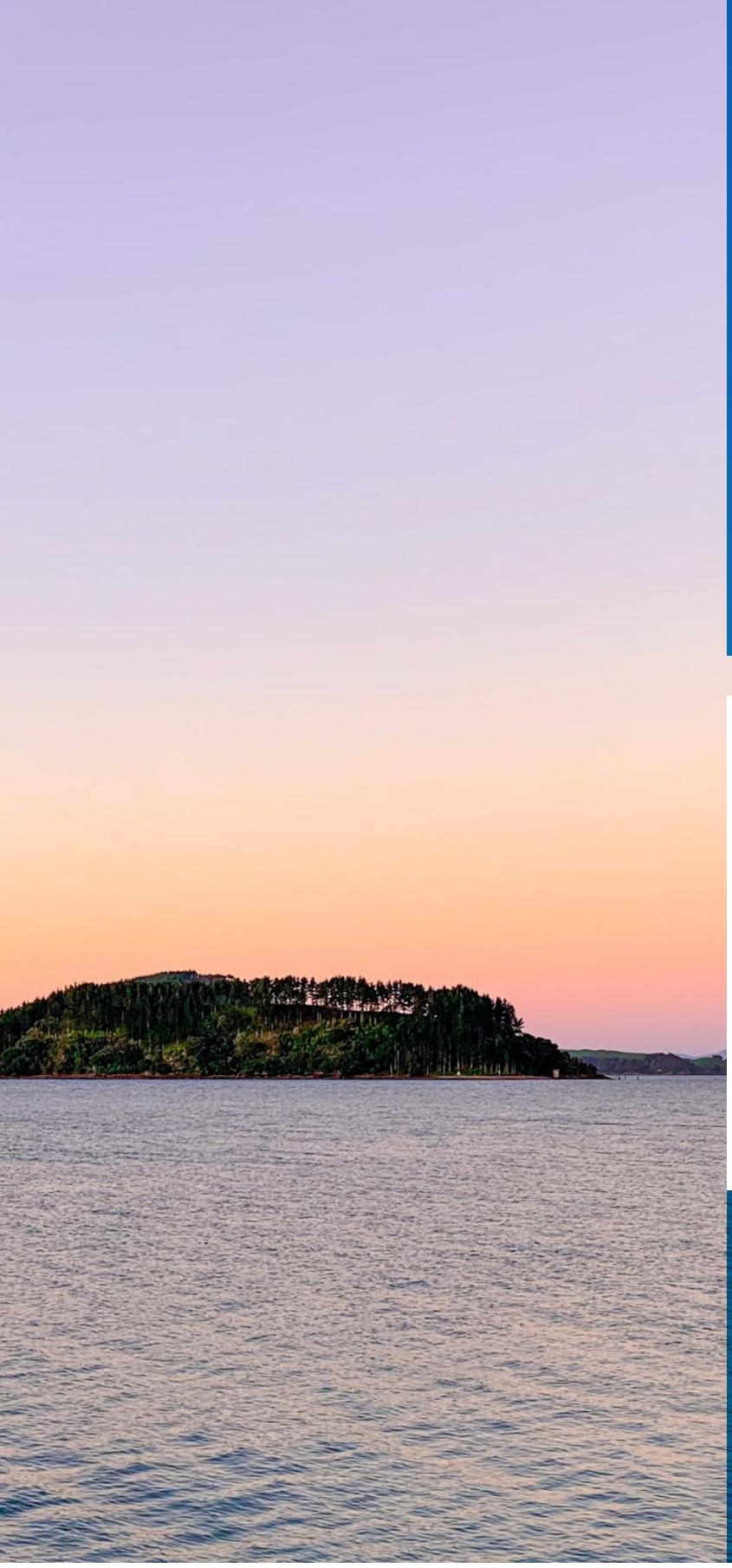


GEF IW:LEARN

GEF Transboundary Diagnostic Analysis/ Strategic Action Programme Manual

TDA-SAP Methodology

gef

IW LEARN

UNDP
Empowered lives.
Resilient nations.

UNESCO
United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

UN environment
United Nations Environment Programme

ACKNOWLEDGEMENTS

The process of undertaking a Transboundary Diagnostic Analysis (TDAs) to understand the causes of impacts in basins (freshwater lakes, aquifers and rivers) and Large Marine Ecosystems to develop a regional agreed action plan to mitigate the problems causing the impacts through a regional Strategic Action Programme (SAP), has been applied with GEF projects for over 20 years.

The first guidance documents and associated training material was prepared in the early 2000s and this was substantially revised by Martin Bloxham for GEF IW:LEARN in 2010 following the 6th GEF International Waters Conference in Dubrovnik, Croatia.

In 2017 recognising the significant additional information and guidance to support the TDA/SAP process had been prepared or was in preparation GEF IW:LEARN initiated an additional update incorporating information prepared specifically for IW:LEARN (e.g. Economic Valuation of Ecosystems and Gender Mainstreaming), LME:LEARN (toolkits and other guidance specifically aimed at LMEs) and recent GEF projects (e.g. Transboundary Waters Assessment Programme (TWAP) that addressed all waterbody types through a global assessment and Floods and Droughts project that provides tools for freshwater projects).

Multiple partner organisations within the GEF IW community, GEF IW projects, project staff, technical experts, and the GEF Secretariat have contributed to this IW:LEARN updated TDA/SAP Guidance Document.

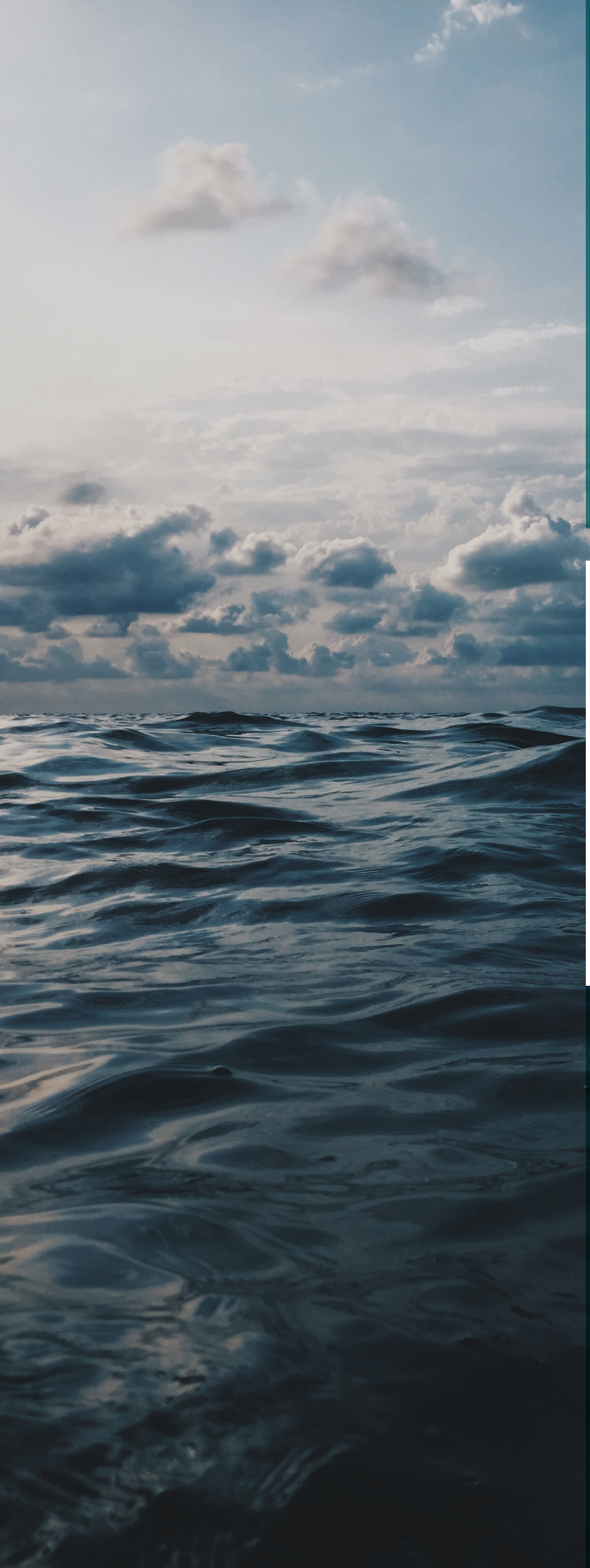
https://iwlearn.net/manuals/methodologies

Contents

This methodology is divided into three parts as follows:

List of Acronyms

ABNJ	Area Beyond National Jurisdiction
ASCLME	Agulhas Somali Current Large Marine Ecosystem
BD	Biodiversity
BSERP	Black Sea Ecosystem Recovery Project
Cap-Net	UNDP Capacity Development In Sustainable Water Management (Project)
CBA	Cost Benefit Analysis
CBD	Convention on Biological Diversity
CCA	Causal Chain Analysis
CCRF	(FAO) Code of Conduct for Responsible Fisheries
CC-M	Climate Change Mitigation
CICES EU's	Common International Classification of Ecosystem Services
CLME	Caribbean Sea Large Marine Ecosystem
CEO	Chief Executive Officer
CoP	Community of Practice (or Conference of the Parties)
DBEP	Dnipro Basin Environment Programme
DPSIR	Driver-Pressure-State-Impact Response Framework
EBM	Ecosystem Based Management
EEZ	Exclusive Economic Zone
ENSO	El Nino - Southern Oscillation
EQO	Ecosystem Quality Objective
EU	European Union
EV	Economic Valuation
FDMT	Floods and Droughts Management Tools (Project)
FREPLATA	La Plata Maritime Front (Project)
FSP	Full Sized Project
GCLME	Guinea Current Large Marine Ecosystem
GDP	Gross Domestic Product
GEF	The Global Environment Facility
GEF	Global Environment Facility
GEFSEC	Global Environment Facility Secretariat
GINI	Generalized Inequality Index
GIS	Geographic Information System
GIWA	Global International Waters Assessment
GWP	The Global Water Partnership
ICM	Integrated Coastal Management
ILBM	Integrated Lake Basin Management
ILEC	International Lake Environment Committee
IPBES	UN's Intergovernmental Platform on Biodiversity and Ecosystem Services
ISA	Integrated Systems Analysis
IUU	Illegal Unreported Unregulated (Fishing)
IW	International Waters
IW:LEARN	International Waters: Learning Exchange and Resource Network
IWRM	Integrated Water Resource Management
LCBC	Lake Chad Basin Commission
KM	Knowledge Management
LME	Large Marine Ecosystem
MAES	EU´s Mapping and Assessment of Ecosystems and their Services
MAP	Mediterranean Action Programme
MCA	
MPA	Marine Protected Area
MSP	Medium Sized Project
M&E	Monitoring and Evaluation
NGO	Non-Governmental Organisation
NSAS	Nubian Sandstone Aquifer System
OPS	Operational Performance Study
PCU	Project Coordination Unit
PDF	Project Development Fund
PIF	Project Identification Form
PIR	GEF Project Implementation Report
PM	Project Management
POP	Persistent Organic Pollutant
PPG	Project Preparation Grant
PSC	Project Steering Committee
QA	Quality Assurance
QC	Quality Control
QO	Quality Objective
RCA	Root Cause Analysis
RDM	Reference Data Model
RFMO	Regional Fisheries Management Organization
SADA	Shared Aquifer Diagnostic Analysis
SAP	Strategic Action Programme
SDG	Sustainable Development Goal
STAG	Stakeholder Advisory Group
STAP	GEF Scientific Technical Advisory Panel
TDA	Transboundary Diagnostic Analysis
TEEB	The Economics of Ecosystems and Biodiversity
TEV	Total Ecosystem Value
TTT	TDA Technical Task Team
TWAP	Transboundary Waters Assessment Programme
TWM	Transboundary Water Management
UNFCCC	United Nations Framework Convention on Climate Change
UNDAF	United Nations Development Assistance Framework
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
WCR	Wider Caribbean Region
WFD	(EU) Water Framework Directive
WRIAM	Water Resource Issues Assessment Method
WRO	Water Resource Objective



GEF IW:LEARN

GEF Transboundary Diagnostic Analysis/ Strategic Action Programme Manual

Part 1
Introduction to the TDA/SAP Process

Contents

List of Figures and Tables

Summary

This is the first of three Parts that makes up the GEF Transboundary Diagnostic Analysis/Strategic Action Programme (TDA/SAP) Manual. It presents an introduction to International Waters and the TDA/SAP process. It describes what International Waters are and why are they important, and why the GEF is interested in them. It then outlines the TDA/SAP process as a tool for IW management, presents a brief history of the TDA/SAP process, gives examples of TDA/SAP processes in action and finally describes the current GEF approved version of the TDA/SAP process.

The two following parts delve deeper into the TDA/SAP Process. Part 2 presents a 'How to' Guide to TDA/SAP development – a simple, non prescriptive stepwise approach that many projects have followed over the last 10 years, including references and links to best practices and experiences from a wealth of completed and on-going projects. Part 3 focuses in on planning the TDA/SAP Process. In particular, it looks at the key steps in managing the TDA and the SAP and meeting/workshop design to ensure the TDA and the SAP processes are as collaborative as possible.

- The TDA/SAP Guidance Manual (significant changes in Part 2) has been updated by GEF IW:LEARN in 2018 to enhance the information and to incorporate guidance on ecosystem valuation approaches, gender mainstreaming and links to ecosystem specific considerations and indicators. These updates are based-on recent GEF global projects that have led to increased understanding of these issues and best practices from SAP implementation. GEF projects delivering this additional guidance, which is summarised in the TDA/SAP manual, include:
- GEF LME:LEARN (with specific tools and guidance for LME projects)
- GEF Transboundary Waters Assessment Programme (TWAP) information and guidance from an application of methodologies to assess transboundary water bodies (aquifers, lakes, rivers, and LMEs) including indicator for these waterbodies;
- GEF Floods and Droughts (delivering tools and approaches for freshwater assessments and management that are highly relevant to the development of TDA/SAPs and their subsequent implementation)

Links and summary details are presented throughout the guidance document supported by four annexes to provide additional brief information on the IW:LEARN supported work on Economic valuation of ecosystems, Gender Mainstreaming, and the GEF TWAP and Floods and Drought projects.

1. International Waters

1.1 What are International Waters and why are they important?

In the context of this manual, International Waters are transboundary water systems which include: river basins where water flows from one country to another; multi-country lake basins; groundwater resources shared by several countries; or large marine ecosystems (LMEs) bounded by more than one nation. These large International Water systems, which cover most of our planet, do not respect political borders. They are often managed in a national and fragmented way that impacts on environmental goods and services, endangers the food supply and affects the livelihoods of billions of people. By exploiting these shared resources in unsustainable ways, humanity faces a potentially difficult future characterized by the depletion of water and marine resources, increased poverty, and greater conflict.

International waters are important because nearly half of the world's population is located within one or more of the 263 international drainage basins shared by two or more states. Even more striking than the absolute number of international drainage basins, is a breakdown of each nation's land surface that fall within these watersheds1.

- At least 145 nations include territory within international basins.
- At least 21 nations lie in their entirety within international basins
- 33 countries have greater than 95% of their territory within these basins
- 19 international drainage basins are shared by 5 or more riparian countries
- The Danube alone has 17 riparian nations
- The Congo, Niger, Nile, Rhine and Zambezi are shared by between 9 and 11 countries
- The remaining 13 basins have between 5 and 8 riparian countries
- The 64 LMEs produce 95 % of the world's fish catch

Groundwater resources, which account for more than one hundred times the amount of surface water, and cross under at least 273 international borders are even more challenging and it is critical to co-manage such water systems sustainably. Furthermore, all LMEs are ultimately affected by both surface water and groundwater systems.

1.2 Threats to International Waters

The threats placed on International Waters are considerable. Demands for freshwater continue to rise, resulting in competition among key sectors and ultimately between countries that share transboundary freshwater systems. In parallel, the human demand for protein from marine waters and pollution releases place stress on both coastal and ocean systems.

The environmental, social and economic impacts are all too apparent—depleted and degraded surface waters, aquifers, and marine ecosystems that have adverse impacts on human and ecosystem health, food security, and social stability. In addition, changes in global hydrologic cycles driven by changes in climate and climatic variability deepen poverty, reduce food supplies, damage health and further threaten political and social stability.

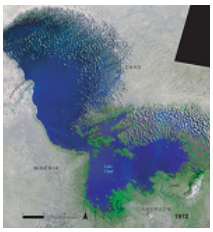
1.3 The GEF and its interest in International Waters

As described above, freshwater, groundwater and marine systems together with their living resources know no borders. With 70 % of the Earth being ocean and 60 % of the land lying in cross-border surface and groundwater basins2, most water systems on Earth are transboundary – and thus are at the heart of the GEF International Waters mandate .

Transboundary waters cover "boundary" water resources where the boundary between two or more sovereign states is formed by an LME, an international lake or river, and "successive" water resources where an international river (or underground aquifer) flows from one sovereign state to another.

The Black Sea: Bulgaria, Romania, Ukraine, Russia, Georgia and Turkey

The Yellow Sea LME: China, North Korea and South Korea



Lake Chad: Chad, Cameroon, Niger and Nigeria

The Guarani Aquifer: Argentina, Brazil, Paraguay and Uruguay

The Mekong River: China, Burma, Laos, Thailand, Cambodia and Vietnam

Figure 1: Examples of transboundary water systems

The GEF International Waters Focal Area was established to enable countries to collectively manage their transboundary surface water basins, groundwater basins, and coastal and marine systems through the implementation of policy, legal, and institutional reforms and investments contributing to sustainable use and the maintenance of ecosystem services. To achieve this the GEF is currently working toward the following objectives during its current funding cycle (GEF 7[2]):

1 The GEF use of the term "international waters" is at variance with its use under the United Nations Convention on the Law of the Sea (UNCLOS) where the term 'High Seas' (equivalent to the "international waters" of previous maritime conventions) is restricted to marine waters beyond those within national jurisdiction and the exclusive economic zones of states.

2 GEF 7 Replenishment Programming Direction: https://www.thegef.org/sites/default/files/council-meeting-documents/GEF-7%20Programming%20Directions%20-%20GEF_R.7_19.pdf

Objective 1. Strengthening Blue Economy opportunities

The Blue Economy concept identifies the oceans as areas for potential sustainable development of existing and new sectors, including tourism, extractive industries, renewable energy production, fisheries and aquaculture, coastal development and marine transport. To foster innovation towards more sustainable use of marine and coastal resources there is a need for coastal and island nations to deploy a suite of tools, among them marine spatial planning. These tools will foster a holistic understanding of the opportunities and constraints that lies within Exclusive Economic Zones (EEZs) to inform policy formulation, adoption and investment processes towards long-term environmental sustainability. Strengthening blue economy opportunities, require regional cooperation and national action.

The GEF will assist countries in identifying sustainable public and private national investments within the Blue Economy space, through funding of collective management of coastal and marine systems and implementation of the full range of integrated ocean policies, legal and institutional reforms. This will be done in tandem with catalyzing regional processes, such as the Transboundary Diagnostic Analysis/Strategic Action Program (TDA/SAP) in order to advance cooperation in Large Marine Ecosystems. Roughly 100 GEF-eligible nations have been reaching agreements, via TDA/SAPs to improve ocean management, via national and regional activities and agreements.

GEF-7 presents a unique opportunity to assist countries in addressing a suite of stressors such as overfishing, land-based sources of pollution, loss and damage of key coastal and marine ecosystems through a combination of national and regional investments towards strengthening national Blue Economy opportunities. In GEF-7, investments will be strengthening nations Blue Economy opportunities, through three areas of strategic action: 1) sustaining healthy coastal and marine ecosystems; 2) catalyzing sustainable fisheries management; and, 3) addressing pollution reduction in marine environments. Sustaining healthy coastal and marine ecosystems

Objective 2. Improve management in the Areas Beyond National Jurisdiction (ABNJ)

The complex ecosystems in the ABNJ include both the water column and seabed making the sustainable management of fisheries resources and biodiversity conservation especially challenging. Urgent action is needed to improve conservation and sustainable use of the open oceans that covers 40% of the planet, and are increasingly threatened by over-fishing of iconic pelagic migratory species, maritime navigation, ocean energy facilities, bottom trawling on seamounts, pollution and extraction of minerals and hydrocarbons.

Building on GEFs past experience in successfully supporting an applied ecosystem-based approach to fisheries management of deep sea fisheries, including seamounts, as well as regional tuna fisheries management organizations in ABNJ. The GEF intends through this strategic objective to renew its efforts within the ABNJ space. In GEF-7 support will be given to foster information sharing to promote sustainable practices and inform decision-making by private businesses and regional organisations such as, LME commissions, RFMOs or the Regional Seas program. Addressing fisheries and in particular IUU fishing in the high seas will also continue to be a high priority. GEF investments will assist capacity building among concerned states and organisations and foster public private partnerships between the RFMOs and the large commercial fishing fleets harvesting in the high seas and its associated supply chain. Finally, GEF investments will facilitate cooperative frameworks between the ABNJs and the Large Marine Ecosystems that they border, to improve management opportunities and cohesion between these two interdependent management frameworks.

Objective 3. Enhance water security in freshwater ecosystems

Shared freshwater resources comprise a special case for cooperation with large potential spill-over and global impacts. Transboundary river basins cover about 50% of the earth's land surface and are home to about 40% of the world's population. 1.2 billion people live in river basins where human water use has surpassed sustainable limits. Cooperation on water, therefore, is 'a must' in most international basins to support the need for water, food, energy, and ecosystems security and increase resilience for each nation. The need for transboundary cooperation, therefore, has been anchored in the SDGs as an essential element for effective integrated water resources management (SDG 6.5). Shared groundwater resources are especially hard to manage due to the limited knowledge of the resource and its 'invisibility'. With mounting pressures on water resources and increasing pressures from climate variability and change managing surface and groundwater is the only sustainable path. Both cooperation on water quantity and quality are of key concern – impacting people and environmental assets of global significance, including wetland biodiversity, freshwater fish stocks, and unique aquatic and terrestrial habitats. IW support in freshwater basins will therefore focus on three areas of strategic action: 1) advance information exchange and early warning; 2) enhance regional and national cooperation on shared freshwater surface and groundwater basins; and, 3) invest in water, food, energy and environmental security.

2. The TDA/SAP

2.1 TDA/SAP - A planning tool for IW

The Transboundary Diagnostic Analysis/Strategic Action Programme (TDA/SAP) approach is a highly collaborative process that has proven to be a major strategic planning tool for GEF International Waters Projects over the last 16 years[3].

The main technical role of a TDA is to identify, quantify, and set priorities for environmental problems that are transboundary in nature. In particular, the TDA aims to:

- Identify & prioritise the transboundary problems.
- Gather and interpret information on the environmental impacts and socio-economic consequences of each problem.
- Analyse the immediate, underlying, and root causes for each problem, and in particular identify specific practices, sources, locations, and human activity sectors from which environmental degradation arises or threatens to arise.

Ultimately, a TDA provides the factual basis for the formulation of an SAP but the TDA is also part of a larger facilitative process of engagement and consultation with all the key stakeholders from the initial TDA steps through to the subsequent development of alternative solutions during the formulation of the Strategic Action Programme. The TDA is a mechanism to help the participating countries to 'agree on the facts' - many conflicts are driven by perceptions and removing these can be an enormous step in itself. Furthermore, the TDA should be seen as more than just an analysis of data and information. It is a powerful process that can help create confidence among the partners involved.

The SAP is a negotiated policy document that should be endorsed at the highest level of all relevant sectors of government. It establishes clear priorities for action (for example, policy, legal, institutional reforms, or investments) to resolve the priority transboundary problems identified in the TDA. A key element of the SAP is a well-defined baseline. This enables a clear distinction between actions with purely national benefits and those addressing transboundary concerns with global benefits. Another key element involves the development of institutional mechanisms at the regional and national levels for implementing the SAP and monitoring and evaluation procedures to measure effectiveness of the outcomes of the process.

The following are some of the key underlying principles incorporated into the TDA/SAP approach:

- Adaptive management
- The ecosystem approach
- Sustainable development
- Poverty reduction
- Gender mainstreaming
- Climate variability and change
- Collaboration
- Stakeholder consultation and participation
- Stepwise consensus building
- Transparency
- Accountability
- Inter-sectoral policy building
- Donor partnerships
- Government commitment

These key underlying principles are described in more detail in Annex 1 at the end of this part.

2.2 TDA/SAP – A history

The first TDA to be developed under a GEF funded project was the 1996 Black Sea TDA. At the time it was considered to be ground-breaking in its approach and was subsequently used as the template for a number of other TDAs during the late 1990's and early 2000's. The subsequent Black Sea SAP, endorsed by all the countries, was less successful – it was considered to be overly ambitious and presented the region with an almost unobtainable vision for the Black Sea that resulted in poor implementation of the SAP over the following decade.

From 1997 onwards, a number of other GEF IW projects developed TDAs and SAPs based on the Black Sea approach. These included Lake Tanganyika, the Benguela Current LME, the Mediterranean Sea, the Volta River, San Juan River, the Western Indian Ocean and the Yellow Sea LME, amongst others.

At this time, the GEF developed the first set of Operational Programs4 for International Waters which made reference to the "conduct of a transboundary diagnostic analysis (TDA) to identify priority environmental concerns" and the formulation of "a Strategic Action Program (SAP) of actions each country needs to take to address priority transboundary concerns[5]."

In 2001, the GEF commissioned a comprehensive programme study for its then Operational Programmes 8 and 96. The Programme Study found that the emphasis on undertaking a science-based TDA prior to the design of a SAP was appropriate for projects in these Operational Programs. In addition, the Programme Study found that there were a variety of ways in which a TDA could be conducted. Some were more resource-intensive than others, but usually offered advantages in providing greater insight and specificity, thereby providing an improved information base for the formulation of the SAP. However, it also concluded that there needed to be more GEF guidance regarding the nature of TDAs and the manner in which they lead to, and are distinct from, the development of SAPs.

From 2000, a number of projects had started to develop TDAs that were different from the Black Sea model. These included the Bermejo River, the Caspian Sea and the Dnipro River Basin. The inspiration for these was a simplified version of the methodology developed for the Global International Waters Initiative (GIWA). GIWA attempted to use a generic TDA methodology as a means of identifying the likely priority problems impacts and causes in transboundary marine and freshwater basins throughout the globe.

As a consequence of the 2001 GEF Programme Study and the development of the GIWA methodology, the GEF, together with UNDP, UNEP and the World Bank, contracted international experts to develop a set of more formal guidelines to assist with the preparation of a TDA and formulation of a SAP. The GEF IW TDA/SAP "best practice" approach7 was drafted in 2002 and although it was not an official policy document of GEF, became the de facto GEF TDA/SAP Methodology3.

In conjunction with this formalised GEF IW TDA/SAP "best practice" approach, a training course was funded by GEF/UNDP under the UN/TRAIN-SEA-COAST Programme and developed by the Marine and Coastal Policy Research Group based at the University of Plymouth, UK during 20038.

Since 2005, a considerable number or projects have used the GEF TDA/SAP best practice approach. These include: the Dnipro River Basin, the Mediterranean Sea (MAP), the Kura Aras River Basin, the Gulf of Mexico LME, the Black Sea (BSERP), Lake Chad, the Rio de la Plata (FREPLATA), the Nubian Aquifer (NSAS), Yellow Sea LME, the Orange-Sengu River Basin, the Caribbean LME, and the Bay of Bengal LME, amongst others3. Table 1 lists completion dates for TDAs and SAPs from a number of water systems over the period 1996 to 2017.

	TDA	SAP
Amazon River	2015	2017
Arafura and Timor Seas	2012	2014
Agulhas-Somali Current LME	2012	2014
Benguela Current LME	1999	1999 2014
Black Sea	1996 2007	1996 2009
Bay of Bengal Sea	2012	2015
Caspian Sea	2002	2006
Canary Current LME	2016	2016
Caribbean LME	2011	2013
Danube	2006	2009*
Dnipro	2003	2004
Río de la Plata and its Maritime Front (FrePlata)	2006	2007
GCLME	2005	2008
Guarani Aquifer	2007	2009
Gulf of Mexico	2007 2011	2012
Humboldt Current LME	2015	2016
Iullumenden	2007	
Kura	2013	2014
Kura - Aras	2006	2007
Lake Baikal	2013	2015
Lake Chad	2007	2009
Lake Peipsi/Chudskoe	2005	
Prespa	2009	2010
Lake Shkodra/Skadar	2016	2016
Lake Tanganyika	1999	2000
Lake Victoria	2006	2007
Mediterranean Sea	1997 2001 2006	2003
Niger River	2009	2010
Nubian Aquifer	2010	2013
Okavango - Cubango	2011	2013
Orange – Senqu River	2008	2014
Rio de la Plata		
Senegal River	2007	2008
South China Sea	2000	2008
Sulu Celebes Sea	2013	2013
Tisza River	2007	2010
Volta River		2009
Western Indian Ocean	1998 2010	2002 2010
Yellow Sea LME	2000 2007	2009

* The Danube River Basin prepared a River Basin Management Plan consistent with the European Union's Water Framework Directive which has a similar purpose to the SAP

Table 1: Completion dates for TDAs and SAPs between 1996 and 2017

2.3 Examples of the TDA/SAP process in action

Black Sea Rehabilitation Project (BSERP)

This 2007 Black Sea TDA was developed in order to update the 1996/1999 Black Sea Strategic Action Programme. The original TDA was developed in 1996, the first of its kind for the GEF. The 1996 Black Sea TDA was a technical document, which examined the root causes of Black Sea degradation and options for actions that could be taken to address them.

The 2007 Black Sea TDA was expected to build on the existing 1996 document and it was anticipated that it wouldn't adhere to the previous TDA development process (the general model used in 1st phase International Waters projects). The final document followed the 2005 GEF IW TDA/SAP "best practice" approach: identification and initial prioritisation of transboundary problems; gathering and interpreting information on environmental impacts and socio-economic consequences of each problem; causal chain analysis (including root causes); and completion of an analysis of institutions, laws, policies and projected investments.

TDA development was carried out with the involvement of all stakeholders using scientific cruise data, existing monitoring information at the national level, expert meetings, international expertise, and local knowledge from different stakeholders. During the process of TDA development, a series of thematic reports, including a hot spot analysis, governance and institutional analysis, stakeholder analysis, and a Causal Chain Analysis (CCA) were drafted through an iterative and consultative process, with several versions being developed after successive consultations with international consultants and national experts.

The TDA document, although highly detailed, logically laid out and easy to navigate, was the result of a very time consuming and resource depleting process. Consequently, there was not enough time available within the project to complete and endorse the SAP – not an uncommon issue within IW projects. A solution was found that involved the development of a 'technical' SAP, which consisted of the key SAP components (Vision, Goals, Actions). This document did not undergo any national or regional consultation by the closure of the project and was passed to the Black Sea Commission to continue the process. The SAP for the Environmental Protection and Rehabilitation of the Black Sea was finally adopted in Sofia, Bulgaria, in April 2009.

Conclusion:

- The Black Sea TDA was the product of a very collaborative process.
- It conformed to the 2005 best practice approach.
- It was very logical, highly detailed and the data and information was quality controlled.
- The TDA was adopted by the steering committee and the participating countries.
- However, too much time was spent on the TDA (22 months) and consequently the SAP was not completed or endorsed within the timescale of the GEF IW project.

Kura-Aras River Basin

The 2006 Kura-Aras River Basin TDA was developed during the project development phase using PDF funding (Project Development Fund). This project was challenging due to the countries involved (Georgia, Armenia, Azerbaijan and Iran), as well as funding levels and the project design.

Again, the TDA followed the 2005 GEF IW TDA/SAP "best practice" approach: identification and initial prioritisation of transboundary problems; gathering and interpreting information on environmental impacts and socio-economic consequences of each problem; causal chain analysis (including root causes); and completion of an analysis of institutions, laws, policies and projected investments.

During the TDA development, 4 country specific reports (termed national TDAs) and a number of thematic reports were drafted through an iterative and consultative process involving the TDA 'technical task team', the Project Management Unit and hired consultants (both regional and international).

Although there was limited data and information and a lack of comparability between data sets from upstream and downstream countries (particularly relating to flow rates and pollution loads), the TDA document was clear, logical and easy to navigate. In addition, it was completed in approximately 12 months, partly due to good project management and partly due to a highly motivated team.

Due to the limited time available during the PDF phase, a preliminary SAP document was developed in 2006 (Vision, EcoQOS, Targets), which it was hoped would help bridge between the PDF phase and subsequent Full Project implementation.

In 2012, a Full Project for the Kura-Aras River (Georgia, Armenia, Azerbaijan) commenced and an early outcome of the project has been the revision of the 2005 TDA, using the same basic format but with more recent, and better quality controlled data and information. The project delivered a SAP (endorsed by Georgia and Azerbaijan) leading to a GEF SAP implementation supported project in 2016.

Conclusion:

- The Kura Aras River Basin TDA was the product of a well-managed, collaborative process.
- It was clear and well laid out and conformed to the 2005 best practice approach.
- The TDA was adopted by the steering committee and the countries.
- It provided a good foundation for the Full Project.
- Limited funds meant there was not enough time to fully QC data and information.
- A forceful management style resulted in delivery of the TDA but with some collateral damage amongst the stakeholders.

Lake Chad

The objective of the Full-Sized Lake Chad project was to build capacity within the Lake Chad Basin Commission (LCBC) and its national committees, so that it could better achieve its mandate of managing land and water resources in the greater Conventional Basin of Lake Chad. The Project initially ran into difficulties due to poor project management, successive project managers and a general lack of strategic direction, particularly with reference to the TDA.

After a difficult and poorly planned start, the TDA Technical Task Team participated in TDA/SAP training using the 2005 GEF IW TDA/SAP "best practice" approach and redesigned the TDA accordingly. During the process of TDA development, country specific reports (termed national TDAs) were drafted and information from these was used to develop the regional Lake Chad TDA.

There were significant issues around availability and quality of data and information (particularly from CAR, Chad and Niger). In addition, a single consultant from Nigeria, aided by an international consultant, drafted the TDA and there was little collaboration with the countries, beyond an initial TDA meeting. However, the final TDA was presented in a very clear, logical and manner, within 18 months.

Based on the findings of the TDA, the SAP was completed as a regional policy framework for the Lake Chad Basin in 2007. The SAP was a well defined, aspirational but reasonably achievable document and as a consequence was endorsed by the Council of Ministers in June 2008. However, the Investment Plan for SAP implementation was not developed within the duration of the project.

Conclusion:

- The final Lake Chad TDA was an acceptable document that conformed to the 2005 best practice approach.
- The TDA was adopted by the steering committee and the countries.
- It provided a good foundation for SAP development.
- Despite many challenges, a fully endorsed SAP was produced within the timeframe of the project.
- However, the TDA and SAP process were driven by external consultants rather than the Project Coordination Unit (PCU) and the countries, which resulted in a lack of collaboration and consultation.

Rio de la Plata Maritime Front (FREPLATA)

The FREPLATA program was a bi-national initiative that culminated in the endorsement of a SAP by a comprehensive range of 37 key stakeholders including 9 ministries, the navy, coast guards, provincial and local authorities, and private sector representatives. This constituted the broadest SAP endorsement in UNDP's IW history and was a significant achievement for the GEF IW portfolio.

During the first phase of the full project, the PCU and a team of national experts developed an initial TDA document in Spanish. This document was long (approx 300 pages), not particularly well structured and was considered to be unacceptable for decision makers.

As a result, a TDA for policy makers was produced in 2006 that presented a non-technical summary of the main points of the more extensive TDA published in the Spanish language. It was designed to inform policymakers and other interested groups and to facilitate their participation in the second stage of FREPLATA, the design of a SAP that includes specific measures to address the problems identified in the TDA. This document conformed to the 2005 best practice approach, was reasonably short and concise, although rather academic in places. A key to the success of this TDA was the use of GIS maps to describe the both the transboundary problems, and their causes and impacts – something that has not been replicated since.

Conclusions:

- The original FREPLATA TDA was overly long and difficult to navigate.
- The clever use of resources to develop a TDA for policy makers resulted in a highly effective TDA document.
- The TDA for policy makers provided a good foundation for SAP development, which resulted in the SAP being endorsed by a wide range of stakeholders from both countries.

Nubian Sandstone Aquifer System (NSAS)

The Nubian Aquifer Sandstone Project was launched in July 2006 with four key objectives, three of which included: (1) The preparation and agreement on a Shared Aquifer Diagnostic Analysis (SADA) to jointly identify and understand threats to the NSAS and their root causes; (2) The preparation of a SAP to outline the necessary legal, policy and institutional reforms needed to address the priority threats and their root causes as identified in the SADA; and (3) The development of an enhanced framework for developing an agreed legal and institutional mechanism towards joint management of the shared NSAS.

The NSAS TDA, titled as a Shared Aquifer Diagnostic Analysis in recognition that the water related environmental problems facing the aquifer were shared or common rather than transboundary, was developed using the 2005 GEF Best Practice approach as a starting point. The project encountered a number of difficulties, including a lack of a PCU in any of the participating countries (the project manager was based at the IAEA in Vienna), poor project management and a general lack of strategic direction, particularly with reference to the SADA and SAP.

A short and rather limited TDA was produced that lacked data due to the nature of the system and the lack of available data from the participating countries. However, it was reasonably logical, gave direction for the SAP process that was to follow, and importantly helped the four participating countries develop a sense of participation and collaboration during the process.

The SAP produced was a framework document that presented a vision, Water Resource/Ecosystem Quality Objectives (WR/EcoQOs) and high-level management targets/actions associated with each Quality Objective. The SAP process proved to be challenging but the four participating countries endorsed the resulting SAP in 2012.

Conclusions:

- The NSAS SADA was a short document conforming loosely to the 2005 best practice approach.
- Although limited in data and information, it provided a suitable foundation for SAP development.
- The SAP was a high level document, again with limited detail but it was endorsed by the participating countries.
- The TDA and SAP process needed to be driven by external consultants due to poor project management, which resulted in poor engagement with the participating countries.

Dnipro River Basin

The Dnipro Basin Environment Programme (DBEP) project was established by the three riparian countries to develop a TDA for the Basin and to achieve agreement on a SAP for protection and recovery of the river and its tributaries. The DBEP project was implemented during a time of considerable change in the region. In particular, the political and economic relationships between the three former Soviet republics changed dramatically. A decision was reached prior to project launch that the effort should proceed despite there being no legal basis in place for joint development and implementation of a Dnipro SAP. Even without a formal legal basis, the DBEP created and maintained strong country buy-in and ownership, in part due to good project management by the PCU at the time.

During the process of TDA development, nine initial chapters/reports were produced by Regional Thematic Centres and constituted the bulk of the information for the TDA. The TDA process was informed by the GIWA methodology as it was produced before the GEF TDA/SAP best practice approach had been drafted. The development phase was highly participatory - all three countries were fully involved, and there was a strong lead from the project management unit, the TDA 'technical task team', and hired consultants (both regional and international). The final document, published in 2003, was overly long (180 pages) but was very logically laid out and relatively easy to navigate, although there has been some criticism of the overly technical causal chains.

During 2003, the 'Kyiv Declaration on Cooperation in the Dnipro Basin' was signed at the 5th Pan-European meeting of European Environment Ministers in Kyiv. The Kyiv declaration signalled a "readiness" to prepare an international agreement to serve as the main organisational mechanism for ensuring "stable international cooperation" amongst the Dnipro Basin countries, and to define "general principles, goals, objectives and commitments of the signatories in the sphere of Dnipro basin environmental rehabilitation".

SAP development commenced accordingly and due in part to the 'esprit de corps' developed during the TDA phase, a full SAP document was produced which was considered aspirational, ambitious, yet attainable. However four years later, and two years beyond project completion, the Dnipro countries were still discussing how to proceed with the international agreement. Initially, Russia indicated its interest to delay the agreement pending further consideration of the financial implications. Then, during June 2007, the three environmental ministers from Russia, Belarus and Ukraine planned to sign a "Ministerial Declaration on Further Development of Cooperation on the Protection of the Dnipro River Basin", including joint Ministerial approval of the Dnipro SAP. Unfortunately, the signing of the Declaration was refused by the Russian government, resulting in a new Declaration being signed on 17 July 2007 by Ministers on environmental protection of Ukraine and Belarus. This event couldn't be overestimated: Ukraine and Belarus officially adopted the SAP and confirmed their joint course on establishment of Dnipro basin international institutional management mechanisms.

Conclusions:

- The Dnipro River Basin TDA was the product of a well-managed, collaborative process.
- It was clear and well laid out and informed the 2005 GEF best practice approach.
- The TDA was adopted by the steering committee and the countries.
- It provided a good foundation for the SAP – not only technically but also due to the good relationships that developed during its formulation.
- The SAP document was well constructed but took a number of years to endorse and ten by only 2 out of the 3 riparian countries involved.

Caribbean LME

The CLME Project, launched in 2009, aims to assist the participating countries from the Wider Caribbean Region (WCR) to improve the management of their shared living marine resources - most of which are considered to be fully or overexploited - through an ecosystem-based management (EBM) approach. In particular, the CLME Project aims to facilitate the strengthening of the governance of key fishery ecosystems in the WCR, at the regional, sub-regional and national levels.

During the project preparation phase (2007), a preliminary TDA was prepared which followed the 2005 GEF IW TDA/SAP "best practice" approach. However, upon commencement of the Full Project, the TDA Technical Task Team (TTT) and the Stakeholder Advisory Group (STAG) modified the methodology to focus the CLME TDA on specific fishery ecosystems rather than geographical sub-regions. Three specific ecosystems (continental shelf, pelagic and reef ecosystems) were agreed as the focus of three ecosystem based TDAs. In addition, draft casual chain analyses for the three systems were prepared, reviewed, validated and prioritized using the Global International Waters Assessment (GIWA) methodology.

Due to significant staff changes in the Project Management Unit during the development of the TDA, together with the geopolitical complexity of the region (27 independent States and more than 10 dependent territories border or are located within the marine area covered by the project), the regional TDA was delivered later than anticipated. As a consequence there was limited time available for the development of the SAP, which was approved as a 'high level' document by the project steering committee in early 2013. By May 2017 26 independent countries and 18 overseas territories endorsed the document with SAP implementation being supported through a follow-on GEF project.

Conclusion:

- The CLME Regional TDA and 3 ecosystem TDAs were the product of a very collaborative process.
- They conformed to the 2005 best practice approach but the methodology was modified to focus the CLME TDA on specific fishery ecosystems rather than geographical sub-regions – a unique approach.
- All documents produced were clear and well laid out.
- The TDA was adopted by the steering committee and the participating countries.
- The SAP is a high level document with limited detail.
- However, too much time was spent on the TDA (24 months) with limited time and resources available for the completion of the SAP.

2.4 TDA/SAP – A GEF Approved Tool

> *"…. the GEF Transboundary Diagnostic Analysis (TDA)/Strategic Action Programme (SAP) process is an appropriate tool for ensuring robust science-based transboundary water body assessment and management, offering a sound methodology for linking science to policy……"*
>
> *Conference Statement*
> ***GEF IW Science Conference,*** *Bangkok, 2012*

In 2011, a consultation paper was prepared during the initial phase of the IW:LEARN Full Sized Project titled "Strengthening IW Portfolio Delivery and Impact"3. The consultation paper aimed to review the current best practice approach and training course and provide a critical analysis of their strengths and weaknesses prior to the revision of the TDA/SAP methodology and training course.

The findings of the paper indicated that although the current TDA/SAP approach has its limitations, it was simple and easy to understand and relatively straightforward to apply. It also stated that although there were areas of the methodology that required substantial changes, the overall approach was sound and would make a good platform for a revised methodology that was fit for practice and met the requirements of GEF, the Agencies and IW projects. It was also proposed that the revised TDA/SAP Methodology would be drafted into a single substantive handbook or manual, which would describe all stages of the TDA/SAP process in detail.

This manual, developed during the current IW:LEARN Full Sized Project titled "Strengthening IW Portfolio Delivery and Impact", presents a stepwise method for undertaking the GEF TDA/SAP approach. It is aimed at:

- New project staff (e.g. Project Management Unit staff)
- Those tasked with developing the TDA and the subsequent SAP
- Key stakeholders, including:
    - Implementing and executing agency staff
    - Government officials and civil society representatives – including those who may have to implement the SAP

It aims to be 'non-prescriptive' - there is no 'standard' approach to the TDA/SAP process: each water system and each IW Project is unique and the resultant TDA and SAP will also be unique. However, the manual provides a simple stepwise approach that many projects have followed over the last 10 years and includes references and links to best practices and experiences from a wealth of completed and on-going projects.

The manual has been developed with input from many sources: experienced project managers, international experts, common requests from existing GEF IW project staff, requests and recommendations from Implementing Agencies (IAs), Executing Agencies (EAs) and the GEF Secretariat. As such, it tries to address the many demands placed on such a guide from such a wide range of potential end-users.

It is hoped that this manual and associated training materials are: fit for purpose; simple to understand and use; stepwise in their delivery; global in their applicability; flexible in use; relevant to both scientists, stakeholders and policy makers; and ultimately produce good outcomes for international water systems

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Annex 1: Key Principles of the TDA/SAP Approach

Key Principles

The following are some of the key underlying principles incorporated into the TDA/SAP approach.

Adaptive management

Adaptive management can be defined as a systematic, rigorous approach for deliberately learning from management actions with the intent to improve subsequent management policy or practice. For the purposes of the TDA/SAP Approach, adaptive management can be described in 4-steps, shown in Figure 2.

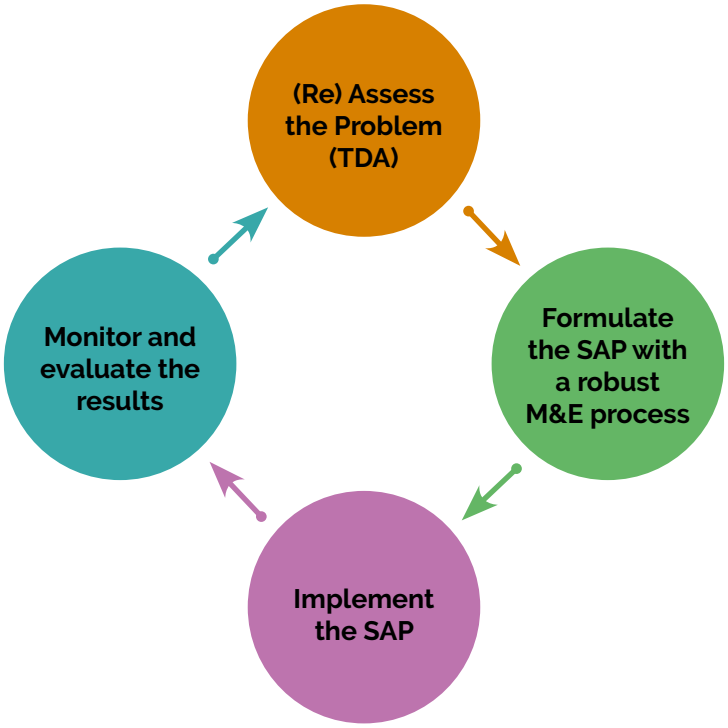


Figure 2: TDA/SAP adaptive management cycle

Simply put, the TDA/SAP adaptive management cycle involves assessing the problem (through the TDA), formulating a strategic plan with robust indicators (through the SAP), implementing the actions identified in the SAP and finally monitoring the outcomes, both short-term and long-term and adapting the plan accordingly.

The Ecosystem Approach

The ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way, and which recognises that people with their cultural and varied social needs, are an integral part of ecosystems.

It is the primary framework for action under the Convention on Biological Diversity (CBD) and comprises 12 Principles. The 12 principles have been organised by IUCN into five implementation steps, each step involving a range of actions, all of which are fully consistent with GEF IW Projects and the TDA/SAP Approach:

1. Determining the main stakeholders, defining the ecosystem area, and developing the relationship between them.
2. Characterizing the structure and function of the ecosystem, and setting in place mechanisms to manage and monitor it.
3. Identifying the important economic issues that will affect the ecosystem and its inhabitants.
4. Determining the likely impact of the ecosystem on adjacent ecosystems.
5. Deciding on long-term goals, and flexible ways of reaching them.

Sustainable Development

Sustainable development underpins all GEF IW Projects. The goal of the International Waters focal area is the promotion of collective management for transboundary water systems and subsequent implementation of the full range of policy, legal, and institutional reforms and investments contributing to sustainable use and maintenance of ecosystem services. Furthermore, sustainable development is embedded in all 4 objectives of the IW focal area and thus the TDA/SAP Approach.

Poverty Reduction

Fundamentally, poverty is a denial of choices and opportunities, and a violation of human dignity. It means lack of basic capacity to participate effectively in society. It means not having enough to feed and clothe a family, not having a school or health clinic to go to, not having the land on which to grow food or a job to earn a living, and not having access to credit. It means insecurity, powerlessness and exclusion of individuals, households and communities. It means susceptibility to violence, and it often implies living in marginal or fragile environments, without access to clean water or sanitation.

It is an aim of the TDA/SAP Approach to actively encourage poverty reduction or alleviation practices to be incorporated into the SAP development process to reduce the level of poverty in communities, regions and countries.

Gender Mainstreaming

'Gender mainstreaming' was defined by the United Nations Economic and Social Council in 1997 as 'a strategy for making women's as well as men's concerns and experiences an integral dimension of...the policies and programmes in all political, economic and societal spheres so that women and men benefit equally and inequality is not perpetuated.'

The relative status of men and women - the interaction between gender and race, class and ethnicity and questions of rights, control, ownership, power and voice - all have a critical impact on the success and sustainability of every development intervention.

GEF defines gender mainstreaming as the process of assessing the implications for women and men of any planned action, including legislation, policies or programs. It is a way to make women's as well as men's concerns and experiences an integral dimension of the design, implementation, monitoring and evaluation of policies and programs so that women and men benefit equally and inequality is not perpetuated. Equality for women and girls is a strategic and operational imperative for the GEF[1]. Men and women use natural resources differently and, as a result, they are affected differently by changes to these resources. Gender inequality and social exclusion increase the negative effects of environmental degradation on women and girls. Despite recent promising policy and legal reforms, persistent gender-discriminatory social and cultural norms, unequal access to land, water and productive assets, and unequal decision-making continue to constrain women and men from equally participating in, contributing to, and benefitting from environmental projects and programs.

It is the intention of the TDA/SAP Approach to actively encourage gender mainstreaming practices to be incorporated into the SAP development process to ensure that all individuals, male and female, have the opportunity to participate and benefit equally.

Climate Variability and Change

Climate change is now an inescapable reality. Human activity is leading to ever increasing levels of greenhouse gas emissions and steadily compromising the natural resources needed to maintain the health of the planet. Without a secure natural environment, sustainable human development is impossible and addressing climate issues is a necessary aspect within a TDA/SAP and to assist countries with achieving relevant Strategic Development Goals (SDGs).

Climate change has been recognised as a significant driver (or root cause) of a number of transboundary problems in international waters– changes in biodiversity, loss of ecosystems, eutrophication, invasive species are all affected by climate change to a great or lesser extent both currently and into the future. Consequently, the effects of climate change (in terms of cause and impact) need to be well understood during the TDA/SAP process to ensure that future interventions in GEF international waters projects are both resilient and adaptive.

1 https://www.thegef.org/council-meeting-documents/policy-gender-equality

Collaboration With Other Approaches

In order to reduce the replication of effort; encourage more efficient use of resources (financial, time and knowledge); and ensure there is no conflict between approaches, the TDA/SAP process should fully collaborate and integrate with other national, regional and international approaches, processes, initiatives or plans that have been, or are being developed for the water system. These could include, amongst others:

- The Large Marine Ecosystem (LME) Approach
- Integrated Water Resource Management (IWRM)
- Integrated Lake Basin Management (ILBM)
- Integrated Coastal Management Processes
- River Basin Management Plans

The TDA/SAP process should also be fully congruent with international conventions and non-mandatory standards such as:

- Convention on Biological Diversity (CBD)
- United Nations Framework Convention on Climate Change (UNFCCC)
- Stockholm Convention on Persistent Organic Pollutants (POPs)
- UN Convention to Combat Desertification (UNCCD)
- FAO Code of Conduct for Responsible Fisheries (CCRF)

This will encourage efficient, shared practices that impact positively on the water system at a national, regional and international level.

Stakeholder Consultation and Participation

Stakeholders are any party who may - directly or indirectly, positively or negatively – affect or be affected by the outcomes of projects or programs. Consequently, a wide range of stakeholders are involved in the TDA/SAP process. They can range from the Government, regulatory agencies, businesses, communities, civil society and NGOs.

Participation can be defined as the process through which people with an interest (stakeholders) influence and share control over development initiatives and the decisions and resources that affect them. In practice this involves employing measures to:

- Identify relevant stakeholders;
- Share information with them;
- Listen to their views;
- Involve them in processes of development planning and decision-making;
- Contribute to their capacity-building; and
- Empower them to initiate, manage and control their own self-development.

For the TDA to be objective and the SAP effective, the TDA/SAP process must develop a shared vision between stakeholders. It has to be accepted that some solutions may not be acceptable to all parties, but it is imperative that those that are eventually adopted should reflect a rigorous social assessment and be subjected to open stakeholder consultation.

Stepwise consensus building

To ensure an effective TDA/SAP Process, there is a requirement to build consensus at every step. By including clear stakeholder representation at all stages, consensus-building is more likely, increasing the probability that the outcome will be "owned" by the stakeholders and sustainable in the long-term.

Transparency

The TDA/SAP process will be in the public domain. Stakeholders should agree to freely share the necessary information and information products, taking care that full recognition is given to information sources.

Accountability

Parties committing themselves to implementing the SAP must be fully accountable for their actions. Stakeholder groups, sectors and government agencies responsible for implementing the actions proposed within the SAP must be clearly and unambiguously identified.

Inter-sectoral policy building

Responsibilities for water resources development and management are often fragmented over many sectors. Solutions should be cross-cutting throughout the decision-making process in different sectors and at different levels.

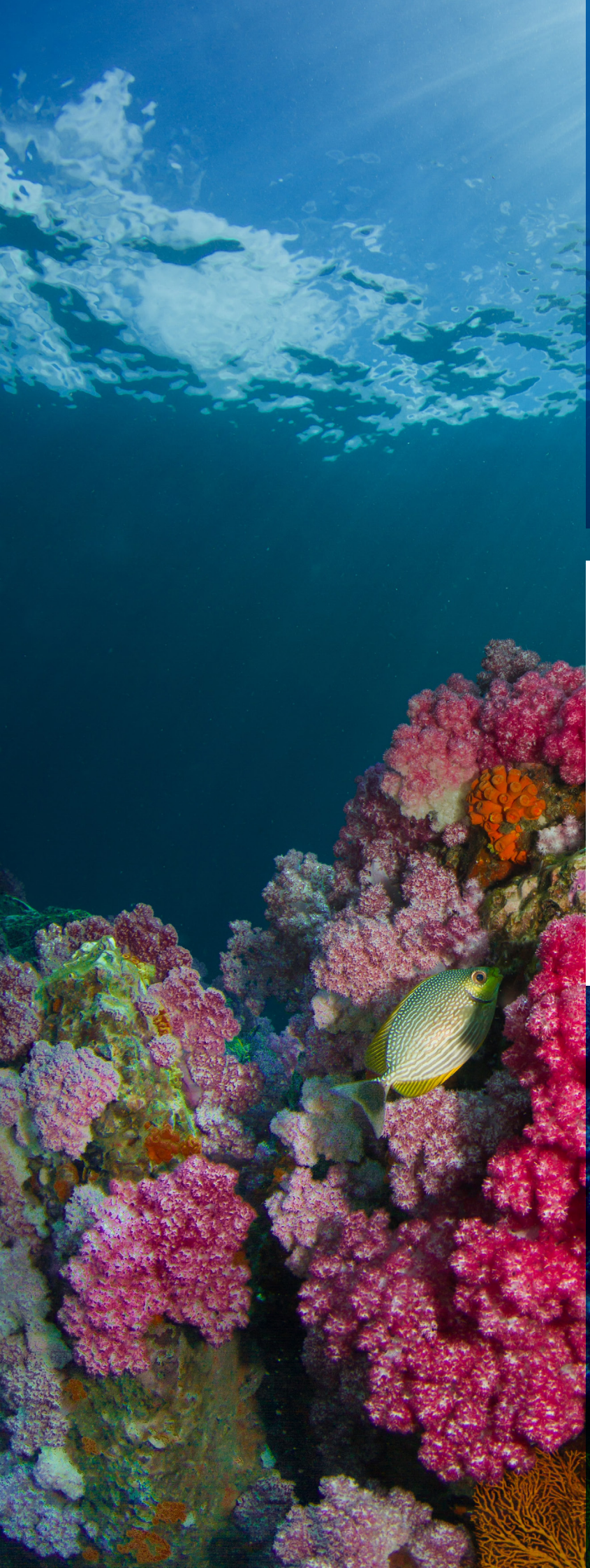
In order to develop a pragmatic SAP, direct participation of all key sectors involved in the transboundary problems should be encouraged, to ensure inter-sectoral policies are developed when necessary. This involvement will normally consist of all key government ministries in the participating countries, as well as other relevant stakeholder representatives.

Donor partnerships

The TDA/SAP process is designed to build partnerships between development partners (donors) in order to address the identified problems and, where necessary, to assist governments to cover the costs of baseline actions. An effective donor partnership will act as an incentive for commitment to the SAP and avoid duplication of efforts by the donor community.

Government commitment

Endorsement of the SAP as a binding agreement between governments should be an important management objective of the process. If the process has been conducted in a stepwise manner, this final step is achievable. A SAP that does not involve a high level of formal commitment is unlikely to be taken seriously as a roadmap for policy development and implementation.



GEF IW:LEARN

GEF Transboundary Diagnostic Analysis/ Strategic Action Programme Manual

Part 2
TDA/SAP
'How to' Guide

Contents

List of Figures and Tables

Summary

This is the second of three parts that makes up the GEF Transboundary Diagnostic Analysis/ Strategic Action Programme (TDA/SAP) Manual.

Part 1 presents an introduction to International Waters and the TDA/SAP approach. It describes what International Waters are and why are they important, and why the GEF is interested in them. It then outlines the TDA/SAP approach as a tool for IW management, presents a brief history of the TDA/SAP approach, gives examples of the TDA/SAP approach in action and finally describes the current GEF approved version of the TDA/SAP approach.

This Part delves deeper into the TDA/SAP process. It presents a 'How to' Guide to TDA/SAP development – a simple, non-prescriptive stepwise approach that many projects have followed over the last 10 years, including references and links to best practices and experiences from a wealth of completed and on-going projects.

Part 3 focuses in on planning the TDA/SAP process. In particular, it looks at the key steps in managing the TDA and the SAP and meeting/workshop design to ensure the TDA and the SAP processes are as collaborative as possible.

- The TDA/SAP Guidance Manual has been updated by GEF IW:LEARN in 2018 to enhance the information and to incorporate guidance on ecosystem valuation approaches, gender mainstreaming and links to ecosystem specific considerations and indicators. These updates are based-on recent GEF global projects that have led to increased understanding of these issues and best practices from SAP implementation. GEF projects delivering this additional guidance, which is summarised in the TDA/SAP manual, include:
- GEF LME:LEARN (with specific tools and guidance for LME projects)
- GEF Transboundary Waters Assessment Programme (TWAP) information and guidance from an application of methodologies to assess transboundary water bodies (aquifers, lakes, rivers, and LMEs) including indicator for these waterbodies;
- GEF Floods and Droughts (delivering tools and approaches for freshwater assessments and management that are highly relevant to the development of TDA/SAPs and their subsequent implementation)

Links and summary details are presented throughout the guidance document supported by four annexes to provide additional brief information on the IW:LEARN supported work on Economic valuation of ecosystems, Gender Mainstreaming, and the GEF TWAP and Floods and Drought projects.

1. Introduction

1.1 What is the GEF TDA/SAP Approach?

The Transboundary Diagnostic Analysis/Strategic Action Programme (TDA/SAP) approach is a highly collaborative process that has proven to be a major strategic planning tool for GEF International Waters Projects over the last 20 years.

The TDA/SAP approach was first presented as a guidance document with an associated training course in 200X. In 2012 the approach was updated by IW:LEARN with associated guidance documents on Project Management. In 2017 IW:LEARN again provided an update to the 2013 guidance manual incorporating links and brief summaries of other recent guidance material developed by GEF Projects including IW:LEARN and LME:LEARN.

The main technical role of a TDA is to identify, quantify, and set priorities for environmental problems that are transboundary in nature. In particular, the TDA aims to:

- Identify & prioritise the transboundary problems
- Gather and interpret information on the environmental impacts and socio-economic consequences of each problem (including on the economic value of ecosystems services and functions)
- Analyse the immediate, underlying, and root causes for each problem, and in particular identify specific practices, sources, locations, and human activity sectors from which environmental degradation arises or threatens to arise.

Consequently, a TDA provides the factual basis for the formulation of an SAP. In addition to this, however, the TDA should be part of a process of engagement of stakeholders through the initial TDA development steps and the subsequent development of alternative solutions during the formulation of the SAP.

The SAP is a negotiated policy document that should be endorsed at the highest level of all relevant sectors of government. It establishes clear priorities for action (for example, policy, legal, institutional reforms, or investments) to resolve the priority transboundary problems identified in the TDA. A key element of the SAP is a well-defined baseline. This enables a clear distinction between actions with purely national benefits and those addressing transboundary concerns with global benefits. Another key element involves the development of institutional mechanisms at the regional and national levels for implementing the SAP and monitoring and evaluation procedures to measure effectiveness of the outcomes of the process.

1.2 What Does It Comprise Of?

A simple schematic of the process is outlined below:

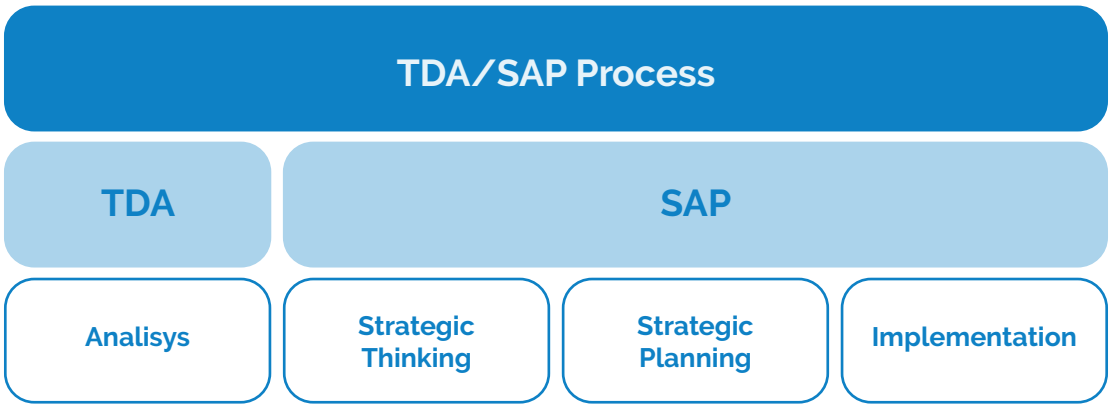


Figure 1: Schematic outline of the TDA/SAP process

As can be seen from the schematic above, the TDA/SAP process comprises 2 major components. These are:

- The TDA: The analytical component comprising of a technical analysis of transboundary problems, impacts and causes
- The SAP: The strategic component comprising of strategic thinking, planning and implementation

Ultimately, the TDA/SAP process is part of a larger adaptive management cycle. This consists of four key steps: involves assessing the problem (through the TDA); formulating a strategic plan with robust indicators (through the SAP); implementing the actions identified in the SAP and finally monitoring the outcomes, both short-term and long-term and adapting the plan accordingly (TDA and SAP revision).

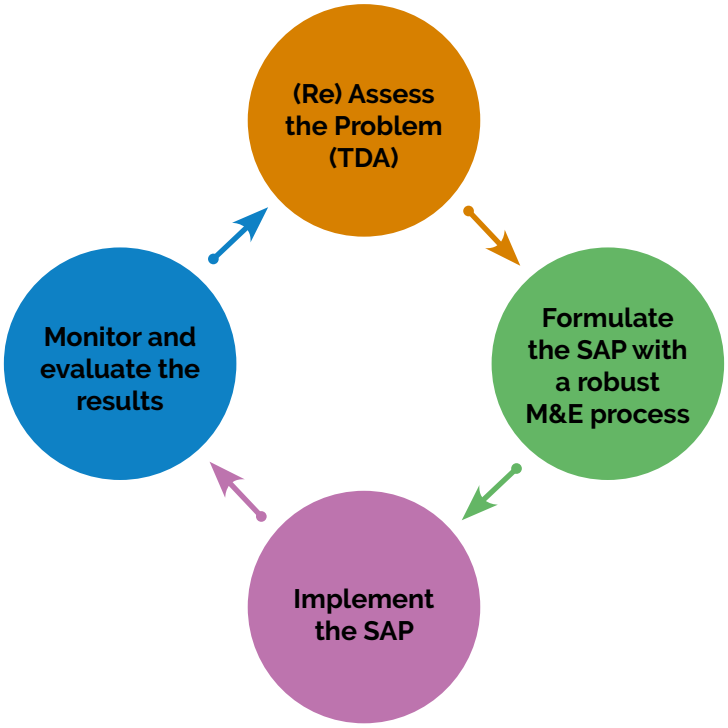


Figure 2: The TDA/SAP process as part of a four-step adaptive management cycle

1.3 The Analytical Component – The TDA

The main technical role of a TDA is to identify, quantify, and set priorities for environmental problems that are transboundary in nature. The key steps in the TDA development process are:

- Definition of system boundaries
- Collection and analysis of data/information: including reference to global/regional needs for data and indicators, ensuring collection of data disaggregated by sex, and linkages to other GEF projects (e.g. TWAP, IW:LEARN, Floods and Droughts, etc.)
- Identification & prioritisation of the transboundary problems and the potential for climate variability and change to affect these problems;
- Determination of the environmental and socio-economic impacts (including on ecosystems, their services and values)
- Analysis of the immediate, underlying, and root causes
- Development of thematic reports (e.g. on ecosystem status, stakeholder analysis, governance arrangements, etc.)
- Identification of leverage points
- Drafting and national approval of the findings of the TDA

The TDA provides the factual basis for the strategic component of the TDA/SAP Process – strategic thinking, planning and implementation of the SAP. In addition to this, the TDA should be part of a larger facilitative process of engagement and consultation with all the key stakeholders from the initial TDA steps through to the subsequent development of alternative solutions during the formulation of the Strategic Action Programme.

> **Note:** The TDA is a mechanism to help the participating countries to 'agree on the facts' - many conflicts are driven by perceptions and removing these can be an enormous step in itself. Furthermore, the TDA should be seen as more than just an analysis of data and information. It is a powerful process that can help create confidence among the partners involved.

1.4 The Strategic Component – The SAP

The SAP is a negotiated policy document that should be endorsed at the highest level of all relevant sectors. It establishes clear priorities for action (for example, policy, legal, institutional reforms, or investments) to resolve the priority transboundary problems identified in the TDA.

The preparation of a SAP should be a highly cooperative and collaborative process among the countries of the region. The strategic component of the SAP process has 2 key phases:

1. Strategic Thinking:
    - Defining the vision
    - Setting goals or status statements
    - Brainstorming new ideas/opportunities for innovation
    - Identifying options or alternatives
2. Strategic Planning:
    - National and regional consultation processes
    - Setting strategies for implementation
    - Action planning - Setting actions, timescales, priorities and indicators
    - Drafting the SAP
    - Steps towards SAP implementation

A key element of the SAP is a well-defined baseline. This enables a clear distinction between actions with purely national benefits and those addressing transboundary concerns with regional and global benefits. Another key element involves the development of institutional mechanisms at the regional and national levels for implementing the SAP and monitoring and evaluation procedures to measure effectiveness of the outcomes of the process.

1.5 Ecosystem Specific Guidance for TDAs and SAPs

1.5.1 Introduction

The TDA/SAP approach presents a practical and straightforward framework that is applicable to all water ecosystems and is easily adaptable by project staff and those working on the development of the TDA and SAP. It allows projects to use a common framework and customize it based on the particular water ecosystem therefore giving ownership to the stakeholders involved in the process. This results in a non-prescriptive approach, based around a common framework.

Other sources of waterbody specific guidance and information from recent global GEF projects include:

- The GEF Transboundary Waters Assessment Programme (TWAP) has developed specific approaches for assessing different water body types (transboundary aquifers, lakes, rivers, LMEs and Open Ocean). An overview of the TWAP project is attached in Annex 6 together with types of indicators that were selected to assess transboundary water systems. This will be of interest as a starting point in the development of both the assessments of waterbodies within a TDA (see section XX) and in the long-term as part of a M&E system to monitor the implementation of the SAP (see Section XX).
- The GEF Floods and Droughts project also offers specific river basin (or relevance all freshwater projects) on addressing climate variability and change adaptation issues and offering tools to assist with the selection of indicators of relevance to both the TDA / SAP and to global, regional and national reporting requirements (www.flooddroughtmonitor.com).
- The GEF LME:LEARN is developing a range of guidance and toolkits to enhance the implementations of LME projects which are highly relevant to projects undertaking TDA/SAPs (see section 1.6.1)
- GEF Global groundwater governance he project was designed to raise awareness of the importance of groundwater resources for many regions of the world, and identify and promote best practices in groundwater governance as a way to achieve the sustainable management of groundwater resources

All GEF Agencies should be considered as sources of information for national, regional and global experiences and guidance that could benefit similar activities being considered within a GEF IW TDA/SAP project.

However, there are some differences between different water ecosystems and alternative management actions that will need to be undertaken when carrying out the TDA and the SAP. The following Sections describe some of those.

1.5.2 River Basins: Key Points to Consider

- River basins are generally successive water resources where an international river flows from one sovereign state to another. Therefore, there is often less incentive for upstream (often polluting/over-abstracting) countries to actively engage in the TDA process and less incentive to participate and endorse the SAP. This can be addressed by GEF projects embarking on joint fact-finding missions and information sharing that can be seen as an overall benefit to the whole basin to future equitable and sustainable utilisation of resources.

- There will often be issues around data comparability and compatibility between upstream and downstream countries. Often countries will have different sampling, monitoring, analysing and reporting approaches. This often links to economic status.

- River basins are not discrete systems – they generally (although not always, the Okavango being a case in point) flow into marine and lake ecosystems via an estuary or delta and this will need to be captured in the TDA. However, it may not result in interventions or action in the SAP - this will depend on the scope of the project and the SAP.

- Many countries are adopting Integrated Water Resource Management (IWRM) or EU Water Framework Directive (WFD) planning processes into national policy. Consequently, appropriate linkages will need to be developed between the SAP and existing/developing IWRM or WF plans.

- UNDP's CapNet launched in 2002 as an international network for capacity development in sustainable water management, offers significant resources for training of a wide range of stakeholders.

1.5.3 Lakes: Key Points to Consider

- Lakes can be considered as freshwater analogues of marine systems (i.e. they are both boundary water resources with boundaries between two or more sovereign states) and consequently many of the issues facing LMEs also affect lakes (e.g. fisheries, eutrophication etc). However, lakes are also subject to water scarcity issues affecting river basins (e.g. over abstraction) and consequently the TDA needs to consider upstream drivers. Furthermore, lakes can often lie entirely within a single country, and yet can cause or be affected by transboundary problems if they also lie within a transboundary basin.

- The TDA and the SAP should also consider hydrologic linkages between different water systems. Lakes, for example, typically have both inflowing and exiting tributaries. They also may be underlain by interacting aquifers and/or drain to downstream LMEs. These linkages are very important in regard to making a comprehensive assessment of the nature, impacts, causes, and possible solutions to transboundary problems.

1.5.4 Aquifers: Key Points to Consider

- Aquifers are not visible (although ecosystems associated with aquifers sometimes are, for example wadis and oases). Consequently, there may be a need to characterize the waterbody and ensure countries recognize the existence and shared nature of the system as a pre-condition to starting the TDA.
- Because aquifers are difficult to visualize, It will be necessary to carefully consider how to describe the size and scale of the water system; the causes of the identified transboundary or shared problems (for example using a hot spot approach for abstraction); and the impacts, both environmental and socio-economic.
- Many of the environmental problems facing aquifers will be shared rather than transboundary. For example, the TDA for the Nubian Sandstone Aquifer was renamed a Shared Aquifer Diagnostic Analysis because of this very issue.

1.5.5 Large Marine Ecosystems: Key Points to Consider

A recent publication by UNDP (Large Marine Ecosystems and Sustainable Development: A Review of Strategic Management Processes and Goals) provides additional information on TDA/SAP process within LMEs. The report had two objectives: to review the TDA-SAP Process and identify the common issues, threats, causes and barriers and how each of the LMEs are addressing these through the SAP implementation process, and 2) based on this synopsis and 'round-up' of TDA-SAP delivery, identify the linkages between the TDA-SAP processes and the SDG 14.

- The size and scale of LMEs can be far greater than that of rivers, lakes and aquifers (although not always). Consequently, the project will need to ensure the TDA and more importantly the SAP take this into account. There may be a need to manage expectations regarding what can be accomplished.
- As with all other water systems, there can be a paucity of data and information. Again though, due to the scale of some LMEs, this can result in considerable gaps in information.
- Most GEF LME projects are working towards ecosystem-based management and consequently need to consider the LME approach. Although there has been a tension between the TDA/SAP and the LME approach in the past, both approaches are not incompatible[1]. In fact both can inform the other:
    - The 5 LME Modules (productivity, fish and fisheries, pollution and ecosystem health, socioeconomics, governance) can support the development of the TDA (both the Gulf of Mexico LME and the Humboldt Current LME have used this approach).
    - By integrating ecosystem-based management into the SAP process, the LME approach can ensure there is a whole systems approach to interventions within the SAP.

1 Carlisle K. M. (2012), The Large Marine Ecosystem Approach: Application of an Integrated, Modular Strategy in Projects Supported by the Global Environment Facility, NOAA.

- LMEs are not discrete systems - coastal zones and river basins are component parts of an LME but are often poorly characterised in TDA documents for LME projects. The project will need to closely consider the scope of the TDA and the SAP. For example, what can the TDA and SAP include? How does the TDA consider causes and impacts from river basins and the coastal zone? What does the SAP focus on?

- LMEs are usually split into EEZs and Areas Beyond National Jurisdiction (ABNJ) – the TDA therefore has to cover both aspects and this makes the analysis more complex under ABNJ transboundary considerations: ballast water, biodiversity reduction (migratory species, introduction of exotic species for mariculture etc).

- Typically the land-sea interface is not dealt with sufficiently by land use planners and those responsible for Marine Protected Areas in the context of the improved management of LMEs as there is not much interaction between the two groups. For example, dead rivers don't discharge water regularly to the sea (as all the water is used under excessive and badly planned irrigation schemes or potable water requirements), but this loss of estuarine function as a natural nursery for marine and riverine species obviously has a negative impact on the recruitment of marine species. This lack of interaction between land use planners and those responsible for Marine Protected Areas can have a significant impact on the SAP.

- Climate change obviously affects both land and marine environments – however the LME functions to regulate climate (via CO2 absorption, O2 generation, heat absorption and redistribution) are of greater importance than land-based systems because the impact from a climate change modified LME system has global impacts e.g. ENSO events modified due to climate change induced sea surface temperature changes.

1.6 TDA/SAP guidance updates from global GEF projects

Since the development of the TDA/SAP manual in 2013 the importance of the SDG reporting process has become more central to GEF projects overall and is a key benefit to countries that can be derived from the TDA/SAP process through the collection and analysis of ecosystem information that could be relevant to, for example, national reporting of SDG 6 and 14 (and other water-related SDGs such as gender, food security. The TDA/SAP process is also important to contributing to the overall goals of Agenda 2030 as many of the issues are transboundary in nature and can only be addressed in a sustainable and equitable manner through consideration of transboundary factors.

All TDA/SAP projects should utilise, where possible, the experiences from other GEF TDA/SAP actions and the multiple guidance documents prepared by IW:LEARN and through specific GEF projects. These guidance manuals and key global projects include:

GEF IW:LEARN manuals include:

- Economic Valuation of Ecosystems
- Climate Change and Variability (with specific guidance manuals for freshwater and marine projects)
- Public-Private Partnerships
- Project Management
- Gender mainstreaming (activities undertaken through IW:LEARN phase 4)

Recent key GEF funded projects that can provide significant input to guide projects include:

- LME:LEARN that is in the process of developing strategies and toolkits specific for LMEs and highly relevant to projects undertaking TDAs/SAPs
- Transboundary Waters Assessment Project (TWAP) with detailed information on transboundary aquifers, lakes, rivers, LMEs and open oceans;
- GEF Floods and Drought project Development of Tools to incorporate the impacts of climate variability and change in particular floods and droughts, in to Basin Planning Processes; and, Using indicators for improved water resources management: Guide for basin managers and practitioners.
- GEF Groundwater Governance.

Summary details of these projects are presented below (with associated further details and links to project websites presented in annexes).

1.6.1 LME:LEARN guidance relevant to TDA/SAP

GEF has also initiated a project focusing on developing tools for LME projects. GEF LME:Learn Toolkits include (REF):

- Environmental Economics toolkit
- LME strategic approach toolkit
- The LME assessment toolkit (scorecard)
- The GEF LME Project toolkit
- Marine Spatial Planning toolkit
- Governance toolkit
- Stakeholder participation toolkit

1.6.2 Economic Valuation of ecosystem services

Economic Valuation is a tool for valuing ecosystems and their services in monetary terms. Through **IW:LEARN, a Guidance Document** has been prepared on pragmatic and easy-to-apply approaches to economic valuation of ecosystem services and how these can be utilised by IW projects with less resources (so-called "tier 1 projects"), and more resources (so-called "tier 2 projects"). The Guidance Document hence covers approaches to guide both a preliminary screening assessment for e.g. the TDA and a more detailed in-depth assessment that will prove beneficial for the SAP and other processes (see Annex 5 for a brief summary of the GEF IW:LEARN recommended approach to economic valuation of ecosystems).

A TDA has mostly been a technical exercise focused on identifying and analyzing environmental problems, while the SAP has been more of a political process (in the sense of different actors negotiating a common plan to solve those environmental problems) that builds on the findings of the TDA. The identification and assessment of the benefits of transboundary water cooperation (both past benefits and potential future benefits) in the elaboration of the TDA would strengthen the basis for prioritization of environmental problems by providing a fuller picture of the links of water management to economic, social and environmental outcomes. It would also help to engage in the elaboration of the SAP relevant economic actors (such as ministries of agriculture, tourism or economic development) that are usually reluctant to engage in what they often perceive as a technical study for water and environmental experts. The early engagement of those economic actors in the TDA/SAP process is often critical for the development of a successful SAP, since many of the actions in the SAP are likely to require policy reforms or investments in the sectors that they represent. The communication of the full range of the benefits that the implementation of the SAP will deliver, including those for which a monetary value cannot be calculated (such as peace and security benefits), would contribute to the approval of the SAP and its implementation.

1.6.3 Floods and Drought Management Tool

The GEF/UNEP 'Flood and Drought Management Tool' (FDMT) project (http://fdmt.iwlearn.org is developing a methodology with tools (understood here as technical applications) which can be applied individually or together at the basin or local level to facilitate the inclusion of information about floods, droughts and future scenarios into Integrated Water Resources Management (IWRM) planning, TDA and SAP. The project is being implemented from 2014 - 2018, and 3 pilot basins (Volta, Lake Victoria and Chao Phraya) have been identified for development and testing of tools developed.

The project outcomes in the form of tools and guidelines are being tested and validated at both basin (basin organisations) and local levels (water utilities) in 3 different pilot basins; however it will be available for all other GEF IW basins. This also includes training modules available at the end of the project to ensure that methods can be applied to other basins. The aim is to develop an approach that interfaces with existing planning practices and the project will support planning activities related to TDA/SAP.

The key outcomes from the project are:

- Web based portal providing access to a number of technical applications (www.flooddroughtmonitor.com)
- Guidance documents (available at fdmt.iwlearn.org at the end of the project)
- Strategic recommendations for how the technical applications could be applied to support TDA/SAP (available at fdmt.iwlearn.org at the end of the project)
- The technical applications at the web based portal (www.flooddroughtmonitor.com) provides a range of technical tools all aiming at supporting the TDA/SAP process, and are freely available for basin organisations and other stakeholders involved in planning within GEF transboundary basins. The technical applications supports the following:
    - Data and information: Near real time satellite based data providing a basic data set available for TDA and SAP development. The satellite data are supported with seasonal and medium range (16 days) rainfall forecast, climate change projects and a wide range of other data types of relevance for the development of TDA and SAP
    - Issue analysis: CCA analysis combined with a rapid issue assessment allowing for stakeholders to identify the causes behind environmental issues
    - Water indicators: Enables a linkage between the identified environmental issues and water indicators used to monitor the state of the specific issue. Contains a large library of relevant indicators (100+ indicators) with information on the usage and interpretation of the indicator, the required data and the application of the indicator.
    - Drought assessment: assessment of the current status related to drought and access to early warning information on how the current status will evolve over the coming weeks and months
    - Flood assessment: relevant information and data on historical flood events in the basin and extreme value analysis of hydrographs
    - Basin planning: key application allowing the user to evaluate investments or external factors as climate change or population change within the basin using an underlying water resource model for the impact assessment. The decision process is supported through MCA and RDM decision methods
    - Reporting: A range of default reports are available to describe the current status in the basin, and the user is able to configure specific reports related to the issues within the specific basin.

All the technical applications are available at www.flooddroughtmonitor.com

1.6.4 Gender Mainstreaming

GEF defines gender mainstreaming as the process of assessing the implications for women and men of any planned action, including legislation, policies or programs. It is a way to make women's as well as men's concerns and experiences an integral dimension of the design, implementation, monitoring and evaluation of policies and programs so that women and men benefit equally and inequality is not perpetuated. Equality for women and girls is a strategic and operational imperative for the GEF. Men and women use natural resources differently and, as a result, they are affected differently by changes to these resources. Gender inequality and social exclusion increase the negative effects of environmental degradation on women and girls. Despite recent promising policy and legal reforms, persistent gender-discriminatory social and cultural norms, unequal access to land, water and productive assets, and unequal decision-making continue to constrain women and men from equally participating in, contributing to, and benefitting from environmental projects and programs.

The GEF IW:LEARN project (fourth phase) includes a gender sub-component "Promotion of Gender Mainstreaming in the GEF IW Portfolio", undertaken by UNESCO – WWAP and WWF-US which has the scope of achieving increased recognition of gender issues and attention on gender equality throughout the GEF IW projects. Information on related programmes are presented in Annex 8 and available through the IW:LEARN website (www.XXXX.org) In particular the objectives of this sub-component are to:

- Accelerate learning for the GEF IW portfolio
- Provide access to training materials on common or important issues or challenges
- Facilitate exchanges of experiences and online learning mechanisms on gender integration and the use of gender indicators

1.6.5 Transboundary Waters Assessment Programe (TWAP)

The TWAP has involved a series of GEF projects aimed at developing agreed methodologies for assessing transboundary aquifers, lakes, rivers, LMEs and the open ocean, and providing global assessments (2015) of the status and trends in these key waterbody types.

The TWAP outputs can assist TDA/SAP projects with multiple aspects (see annex 6X), including by providing:

- Identification and delineation of water bodies. A key output of the TWAP has been to update and improve the delineation of transboundary water bodies. In particular, the identification and delineation of transboundary aquifers has been greatly improved through the TWAP.
- Background data and information on the relevant transboundary aquifers, lakes, rivers and LMEs, such as biophysical, geographic, socioeconomic, and governance information (analysis of arrangements and effectiveness).

- Indicator results which can be used as a starting point, particularly in the TDA, to identify some of the key issues in the relevant water bodies, as well as an initial assessment of their severity and potential priority. Indicator results include both a baseline assessment, as well as projected scenarios for the 2030s and 2050s.

- Indicator frameworks, and underlying indicator methodologies and data sources, which can be used as starting points for undertaking assessments during a TDA and providing baseline for the subsequent implementation of the SAP to complement national and regional indicators specific to the TDA/SAP region.

- Access to data partners and stakeholders. Partners involved in TWAP may be able to assist with filling data gaps. Though much of the data used was primarily assessed at a global resolution, a significant amount of data is likely to be available at a resolution that is applicable at the individual water body level. In some cases, partners may have updated datasets to a finer resolution since the completion of the TWAP baseline (2015). In some cases, TWAP assessments involved local stakeholders who could contribute to the TDA/SAP processes. This was particularly true in the case of transboundary aquifers and lakes.

The TWAP web portals provide information and contact details of significant value to projects undertaking TDA/SAPs in providing waterbody-type specific guidance and potential indicators that can be utilised. Further brief details on TWAP can be found in Annex 6 and all waterbody reports and guidance can be found on www.geftwap.org.

1.6.6 Groundwater Governance:

The project was designed to raise awareness of the importance of groundwater resources for many regions of the world, and identify and promote best practices in groundwater governance as a way to achieve the sustainable management of groundwater resources. The first phase of the project consisted of a review of the global situation of groundwater governance and aimed to develop a Global Groundwater Diagnostic integrating regional and country experiences with prospects for the future. This first phase built on a series of case studies, thematic papers and five regional consultations. The second phase of the project has developed the main project outcome, a Global Framework for Action consisting of a set of policy and institutional guidelines, recommendations and best practices designed to improve groundwater management at country/local level, and groundwater governance at local, national and transboundary levels

2. How to Develop a TDA

2.1 The Analytical Component – The TDA

Section 1 introduced the GEF TDA/SAP Process and presented a simple schematic that outlined the 2 key components – namely the Transboundary Diagnostic Analysis (TDA) and the Strategic Action Program (SAP). The TDA is the analytical component that identifies and analyses the transboundary problems, their impacts and causes. The SAP is the strategic component that focuses on strategic thinking, planning and implementation. Both the TDA and the SAP components should be highly collaborative and fully engage with the key stakeholders from the water system. This Chapter focuses in on the TDA and the steps required to develop the key components of the final document.

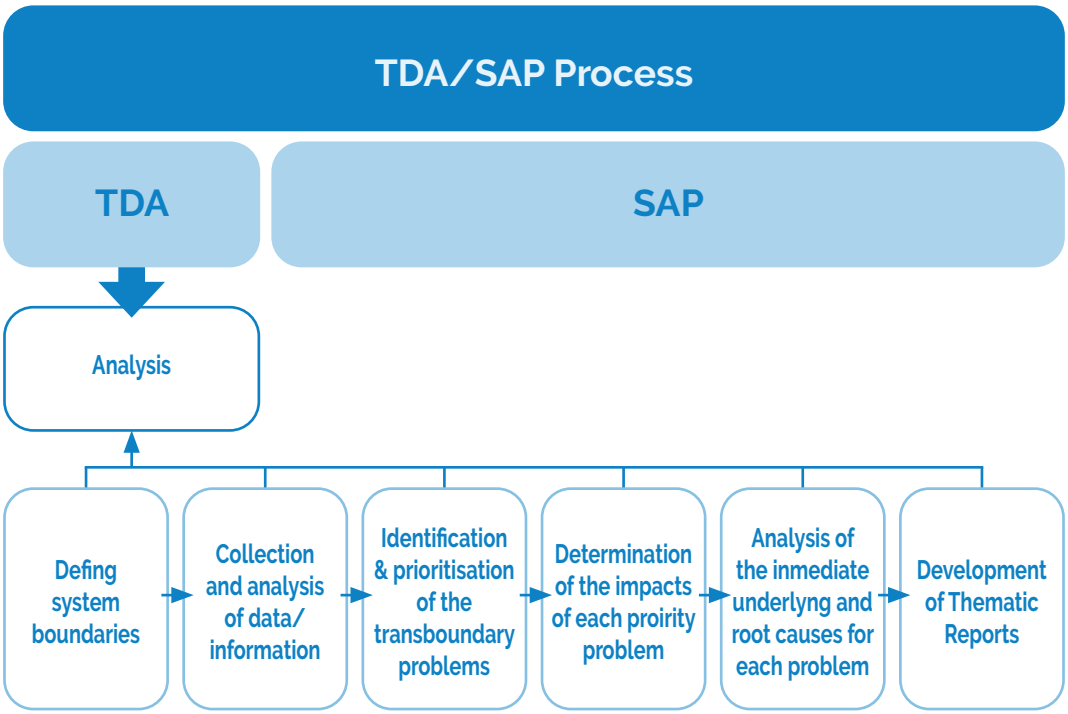


Figure 3: Schematic outline of the TDA process

The main technical role of a TDA is to identify, quantify, and set priorities for environmental problems that are transboundary in nature. The following indicates the key activities in the TDA process (not necessarily as sequential steps) include:

1. Defining system boundaries
2. Reconfirming the stakeholders (and their roles) outline in the Project Documentation submitted to the GEF and ensuring their inclusion in the development work of the TDA
3. Collection and analysis of data/information including reference to global/regional needs (e.g. SDGs) for data and indicators to support the SAP utilising lessons and guidance from GEF projects and other sources (e.g. GEF TWAP, floods/droughts projects)
4. Identification & prioritisation of the transboundary problems and the potential for climate change and variability to impact these problems
5. Determination of the environmental and socio-economic impacts (including on ecosystems, their services and values as a starting point)
6. Analysis of the immediate, underlying, and root causes
7. Development of thematic reports (e.g. stakeholder, gender and governance analyses, ecosystem status and pressures, etc.)
8. Identification of leverage points
9. Drafting the TDA

The TDA provides the factual basis for the strategic component of the TDA/SAP Process – strategic thinking, planning and implementation of the SAP. In addition to this, however, the TDA should be part of a process of engagement and collaboration with stakeholders through the initial TDA steps and the subsequent development of alternative solutions during the formulation of the SAP. Consequently, studies of institutional capacity, governance, and investment are all essential components of the TDA.

2.2 Defining System Boundaries

In order to identify the geographical scope of the TDA and SAP it is important to ensure the system boundaries are well defined and agreed by all parties.

System boundaries can be defined in a number of different ways according to the problem being managed. In particular, when trying to develop policies for reducing environmental pressures, it may be necessary to work within larger boundaries that encompass the source of the problem, as well as the problem itself. This is particularly relevant for land-based sources of pollution effecting coastal zones or LMEs.

Other examples include the global transport of invasive species, which cannot be tackled without actions at the global scale and certain aspects of coastal pollution that may only require actions in one district or municipality of a single state.

It is likely that the system boundary was defined in the original project document but it would be sensible to revisit this issue when starting the TDA development (see Box 1).

Any change to the system boundary will need to be agreed by all participating countries and by the Implementing and Executing Agencies. If there is an issue regarding the system boundary (for example it cannot be changed for political or legal reasons), the TDA Development Team will need to consider the implications of this during the TDA and subsequent SAP.

The TWAP project offers guidance on system boundaries especially for transboundary groundwaters(see Annex 6 and www.geftwap.org).

2.3 Data/Information Collection and Analysis

2.3.1 What is Data and Information?

The terms data, information and knowledge are frequently used for overlapping concepts. The main difference is in the level of abstraction being considered. Data is the lowest level of abstraction, information is the next level, and finally, knowledge is the highest level among all three.

Data on its own carries no meaning. For data to become information, it must be interpreted and take on a meaning. For example, a Part on the Pacific Ocean is generally considered as "data", a book on the oceanographic characteristics of the Pacific may be considered as "information", and a report containing practical information on the best way monitor and analyse ocean currents in the Pacific may be considered as "knowledge".

The quality of satellite based data is increasing rapidly as many data providers are combining satellite based information with ground information to increase the accuracy of the data. Satellite data have the advantage of being i) freely available (in most cases), ii) spatially distributed and iii) available in near real time. In many cases it will be possible to get information on e.g. the spatial distribution of the rainfall from yesterday for any location on the globe. The key issue for the use of these data are often where to locate the data and how to transform them into a format that can be used in the TDA. The Flood & Drought Management Tools project have worked on this specific issue with the objective of creating a basic dataset available for the development of a TDA in any basin. The web based portal at www.flooddroughtmonitor.com provides free access to a wide range of relevant data sets for the development of a TDA (see Annex 7 for more information).

The TWAP project extensive provides data sources including links to partner data resources for all transboundary waters types (e.g. aquifers, lakes, rivers, LMEs and open oceans). Further details are included in Annex XX.

2.3.2 Issues Around Data and Information for the TDA

IW Projects do not normally carry out new research or repeat studies already undertaken. The aim of the TDA is to use existing data/information and analyse it in a more interdisciplinary/holistic manner. The amount of data and information available will vary from project to project. Some regions are data rich whilst others are data poor. For most TDAs, it is likely that data and information:

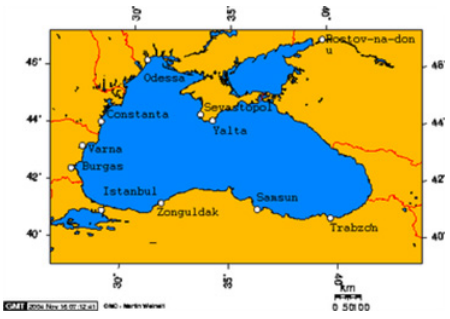
- Will come from multiple sources (Including GEF and other donor funded national, regional and global projects)
- May often be difficult to access
- May not be entirely appropriate
- Will often be uncoordinated in its generation and use
- May be intentionally or unintentionally inaccurate

Furthermore, much of the data and information will have been collected at the national level and will need to be either:

- Aggregated with other data sets
- Disaggregated if national data needs to be examined at a more local/basin level
- Data on stakeholders disaggregated by sex to facilitate responding to gender considerations and developing gender actions plans

Box 1: Examples of Defining System Boundaries

Black Sea Ecosystem Recovery Project (BSERP)



The major regional document for protecting the Black Sea is the Bucharest Convention (1992). However, the Convention does not include the Sea of Asov which is geographically connected to the Black Sea though the Kerch Straights although protocols to the Convention can (and do) include it. For the purposes of the revise d Black Sea TDA (2007), the Project Management Unit and the TDA Development Team decided that the Sea of Azov should be considered within the system boundary, which was agreed by all parties.

Environmental Protection of the Río de la Plata and its Maritime Front: Pollution Prevention and Control, and Habitat Restoration (Freplata)

The geographical area defined for the Freplata Project was the Río de la Plata and its Maritime Front as delimited in the Treaty of the Río de la Plata and its Maritime Front signed by Argentina and Uruguay in 1973.

From the point of view of International Law, the Project Area, therefore, comprises a river sector subject to the legal regime of internal waters, and a maritime sector: the Maritime Front. This overlaps part of the territorial waters and the economic exclusive zone of Argentina and Uruguay. The Area is included within the technical concept of "international waters" and "transboundary waters" as applied by the Global Environment Facility.

However, the project title includes pollution prevention, which is predominantly outside the geographical scope of the Treaty.

Consequently, in order to agree policies for reducing the environmental pressures on the Rio de la Plata Maritime Front, it was necessary to work within larger boundaries that encompass the source of the problem, as well as the problem itself. For example, the issue of land-based sources of pollution, where it is necessary to incorporate the source of pollution within the boundary of the study and the boundary of any policy developed to resolve the problem, was included in the TDA.

In general the aim of the this step is to identify the high quality data, preferably with some degree of quality assurance, quality check or peer review - although this may not always be possible. Often data may have no QA/QC or will not peer reviewed.

> **Note:** IW Projects do not normally carry out new research or repeat studies already undertaken. The aim of the TDA is to use existing data/information and analyse it in a more interdisciplinary/holistic manner.

2.3.3 Scope of the Data and Information Needed

Data and information will be needed to confirm the findings in the TDA. In particular, it is important to substantiate the:

- General situation in the water system
- Priority transboundary problems
- Key impacts - both environmental and socio-economic
- Economic benefits derived from ecosystem services
- Causal chains – Immediate causes, underlying causes and root causes
- Thematic or synthesis reports (e.g. governance, stakeholder, gender analysis, etc.)

This information will contribute to a baseline enabling the progress of the future SAP implementation and the regional agreement of indicators to be assessed as part of an overall Monitoring and Evaluation (M&E) system.

The reporting on the baseline condition through specific tailored reports providing a basic overview of the baseline condition is often very important as a starting point for a TDA process. This is supported in the Floods & Drought Management Tools Project providing access to a number of guidance documents as well as standard reports of the specific basin.

Whilst developing the TDA the team should consider the future implementation of the SAP and identifying indicators that could also be applicable to the data provided by the GEF TWAP project may provide insight to regional problems and offering baseline data. As described above the TWAP approaches for transboundary waterbody assessments provides a scientifically robust and validated approach to the selection of indicators for both the TDA and the subsequent SAP stages. In addition, GEF IW Conferences have had a long history of open discussions on the application of indicators within GEF IW projects. At the the GEF International Waters biannual Conference (IW 8) conference in Sri Lanka an in-depth workshop was held on the 'jungle of indicators' that are available with the aim of providing technical and communication guidance on the use of indicators within an IW project context. Linked to this even GEF has supported the development of a comprehensive guidance document for improving the application of indicators within an IWRM setting based on an extensive review of over 1,600 indicators in use. This guide proposes a comprehensive indicator framework that will guide users on the selection of appropriate indicators in basin management and is available as an on-line tool. The collection of information relevant to indicators (including reporting of SDGs by national authorities) will be central to the TDA and the implementation of the SAP, and these global projects will be a source of relevant information.

Gender Analysis requires a critical examination of how differences in gender norms, roles, power structures, activities, needs, opportunities and rights affect men, women, girls and boys in a certain situation or context. It includes collection and analysis of *sex-disaggregated data and gender information to understand gender differences and gaps,* determine gender differentiated impacts and risks, to identify measures to avoid adverse gender impacts, and to uncover and act on opportunities to address gender gaps and inequalities relevant to the activity. One of the key stumbling blocks to achieving a more robust gender-integrated international policy regime is the astonishing lack of comparable international data on gender-sensitive water indicators. International policy mechanisms are driven first and foremost by data. Without sex-disaggregated data, it is not possible to fully measure progress towards SDGs. Without data, it is difficult to make effective analytical assessments of the comparative situation of women and men in different communities, countries, or parts of the world. If data are not available on a topic, no informed policy will be formulated; if a topic is not evident in standardized databases, then, in a self-fulfilling cycle, it is assumed to be unimportant.

IW:LEARN has organised a series of webinars including on water/gender M&E and indicators, and on SDGs 5 and 6 in the context of climate change. These will be of help to TDA/SAP projects in understanding the integration of gender and water management. (REF IWL)

In order to carry out an effective TDA and to design a SAP that is likely to be approved, there is a need to have at least an approximation of the economic value of the ecosystem services provided by ecosystems in the project area. This is difficult, especially when it comes to considering the non-use values. Leverage points have to be based on an action that a government is prepared to finance. Hence an initial estimation ("screening") of the ecosystem services value is a helpful step within a TDA (a "tier 1" assessment) and within the formulation of the SAP, a more specific ecosystem services valuation (a "tier 2" assessment) can be useful to assess policy options (see IW:LEARN guidance on ecosystem valuation for more detail http://iwlearn.net/learning/manuals/economic-valuation).

The critical elements to source will differ from project to project. A TDA for an LME project may require data and information that links to the LME modules – pollution and ecosystem health; productivity; fish and fisheries; socio-economics; and governance. River basin projects often require data and information on water resources, water quality, biodiversity, land use etc. (For more information see the GEF LME:LEARN LME Strategic Toolkit [ref], GEF TWAP and the GEF Floods & Drought.)

The key to understanding what kind of data will be required throughout the TDA development process is to fully understand the water system. A good starting point for this is the Project Document, together with the expertise in the Project Management Unit and the TDA development team. It is also worthwhile discussing data and information requirements with country focal points, Agency country representatives and the members of Inter-ministry committees.

The main sources of information will vary from project to project but Table 1 gives a good starting point.

TYPE	TDA
Government departments (both national and local/provincial)	Environment Health Employment Trade Industry/Mining/Agriculture/Fisheries/Transport Finance/Economic Affairs
Government agencies	Marine Fisheries Water Environment Economic Development
International organisations	Other UN Agencies (Including WHO, IMO etc) World Bank GEF Agencies European Union International development organisations (e.g. SIDA, CIDA, GIZ, DFID, USAID, amongst others)
NGOs	Local National Regional International (e.g. WWF, IUCN)
Commercial sources	Consultancies Corporate organisations (e.g. oil and gas, agro-industry, construction, minerals etc)
Academia and research organisations	Local National Regional International (e.g. NOAA for LMEs)
Other on-going or completed International Projects	Other GEF focal areas (biodiversity, Climate, Chemicals, Land Degradation, Sustainable Forest Management) World Bank projects International Development Organisation projects

Table 1: Examples of sources of information for the TDA

2.3.4 Data and Information Stock Taking

Prior to any TDA development, there will need to be an information and data stock taking exercise, the purpose of which is to:

- Identify all sources (including the guidance manuals prepared by **GEF IW:LEARN manuals** on private sector engagement, economic valuation of ecosystems, LME:LEARN toolkits, from other GEF projects, e.g. TWAP and Floods and Drought[2], etc.)
- Ascertain the availability of the data and information
- Assess the compatibility and comparability of data sets and information
- Identify where there are gaps
- Analyse the quality of data and information
- Assess how verifiable the data is (e.g. is it cited or peer reviewed?)
- Determine cost implications (if there are any)

By carrying out this exercise prior to any TDA development work, the TDA Development team can ensure that the resultant TDA will be a more complete, coherent and integrated document.

2.3.5 Advice from the Field

Consider the hierarchy of the data and information available – What is the most reliable? Quality-controlled governmental data and information will generally be reliable and verifiable. But what is next in terms of hierarchy? Is it non-quality-controlled governmental data and information? Or accredited commercial data and information? Or NGO data and information? And what about public perception studies? All are valuable but the TDA Development Team needs to consider the importance and worth of each.

Develop a network of contacts – When a source has been identified, ask your contact for other possible data or information sources.

Be creative and think laterally – there are likely to be ways to access data and information that don't follow the normal approach.

2 The GEF Floods and Drought project (see Annex XX) is currently developing specific information requirements on data sources and quality and this will be eventually available on the project's web portal (www.flooddroughtmonitor.com)

Example: Yellow Sea LME Project

The Peoples Republic of China has a policy of not divulging all of its national data to other parties whereas South Korea has a more open policy. In order to acquire current and appropriate GIS maps for the YSLME TDA, South Korea sent national data pertaining to each transboundary issue to colleagues in China who converted the relevant data into GIS format, together with Chinese national data. The resultant GIS maps were sent back to the YSLME Project for inclusion in the TDA.

Keep asking – Don't take no for an answer. Use different contacts to try to access the same data or information.

If the answer is always no – Particularly to raw data, ask for analysed data or reports. Also consider Metadata (data about data) – it may give you an indication of other avenues or organisations to try.

Consider anecdotal evidence and stakeholder observations - It can also be worth considering anecdotal evidence and stakeholder observations - public perception can be very powerful.

Example: BSERP Project

For example, during the BSERP project for the Black Sea over 400 people were randomly questioned from coastal cities and towns around the Black Sea. Those questioned were not selected on the basis of gender, age or occupational considerations. The survey was organized through regional environmental NGOs and represented the only recent regional survey of public opinion undertaken on the causes, status and perceived responsibilities for environmental problems of the Black Sea. Some of the results were presented in the Black Sea TDA.

Data and information is sometimes available in strange places - It can often be a substitute to collecting your own, often more expensive, data and information. For example, weather data from airports is often freely available - sometimes it is only about knowing where to look.

Manage your assumptions regarding data - Try to be rigorous in monitoring assumptions – differentiate between what is perceived and what can be factually supported.

Don't be frustrated by lack of data - Many regions are data poor so think creatively:

- Use unconventional sources
- Ask Google and Google.org – they have a huge wealth of maps and data
- Gapminder contains a great deal of international and national data and indicators
- Consider resources such as the Ecosystem-Based Management (EBM) Tools Network for coastal and marine systems
- Consider surrogate or proxy indicators
- Use photographic evidence – pictures are very powerful

2.4 Transboundary Problem Identification and Prioritisation

2.4.1 What is a Transboundary Problem?

A transboundary problem is an environmental problem that is transboundary in scale. In other words, it is an environmental problem originating in, or contributed by, one country and affecting (or impacting) another.

For example, in the case of eutrophication in the Dnipro River Basin, a transboundary problem common to many aquatic systems (see Figure 4), the nutrients may be emitted predominantly by one country in a region but the effects felt in several countries. The impact may be damage to the natural environment (e.g. algal blooms) and/or damage to human welfare (e.g. health problems).

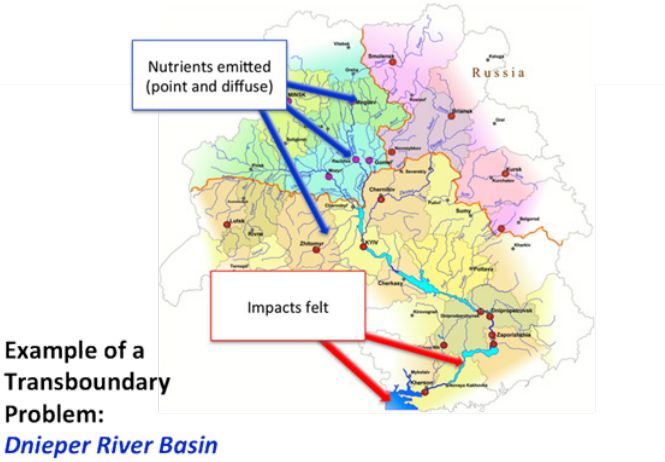


Figure 4: Eutrophication in the Dnipro River Basin

Likewise, the loss of coastal habitats in the Mediterranean is a transboundary problem (see Figure 5). For example, the loss of nesting sites for Loggerhead Turtles in a number of Mediterranean countries (together with accidental capture in fishing gear) has resulted in the rapid decline of this global migratory species.

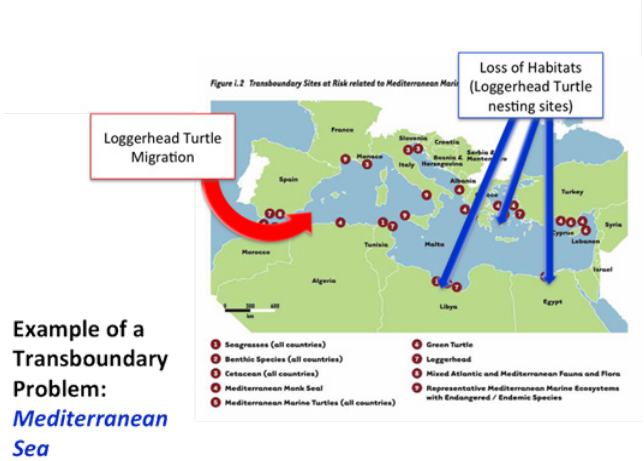


Figure 5: Loss of coastal habitats in the Mediterranean

2.4.2 What Are Shared Environmental Problems?

A shared environmental problem is an environmental problem that is shared between 2 or more countries in a given water system. That is, the problem is not transboundary as given in the definition above but is a common problem in the region.

In terms of the GEF, IW projects should focus on transboundary problems (hence the Transboundary Diagnostic Analysis) but there is a realisation that some projects (particularly those that are based around groundwater systems and LMEs) should also look at those problems that are currently shared but could in some instances become transboundary in the future.

For example, the Nubian Sandstone Aquifer System (NSAS) Project identified 4 problems in its TDA analogue, called a SADA (Shared Aquifer Diagnostic Analysis), that are currently considered to be shared problems. These were:

- Declining Water Levels
- Water Quality Deterioration
- Changes in the Groundwater Regime
- Damage or Loss of Ecosystem and Biodiversity

Each country that is located above the aquifer is affected by these problems but there is very little evidence to indicate that the problems are currently transboundary, although this situation could change in the future.

BOX 2: TRANSBOUNDARY PROBLEMS - NOTES OF CAUTION

Confusion between Impacts and Causes

It is easy to confuse the causes or impacts of a given transboundary problem with the transboundary problem itself. If this occurs, it can result in difficulties when carrying out the impact and causal chain analysis. Remember – a transboundary problem is an environmental problem that is transboundary in scale.

Using the example shown above, **eutrophication** in the Dnipro River Basin is the transboundary problem. A common **cause** of eutrophication is inadequate wastewater treatment. The **impacts** of eutrophication include harmful algal blooms (an environmental impact) and diminished amenity (a socio-economic impact).

Confusion between Transboundary Problems and Causes

Quite often one transboundary problem can cause or contribute to another transboundary problem. For example:

Changes in the Hydrological Regime of a river or aquifer can put stress on **ground and surface water resources** and result in **land degradation** and the **deterioration of water quality.**

All the above are perfectly valid transboundary (or shared) water problems and it is likely that each will need to be analysed in terms of impacts and causes. However, it is important to understand that they are also intrinsically and systemically linked to each other.

2.4.3 Examples of Transboundary and Shared Environmental Problems

Transboundary and shared problems will vary from water system to water system. The tables in Annex 1 give examples of common transboundary problems for different water systems including enclosed seas and LMEs, river basins and estuaries, groundwaters and aquifers, and lakes. This list is not exhaustive and is not intended to be prescriptive – the transboundary problems identified will be unique to a given water system. However, there are often transboundary problems that are comparable between water types, e.g. fisheries related problems affect all LMEs, whereas water quality and changes in flow regimes are commonly associated with river basins.

2.4.4 Climatic Variability and Change - Is it an International Waters Transboundary Problem?

From the tables in Annex 1, one thing that is clear is the absence of climate change as a transboundary environmental problem. There are a number of possible explanations for this, including:

- Until recently, climate change has been seen as beyond the scope of IW project intervention and consequently any single TDA/SAP process. Recent project (e.g. Amazon) have had more attention on the issues of climate variability and change within the development of the their TDA and SAP.
- Climate change has been recognised as an external driver of many of the above problems – something that cannot be changed in the short to medium term (although its impacts can be mitigated against or adapted to).
- There is a perceived or real lack of research or monitoring data on the subject, particularly at the water system level and particularly in freshwater and groundwater systems.

However, many of the transboundary problems identified in most TDAs are reinforced (both positively or negatively) by climate change. Consequently, whether climate change is considered as a transboundary problem or not, its effects (in terms of cause and impact) need to be well understood to ensure that future interventions are both resilient and adaptive.

Example: Common transboundary problems reinforced by climate change

Climate change can alter storm frequency and strength, which in turn alters precipitation, runoff and flooding scenarios. This can result in increased sediment load from one country to another. Both increased sediment load and flood are common transboundary problems in river basins.

The GEF has provided global advice and tools through the 'Floods and Droughts' project (see annex XX) and specifically for IW freshwater and marine projects through a IW:LEARN guidance manuals aimed at integrating climate change and variability concerns in IW marine and freshwater projects.

2.4.5 Identifying and Prioritising Transboundary Problems

The identification of transboundary problems is a crucial part of the TDA/SAP process as a whole and the TDA development phase in particular since those that are not identified at this stage may not be captured at a later stage.

The difficulty and effort involved in this initial stage will vary widely depending on the particular circumstances of the region. Generally, the key determinants are likely to be the extent to which:

- Potential transboundary problems have been the subject of scientific research at the national, regional and/or transboundary level; and
- Particular environmental problems have already been recognised as essentially transboundary in nature

A key to TDA development and the ultimate success of the TDA/SAP process is the importance of prioritisation - an integral part of any strategic planning process. Because there are often limited available resources, prioritisation helps to identify which transboundary problems need to be considered further in the TDA.

It will not always be possible to produce a strict ordering of the transboundary problems. There may be problems considered of equal importance, or there may be so much uncertainty that the ordering is unreliable. It is not essential to aim for a "perfect" strict ordering. The important thing is to distinguish those problems that should be considered further in the TDA from those that need not.

For the purpose of the initial transboundary problem prioritisation, the problems need to be assessed by reference to criteria - features of a problem that contribute to its relative importance. There is no single set of criteria that could be employed in every TDA. Each TDA will be different. Similarly, the importance given to each criterion will vary, depending on the views of those doing the prioritisation.

An example of a collaborative workshop for identifying and prioritising transboundary problems is given in Part 3 (Managing the TDA/SAP Process). A number of projects have used this approach with some success including: the Black Sea; Lake Chad; the Kura-Aras River Basin; the Gulf of Mexico LME ; the Dnipro River Basin; the Orange-Senqu River Basin; the Nubian Sandstone Aquifer; and the Rio de la Plata.

2.5 Determination of Impacts

2.5.1 What are Environmental Impacts and Socio-economic Impacts?

In the context of the TDA/SAP process, environmental impacts are the *effects of a transboundary problem on the integrity of an ecosystem* whereas socio-economic impacts are a change in the welfare of people attributable to the transboundary problem or its environmental impacts.

NB: a gender analysis will help identify potential differences between women and men from environmental and socio-economic impacts and this will be important to understanding how the different stakeholder groups will be affected enabling management actions developed by the SAP to address impacts more effectively.

As an element of socio-economic analysis within the TDA/SAP process, GEF IW:LEARN has developed guidance to integrate the assessment of ecosystem value in the process. The economic valuation Guidance Document (REF) sets the scene as:

Ecosystem services are crucial for the well-being of people, but their contribution to economic systems is difficult to quantify in monetary terms. Since some of them are not traded in commercial markets, they are often given too little or no weight in decision making, e.g. for development of big infrastructure projects. Thus, final decisions may favor outcomes which do have a commercial value, turning unsustainable use of ecosystems more profitable in a short term while having considerable economic long-term costs. Economic valuation is a tool for valuing ecosystems and their services in monetary terms. It quantifies the benefits provided by ecosystems and the impact of ecosystem changes on the wellbeing of people.

However, economic evaluations can be resource-intensive, and significant expert´s knowledge is needed to conduct an analysis "from scratch" (an "original valuation study"). In cases where such knowledge and resources are limited, the "benefit transfer" method is often used to estimate economic values for ecosystem services that cannot be valued otherwise, by transferring available information from detailed original studies already completed in another location and/or context. Benefit transfer is hence used when it is too resource intensive (in terms of money and expertise) and/or there is too little time available to conduct an original valuation study (i.e. an independent, individual assessment of e.g. a hotspot ecosystem), yet some measure of benefits is needed.

Within a TDA undertaking a economic valuation (probably a "tier 1" assessment), the Economic Valuation of Ecosystem Services Guidance Document assists to provide initial information with:

- The identification of ecosystems and ecosystem services present in the IW project (including a checklist to select them for analysis);
- Guidance to obtaining local market prices to assess the value of, e.g. food and building materials;
- Guidance on how to use the repository of original valuation studies;
- Guidance on the benefit transfer methodology.

An economic valuation as a "screening analysis", assessing the overall value of all ecosystem services in a whole LME or transboundary river basin in a resource-efficient way, i.e. without conducting resource-intensive in-depth analyses. Such a screening will most likely be conducted using the easier tier 1 methodology, and be used mainly for communication and awareness raising purposes, possibly in the context of a TDA. Such a "screening" could also form the basis for a following in-depth analysis of all or some ecosystem services in the LME/river basin, which would then follow the tier 2 methodology to be undertaken in the SAP (Section XXX).

For example, eutrophication due to nutrient over-enrichment may result in high concentrations of nitrates of phosphates in a particular water body but the question is: what are the impacts or consequences of this? An environmental impact might be a reduced fish population. This could result in a loss of income and/or a food a source for the riparian population. These are *indirect socio-economic impacts* of the problem. However, there may also be direct socio-economic impacts, for example the impact on health from polluted drinking water. This is shown in Figure 6 below.

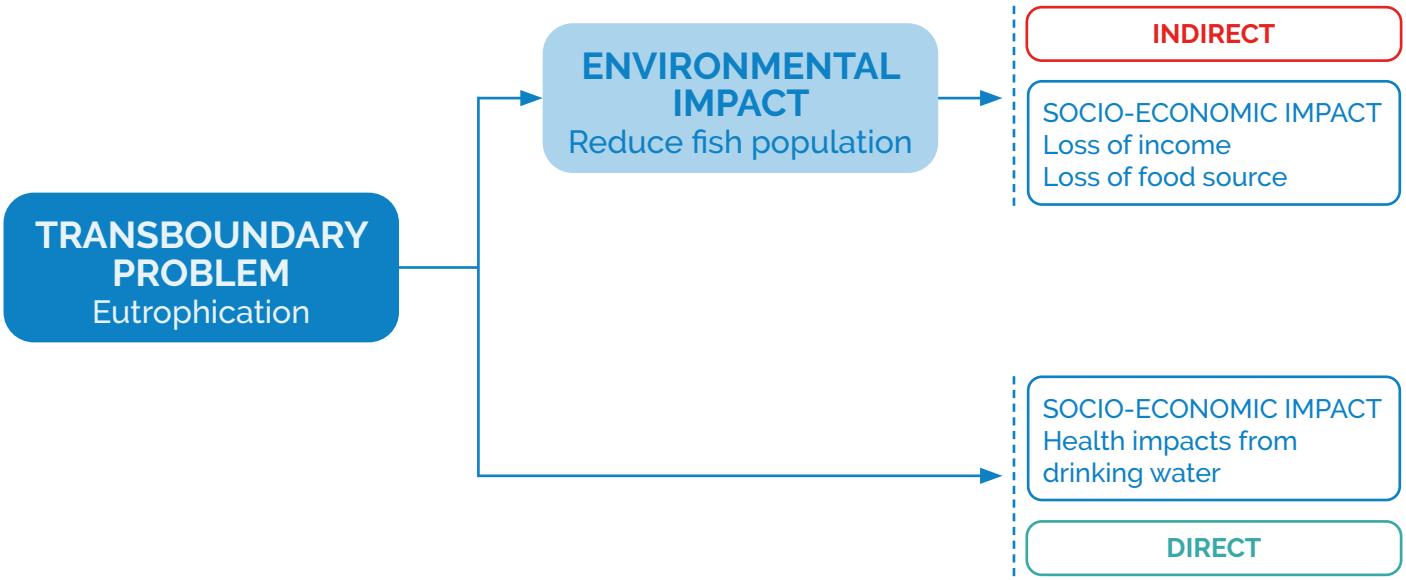


Figure 6: Schematic showing the link between transboundary problems and impacts

2.5.2 Determining Environmental and Socio-economic Impacts

There are 2 key steps in this process:

Step 1: Identification of the impacts of each priority transboundary problem

This step can successfully be accomplished through a collaborative workshop involving the TDA Development team. An example of this is given in Part 3 (Managing the TDA/SAP Process).

Step 2: Further description of key environmental and socio-economic impacts

The purpose of this step is to describe the problem itself (using available survey data showing changes over time, etc.) and the impact of the problem on the environment and socio-economically. The approach to economic valuation as presented in the GEF Guidance Document on Economic Valuation will provide an overview assessment on the dimension of the values of ecosystem services, which could be used for further in-depth assessments during the formulation of the SAP options.

There are a number of options for undertaking this step. These include:

- Use of simple lists of the identified impacts, based on the output from step 1. An example of this approach is the Dnipro River Basin TDA
- Detailed supporting text for each impact, including maps, graphics and figures. An example of this is the Orange-Senqu River Basin TDA. The development of thematic or national reports on impacts could support this.
- The development of a robust set of relevant indicators for which data is available, including baseline data, showing changes over time. An example of this is the 2012 Kura-Aras TDA.

All these options are valid and will depend on the level of data and information available. However, in all cases, the information gathered should concentrate on the transboundary impacts although national or localised impacts can also be described if they are relevant.

2.6 Causal Chain Analysis

2.6.1 What is Causal Chain Analysis?

Causal Chain Analysis (CCA), often also called Root Cause Analysis[3] (RCA), is closely related to systems thinking[4] and the DPSIR approach[5].

At its most basic, a causal chain is an ordered sequence of events linking the causes of a problem with its effects. Each link in the causal chain is created by repeatedly answering the question Why?[6] A simple schematic showing the major components of a CCA is shown in Figure 7 below.

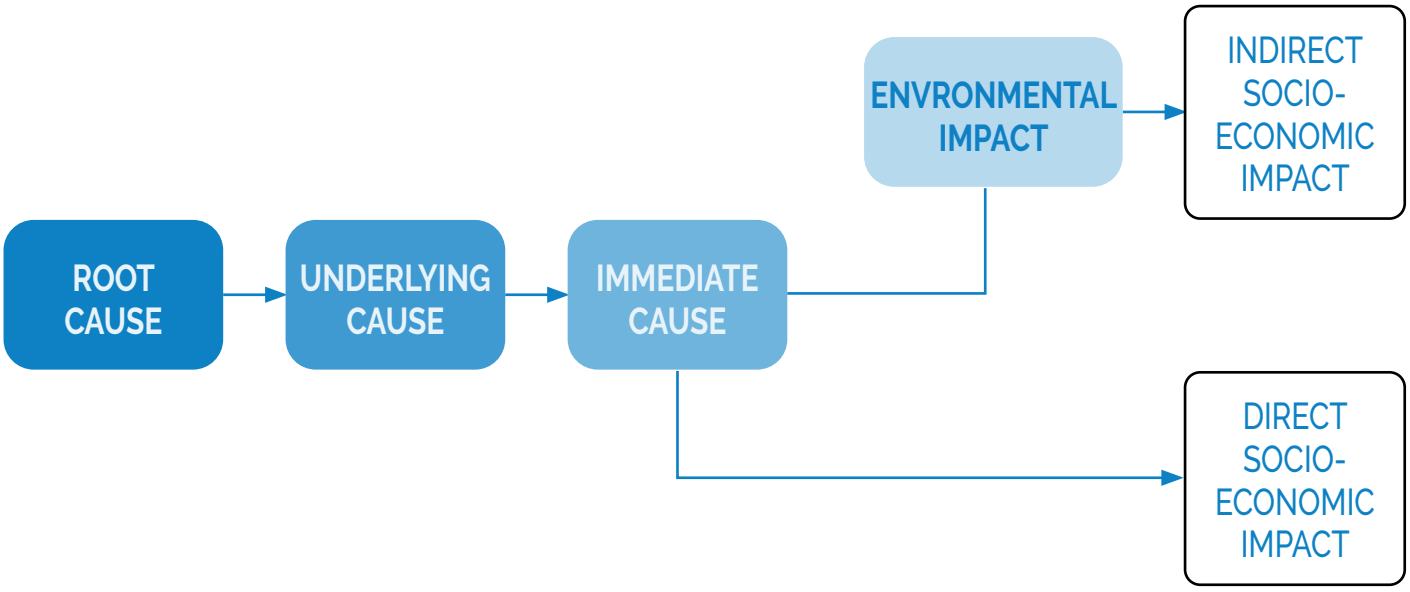


Figure 7: Major components of a causal chain

CCA is predicated on the belief that problems are best solved by attempting to address, correct or eliminate root causes, as opposed to merely addressing the immediately obvious symptoms. By directing corrective measures at root causes, it is more probable that a recurrence of the problem will be prevented. However, it is recognized that complete prevention of recurrence by one corrective action is not always possible.

3 Harich J., Bangerter P. and Durlacher S. (2012), Solving the Sustainability Problem with Root Cause Analysis, Ecosystem Services Partnership Conference Portland, Oregon, US, July 31 to August 4, 2012

4 Meadow D. H. (2008), Thinking in Systems - A Primer, Edited by Diana Wright, White River Junction, VT, Sustainability Institute, Chelsea Green Publishing

5 Kagalou I., Leonardos I., Anastasiadou C. and Neofytou C. (2012), The DPSIR Approach for an Integrated River Management Framework. A Preliminary Application on a Mediterranean Site (Kalamas River -NW Greece), Water Resources Management, 26, 6, 1677.

6 Serrat O. (2009), The Five Whys Technique, Knowledge Solutions, The Asian Development Bank, Manila, Philippines

Unlike systems thinking which focuses on the dynamic and complex whole system interacting as a structured functional unit, CCA approaches have historically tended to be used in a linear manner, examining cause and effect. However, although often displayed in a linear fashion, it should be remembered that a causal chain is a component of a policy response system, which by its very nature is cyclical (Figure 8 below).

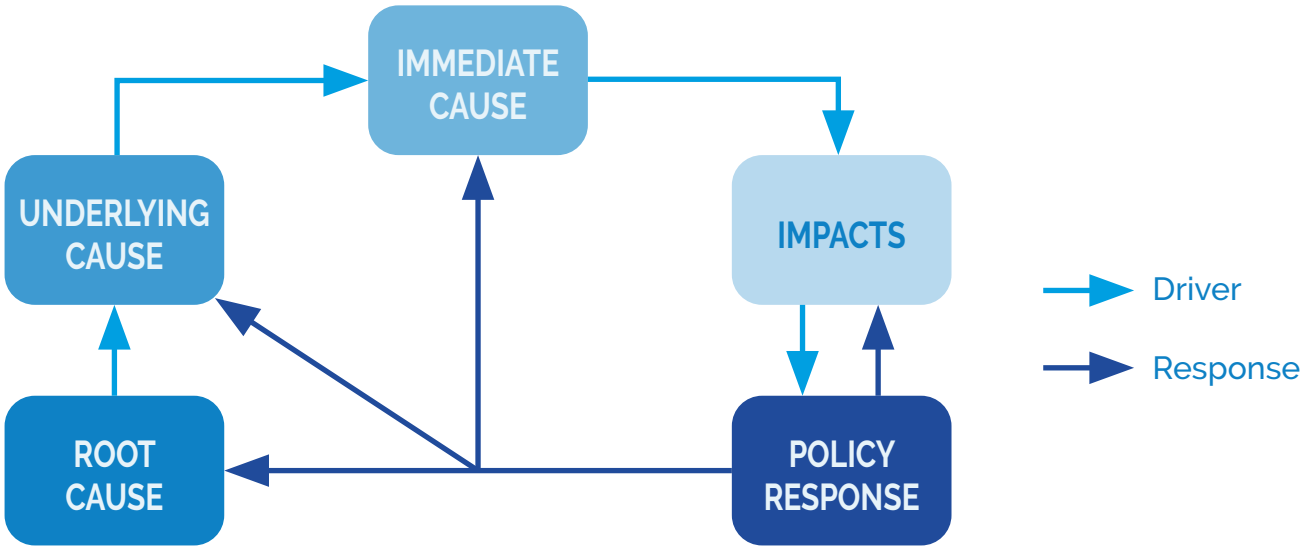


Figure 8: The causal chain as a component of a policy response cycle.

For the purposes of GEF IW projects, CCA is likely to be the most appropriate approach for analysing cause and effect as it is a relatively simple, robust and informative process. Systems thinking approaches - such as Integrated Systems Analysis (ISA) or causal loop diagrams (CLD) can be attempted but will require a much great input of time and resources.

The GEF Floods and Droughts project has developed a CCA tool based on 'Issue Analysis'. This tool can be used to evaluate the key issues and assess the causes based on the environmental impacts and help to prioritise the environmental impacts based on the Water Resources Impact Assessment Method (further details and linkages to the Floods and Drought project is given in Annex 7).

2.6.2 Components of a Causal Chain

As discussed above, at its most basic, a causal chain is an ordered sequence of events linking the causes of a problem with its effects. However, causal chains developed as part of a TDA tend to consist of 3 broad categories of causes:

- Immediate or technical causes
- Underlying causes
- Root causes

Immediate or technical causes (sometimes known as primary causes) are usually the direct technical causes of the problem. They are predominantly tangible (e.g. enhanced nutrient inputs), and with distinct areas of impact (with the exception of causes such as atmospheric deposition or climate change).

Immediate causes, usually being technical in nature are the most straightforward to quantify, prioritise and geographically locate using maps. A few examples of immediate causes taken from existing TDA documents are shown in Table 2 below.

Transboundary Problem	Examples of Immediate or Technical Causes	TDA
Pollution	Discharge of untreated industrial effluents Diffuse pollution from improper application of fertilizers Point and diffuse sources of effluent from livestock farms Pumping of polluted water from mines	Black Sea Lake Chad Dnipro River Basin Orange Senqu River Basin
Fisheries	Excessive fisheries effort/overfishing Destruction of benthic habitats Damage to nursery/spawning areas Destructive fishing methods	Mediterranean Sea Rio de la Plata Black Sea Bay of Bengal LME
Changes in Biodiversity	Discharge of untreated ballast waters Exotic species introduction (notably Mnemiopsis leidyi) Sediments, pesticides and pollution from land-based activities	Black Sea Black Sea Bay of Bengal LME
Degradation of Habitats	Changes in land use Conversion of mangroves for agriculture, aquaculture (shrimp), and salt production	Dnipro River Basin Bay of Bengal LME
Changes in hydrological regime	Damming for abstraction	Orange-Senqu River Basin
Introduction of exotic species	Transport of fouling organisms attached to ships' hulls.	Rio de la Plata

Table 2: Examples of immediate causes

Underlying causes are those that contribute to the immediate causes. They can broadly be defined as

underlying resource uses and practices, and their related social and economic causes (including a lack of awareness of the value of ecosystem services). Governance related causes are often identified here.

Resource uses and practices will tend to fall into areas such as:

Land uses (reclamation/drainage operations, deforestation, agriculture)

Damaging or unsustainable practices (Intensive livestock production, lack of or outdated water tratment technology, destructive fisheries practices)

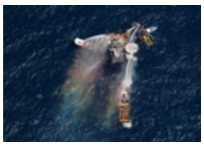
Uses of water (diversion, storage, etc.)

The social and economic causes tend to fall into areas such as:

Lack of investment, operation and maintenance

Poor awareness or education

Governance failures - legislation, regulation, enforcement



To identify these underlying causes it is necessary to understand which sector they fall in (e.g. within agriculture or industry), and the governance framework within which they operate.

Unfortunately, different sectors often act independently. This makes it very difficult to achieve a coordinated inter-sectoral response. Although both policymaking and information are generally sharply divided between sectors, their environmental impacts are not.

Root causes are linked to the underlying social and economic causes and sectoral pressures but they are often related to fundamental aspects of macro-economy, demography, consumption patterns, environmental values, and access to information and democratic processes. Many of these may be beyond the scope of GEF intervention, but it is important to document them for two reasons:

1. Some proposed solutions might be unworkable if the root causes of the problem are overwhelming.
2. Actions taken nearer to the root causes are more likely to have a lasting impact on the problem.

Root causes can be divided into the following categories:

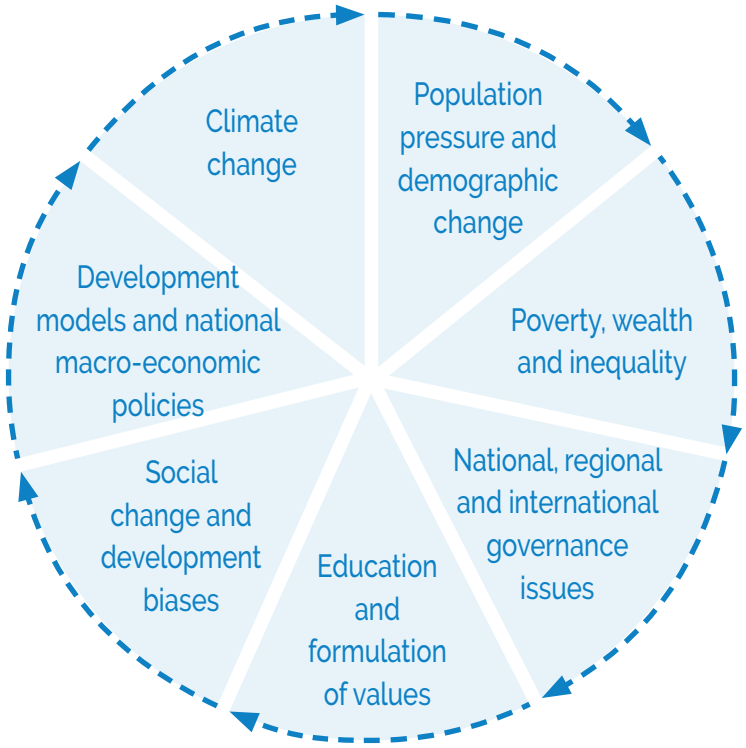


Figure 9: Examples of root causes

In terms of importance to the degradation of the aquatic environment, root causes are often the most difficult to assess. Within each of the above categories, the underlying causes or pressures will link to numerous social/economic/governmental causes, at scales and levels that may vary significantly from region to region.

For example, in the case of eutrophication, a root cause might be a cultural change in diet – such as an increase in meat consumption – that leads to a market demand for cheap meat, and the intensification of animal farming resulting in higher nitrogen and phosphorus emissions. Clearly the GEF would not be able to intervene here, but it is important to understand the driving force for this causal chain when deciding whether or not to intervene at all.

2.6.3 Climate Change - Is it a Root Cause?

As described earlier, climate change could be analysed as a transboundary problem but is often not. Climate change and variability has also been recognised as a significant driver (or root cause) of a number of other transboundary problems – changes in biodiversity, loss of ecosystems, eutrophication, invasive species are all affected by climate change to a great or lesser extent both currently and most probably into the future. Consequently, the effects of climate change (in terms of cause and impact) need to be well understood to ensure that future interventions are both resilient and adaptive.

Further advice, tools and guidance on climate change and variability should be sought through the GEF 'Floods and Droughts' project and from the GEF IW:LEARN Guidance Document aimed at assisting IW projects to integrate solutions to mitigating the impacts of climate change and variability.

BOX 3: CAUSALITY – A NOTE OF CAUTION

Boundaries Between Causes

The 3 categories of causes described above (immediate, underlying, root) are not necessarily discrete from each other. It is useful to consider that they are often component parts of a continuum.

Immediate causes can often be very close to underlying causes, particularly resource uses and practices. For example, the ***immediate causes*** of the ***transboundary problem*** of reduced fish stocks often involve excessive fisheries effort (or overfishing) and destructive fishing methods. These are as a result of damaging or unsustainable practices (an ***underlying resource use and practice).***

Using the same example, the **underlying social and economic causes** of reduced fish stocks are often governance failures, particularly around fisheries legislation, regulation and enforcement, both nationally and internationally. These causes are often very close to the **root cause** of the problem – often a lack of multi-lateral agreements between countries and macro-economic policy development of individual countries. This in turn can be driven by population pressures and demographic change.

The key point to remember is that for the purpose of the TDA, there is likely to be some form of separation of causes to allow for a rigorous analysis, but in reality, causes are often more complicated….

2.6.4 How to Develop a Causal Chain

A causal chain should be developed for each priority transboundary problem with its associated environmental impacts and socio-economic consequences. A number of different approaches to CCA have been developed, some more successfully than others, examples of which are included in Table 3, below.

The process of undertaking CCA is not prescriptive – the examples in Table 2 (above) show that. However, for the purpose of this Manual, a stepwise process used by a number of projects, including: the Black Sea; Kura-Aras River Basin; Dnipro River Basin; Orange-Senqu River Basin; and the Nubian Aquifer is presented below.

CCA Type	TDA	Year
Table or matrix	Black Sea	1996
	Mediterranean Sea	1997
	Benguela Current LME	1999
	Bermejo River	2000
	San Juan River Basin	2000
	Guinea Current LME	2005
	Yellow Sea LME	2007
	Bay of Bengal LME	2010
	Cubango-Okavango River Basin	2011
Graphical or flow diagram	Bermejo River	2000
	San Juan River Basin	2000
	Caspian Sea	2002
	Gulf of Honduras	2003
	Dnipro River Basin	2003
	Mediterranean Sea	2005
	Kura Aras River Basin	2006
	Gulf of Mexico LME	2007
	Black Sea	2007
	Lake Chad	2007
	Guarani Aquifer	2007
	Orange-Senqu River Basin	2008
	Kura Aras River Basin	2013
Text only	South China Sea	2000
	Lake Peipsi/Chudskoe	2005
	Lake Shkoder/Skadar	2006
	Iullemeden aquifer	2007

Table 3: Approaches to causal chain analysis

Note: Examples of causal chains for selected TDAs are highlighted in blue in the above table and are presented in Annex 1 at the end of this part.

There are 2 key steps in the CCA process:

Step 1: Identification of the components of the causal chain

As with the previous sections (Identification of Priority Transboundary Problems and Analysis of Impacts), this step can successfully be accomplished through a collaborative workshop involving the TDA Development team. An example of this is given in Part 3 (Managing the TDA/SAP Process).

Ideally, this workshop will be a separate event from the workshop that focused on transboundary problems and impacts but this will depend on the time, funds and human resources available for the task.

Step 2: Further development of the causal chains based on the outputs from the CCA Workshop

It is highly probably that the outputs from the CCA workshop will only provide a starting point for the completed causal chains. At the very most, it will produce a comprehensive list of sectors, immediate, underlying and root causes for the priority transboundary problems with information on linkages between different levels.

The purpose of this step is to complete each causal chain and provide quantitative or qualitative data to substantiate the analysis if possible. The two approaches for undertaking this step shown in Table 4.

CASUAL CHAIN TYPE	ADVANTAGES AND DISADVANTAGES
Table or matrix (e.g. Bay of Bengal LME)	✓ Simple to produce ✓ Conceptually easy for the expert to produce ✗ Difficult to show linkages between causes ✗ Can be conceptually difficult for the reader to understand ✗ Often difficult to identify SAP interventions
Flow diagram (e.g. Kura-Aras River Basin)	✓ Show linkages between causes ✓ Work well using the sectoral approach ✓ Conceptually easy for the reader to understand ✗ Difficult to construct ✗ Conceptually difficult for the expert to produce ✗ Time consuming ✗ Often difficult to identify SAP interventions

Table 4: Two approaches for causal chain analysis – advantages and disadvantages

Both approaches are valid - table (or matrix) based causal chains are generally simpler to produce but provide less information and do not show linkages between causes whereas flow diagrams are more difficult to construct but are generally more informative and show the linkages between causes.

Examples of causal chains using both approaches are presented in Annex 1 at the end of this part.

Irrespective of the approach used, each chain should be supported with a narrative with quantitative or qualitative data or indicators.

2.6.5 Advice from the Field

At each stage in the CCA, keep asking 'Why?' – Generally five iterations of asking 'why' is generally sufficient to get to a root cause5.

Causes interact – It is very likely that there will be links between several causes and the same effect or the same cause producing several different effects. In addition, activities in different sectors of society (e.g. agriculture, industry, transport, etc.) will result in specific causes and effects but these are likely to interact with other sectors.

Do not underestimate the time needed to carry out CCA – It is unlikely that all the CCAs will be completed in one workshop. Work will need to be continued between sessions.

Expertise – Ensure that the TDA Development team members working on the CCAs cover all the areas of expertise needed. In particular, good social, legal, political and economic experts (including ecosystem valuation experts) will be required.

Work in a stepwise manner – Start with the immediate causes and work towards the root causes.

Preparedness – Try to be well prepared prior to the main causal chain workshop. Have the CCA methodology well developed and understood by key members of the TDA Development team.

Briefing – The CCA process can be difficult for people to conceptualise, so ensure that the Development team are adequately briefed prior to any workshop by key members of the team and try not to be over ambitious.

2.7 Development of Thematic or Synthesis Reports

2.7.1 What are Thematic or Synthesis Reports?

The main source of supporting information for the TDA will be thematic (synthesis) or national reports. These are likely to be drafted by selected consultants or team members from the TDA development team with each report using a similar structure.

Projects are encouraged to utilise previous GEF IW project results (as emphasised above) when developing thematic reports. For example the GEF IW TWAP or Indicators projects could assist in developing reports on the status of waterbodies, providing data that can assist with developing baselines and methods to develop appropriate indicators for use in both the TDA and SAP; potential climate change impacts could be assisted by the GEF 'Floods and Droughts' project (including a semi-automated approach for preparing reports – see annex 7) or IW:LEARN guidance aimed at IW projects; stakeholders analysis can be assisted by the work being undertaken in IW:LEARN (phase 4) on gender mainstreaming training and approaches. Tools developed by UNESCO-WWAP and WWF are summarised in Annex 8.

Thematic or (synthesis) reports

These can range from specific reports on transboundary problems (e.g. biodiversity, pollution, flooding, fisheries etc), to reports on broader issues (e.g. the current situation in the water system, climate change etc), to detailed studies on aspects of the TDA (e.g. governance, stakeholders, socio-economics, environmental goods and services).

In developing ecosystem valuation reports, the advice from the TDA/SAP guidance manual is to ensure that TDA experts recruited to assist with economic aspects are familiar with the IW:LEARN Ecosystem Valuation Guidance Document.

> **Note:** When undertaking an LME Project, the 5 LME Modules (productivity, fish and fisheries, pollution and ecosystem health, socio-economics, governance) are a good starting point when developing thematic reports. This approach has been successfully used by the Humboldt Current LME project.

More details on some key Thematic Reports - Governance Analysis, Stakeholder Analysis, Socio-economic Analysis and Analysis of Environmental Goods and Services - are presented in Section 2.8. Examples of projects that have developed thematic reports are shown in Box 4, below.

National reports

These are essentially country specific TDAs which collate all transboundary data/information relating to a given country into a single document.

Both approaches have been used for TDA development, although thematic reports are generally favoured. Consequently, for the purpose of this Manual, a process for developing thematic or synthesis reports is presented in Section 2.7.2, below.

BOX 4: EXAMPLES OF THEMATIC REPORTS

Black Sea

- Thematic report on: fisheries; biodiversity; pollution loads pollution assessment
- Stakeholder analysis report
- Causal Chain analysis report
- Governance analysis report

Kura-Aras River Basin

- Thematic reports on: climate change biodiversity and ecosystems; water quality; non rational use of water; irrigation and drainage; flooding; groundwaters; gender mainstreaming
- Socio-economic and institutional trend analysis
- Legal and institutional framework for the water sector

Yellow Sea LME

- Thematic reports on sustainable management of fisheries and aquaculture; Biodiversity protection; reductions on the stress of ecosystem, improvement of water quality and protection of human health; institutional development and capacity building

Lake Chad

- Thematic reports on: the environment; soils; socio-economic aspects; IWRM

Orange Senqu River Basin

- Thematic reports on: socio-economic situation and land-use; legal and institutional framework for the water sector; change of climate and evaluation of environmental vulnerability; biodiversity and ecosystems; deteriorating water quality as a result of pollution and land degradation; hydrology of the Basin

2.7.2 Developing Thematic or Synthesis Reports

There are 2 key steps in the in this process:

Step 1: Identification of the key areas for reporting and national experts to develop the reports

The Project Manager and TDA Development Team will need to identify the key areas for reporting, based on the prioritised transboundary problems, their impacts and causes. In addition, they will also need to identify suitable candidates to develop each report. Candidates could be members of the Development Team or recommended by the Development Team. Terms of Reference (ToR) for each Report will need to de developed and it is recommended that each ToR and report use a similar structure.

Step 2: Report development and review

It is critical that the national experts recruited to draft the thematic reports regularly report back during the report development phase. In addition, it is important to host a Thematic Report Workshop to enable the TDA development team to:

- Review and comment on the draft thematic reports presented by the national experts
- Make suggestions for improvement
- Accept the reports as concrete inputs to the next phase of the TDA development, if appropriate.

2.8 Key Thematic Reports

2.8.1 Introduction

This section describes some key Thematic Reports that are likely to be undertaken during the TDA development process, in addition to reports on ecosystem status and pressures, etc. as required by the specifics of the problems to be addressed. These are:

- The Governance Analysis;
- The Stakeholder Analysis (including gender related aspects[7]);
- The Socio-economic Analysis; and
- The Analysis of Ecosystem Services

Note: When undertaking an LME Project, the governance and socio-economic LME Modules are a good starting point when developing thematic reports.

7 GEF 7 requires a detailed gender analysis for all projects and the TDA should build on the analyses undertaken in the Project Document.

2.8.2 Governance Analysis

What is Governance?

Simply put governance means the process of decision-making and the process by which decisions are implemented (or not implemented). The challenge for all societies is to create a system of governance that promotes, supports and sustains human development - especially for the poorest and most marginal.

Governance can be seen as the exercise of economic, political and administrative authority to manage a country's affairs at all levels. It comprises the mechanisms, processes and institutions through which citizens and groups articulate their interests, exercise their legal rights, meet their obligations and mediate their differences.

The processes of governance can be expressed through three key mechanisms: economic, political and civil society.

1. **Civil society –** This includes non-governmental institutions and arrangements and focuses on individual and collective behavior, and cooperation among individuals and between groups of individuals- in particular NGOs and special interest groups.
2. **Political –** This includes the process of decision-making to formulate policy and regulation, whether at a local, regional, or national level.
3. **Economics –** This includes decision-making processes that affect a country's economic activities and its relationships with other economies as well as efforts to attach monetary values to ecosystem services.

These mechanisms interact with one another through complex and dynamic interrelationships. Individually and collectively these three mechanisms of governance affect how society uses and otherwise interacts with its environment.

Good governance should be, among other things, participatory, transparent and accountable. It should also be effective and equitable. And it promotes the rule of law. Good governance ensures that political, social and economic priorities are based on broad consensus in society and that the voices of the poorest and the most vulnerable are heard in decision-making over the allocation of development resources.

What is Governance Analysis?

Governance analysis examines key aspects of the processes of governance (political, economic, civil society) and focuses in on the dynamics of these relationships. This is outlined in Figure 10 below.

As described earlier, the main objective of the TDA is to provide the factual basis for the development of the overall Strategic Action Programme (SAP). Taken in isolation, the TDA focuses on scientific and technical assessments, whereas the options for strategic action require decisions and implementation by a wide range of stakeholders, both in government and outside government. This is why governance analysis is critical to the TDA/SAP process.

Economic arrangements

- Decision-making processes that affect a country's economic activities and its relationships with other economies
- Butgetary allocations
- Relevant investments (both national and international)

Political and decision-making arrangements

Institutional structures

- Political structure of the countries involved - including electoral precesses & representation systems
- Institutional frameworks - key government departments and regulatory agencies including the dynamics between differents branches

Policy, legislative and regulatory framworks

- Policy, legislative and regulatory framworks - including the process of decision-making to formulate policy and regulation at the local, sectoral, national and regional level
- Current development plans and policies, again at local, sectoral, national and regional level

Civil society arrangements (including non governmental institutions)

- Key businesses and corporations
- Networks within civil society
- Key NGO's and special interest groups
- Trade groups
- Community groups

Figure 10: Key aspects of the processes of governance

There is no agreed blueprint for governance analysis in the TDA/SAP Approach. The type of governance analysis used will always reflect the cultural, political and social structure of the countries where it is being carried out. Furthermore, it will differ between different water systems – what is appropriate for river basins may not be appropriate for LMEs and vice versa.

However, the governance analysis should be informed by the other thematic reports developed during the TDA (stakeholder analysis, socio-economic analysis and economic valuation of ecosystem services).

The GEF TWAP project investigated governance approaches for five waterbody types at the global level and will serve as a useful starting point in developing a governance thematic report. (reference) and has developed approaches for assessing the effectiveness of governance approaches (applied in CLME and BoBLME TDA/SAP). Projects are referred to the governance work undertaken by TWAP for further details (www.geftwap.org).

Governance Analysis for different aquatic systems

As described above, there is no agreed blueprint for governance analysis in the TDA/SAP Approach. Consequently, this subsection focuses on approaches for governance in both marine systems, and surface water and groundwaters that are already in existence and have proven to be practical and effective.

Marine systems (LMEs, enclosed seas)

The LME concept, currently being applied to 23 international projects in Africa, Asia, Latin America, and Eastern Europe uses a five-module approach (productivity, fish and fisheries, pollution and ecosystem health, socioeconomics, and governance). The LME governance module has been much studied and has produced a number of well-written and substantive frameworks, handbooks and manuals. In addition, LME projects are encouraged to review the various toolkits that have been prepared by the GEF LME:LEARN project[8] (in particular the Governance Toolkit and socio-economic that are designed to support the TDA/SAP process.). These include:

A Handbook on Governance and Socioeconomics of LMEs[9] - The primary purpose of this handbook is to serve as a practical guide to innovators of governance and socioeconomics in Large Marine Ecosystem (LME) projects. It explains why governance and socioeconomics are important to the success of resource management in the LME context. Good governance and socioeconomics can lead to good outcomes; bad governance and socioeconomics nearly always doom management efforts to failure. To improve the chances of successful management, the Handbook explains the basic principles and ingredients that make for good governance and socioeconomics – at all phases of LME project development, from the Transboundary Diagnostic Analysis to the Strategic Action Program, and implementation of adaptive management and sustainable financing.

Implementation of adaptive management and sustainable financing: A Framework for Monitoring and Assessing Socioeconomics and Governance of Large Marine Ecosystems[10] – This comprehensive report provides a framework for linking the LME socioeconomic and governance modules with the natural resource science-based LME modules (productivity, fish and fisheries, and pollution and ecosystem health). In particular there is a very useful section on Monitoring and Assessment, which uses a stepwise process of monitoring and assessing the human dimensions of an LME and the use of its resources, including governance interactions.

Measurement and assessment for improved water governance: An understanding of the values and benefits that people derive from water systems should be central to the development and implementation of regional, national and international policies addressing these assets as well as specific management decisions for individual sites. The GEF TWAP project developed a comprehensive approach to assessing governance framework in transboundary waters, primarily aimed at LMEs. This approach has been successfully applied with the GEF CLME and BoBLME to review complex governance structures in developing the TDA and SAP for their regions. The IW:LEARN (4th phase) has provided knowledge on the application of gender sensitive key indicators for water assessment, in particular on water governance aspects and on transboundary cooperation and institutional frameworks[11].

8 LME:LEARN

9 Olsen S.B., Sutinen J.G., Juda L., Hennessey T.M. and Grigalunas T.A. (2006), A Handbook on Governance and Socioeconomics of Large Marine Ecosystems. Kingston, RI: Coastal Resources Center, University of Rhode Island. 94 p

10 Sutinen, S.G. (Ed) (2000), A Framework for Monitoring and Assessing Socioeconomics and Governance of Large Marine Ecosystems, NOAA Technical Memorandum NMFS-NE-158

11 Seager, J. 2015. Sex-disaggregated indicators for water assessment monitoring and reporting. Technical Paper. Gender and Water Series. WWAP. Paris, UNESCO

In addition, the Yellow Sea and the Caribbean Sea LME Projects have both produced governance reports that are examples of good practice in action:

The Yellow Sea: Governance Analysis Reports (2008), UNDP/GEF Yellow Sea Project, Ansan, Republic of Korea[12] - This publication contains reports on governance Analyses conducted under the UNDP/GEF Project entitled, "Reducing Environmental Stress in the Yellow Sea Large Marine Ecosystem." The publication consists of three reports: The National Governance Analysis for China, The National Governance Analysis for Republic of Korea, and a Regional Governance Analysis. The national reports describe governance issues in the Yellow Sea in terms of stakeholders, national institutions, and national policies and legislations. The regional analysis addresses the issues from regional perspectives, providing suggestions on how to improve the current co-operative mechanisms in the Yellow Sea. Research institutes and universities in the region conducted data collection and analysis. Data were collected from online databases, data information centres, peer-reviewed journal articles, universities, and through interviews with regional experts. The results of the Governance Analyses were used to provide the basic foundation for identifying possible interventions to mitigate the transboundary problems of the Yellow Sea, and greatly contributed to the Yellow Sea TDA and SAP.

The Caribbean LME: TDA Update for Fisheries Ecosystems: Governance Issues[13] *(2011)* and the CLME SAP (2013) - The Caribbean LME Governance Report addresses the governance aspects of updating the TDA and causal chains for the CLME Project. It begins by providing an overview of the governance issues identified in the preliminary TDA. The report considers how the original governance perspective, as well as the subsequent advances in ocean governance, can be incorporated into the new orientation towards a fishery ecosystem-based approach to provide the most comprehensive and up-to-date approach to governance for the CLME Project. The fishery ecosystem-based approach was adopted early in the Full Project which is now oriented towards three fishery ecosystems: the continental shelf, the pelagic and the reef fishery ecosystems. The work on the CLME was further utilised in the GEF TWAP LME governance assessments.

Surface water and groundwater systems (Rivers, lakes, aquifers)

Although there is no definitive approach to governance analysis in river basins, there are examples of good practice. In addition to the specific guidance offered by the GEF TWAP project on assessment and indicators, TDA/SAP projects are encouraged to review the approaches and tools in the GEF Floods & Drought Management Project and the GEF Groundwater Governance Project. Relevant examples of GEF projects include:

The Danube River Basin Transboundary Analysis (2006) – The Danube Transboundary Analysis was based on extensive work undertaken by the countries in meeting the European Union Water Framework Directive. It presents a simple, yet logical analysis of institutions, legislation and investment needs within the Danube River Basin.

Kura-Aras River Basin Legal and Institutional Framework for the Water Sector in Armenia, Azerbaijan, Iran and Georgia (2005 and updated in the 2013 TDA) – This report was prepared within the UNDP/GEF Project on Reducing Transboundary Degradation in Kura-Aras Basin and reviews the legal and institutional framework of the water sector in the Kura-Aras basin countries. It analyzes the existing strengths and weaknesses, and proposes some measures to improve water management in the riparian countries. An emphasis was focused on regional cooperation from a transboundary perspective, rather than looking at countries as separate entities.

12 UNDP/GEF 2008. The Yellow Sea: Governance Analysis Reports. UNDP/GEF Yellow Sea Project, Ansan, Republic of Korea

13 Mahon R., Fanning L. and McConney P. (2001), CLME TDA Update for Fisheries Ecosystems: Governance Issues, The Caribbean Large Marine Ecosystem and Adjacent Areas (CLME) Project, Cartagena, Colombia.

A number of studies on lake governance have been carried. The International Lake Environment Committee (ILEC) has produced a number of well-written and substantive reports and manuals. These include: Managing lakes and their Basins for Sustainable Use: A Report for Lake Basin Managers and Stakeholders. This report derives lake based management lessons (including governance challenges) from a range of GEF funded projects. The experiences gained from the lake projects reviewed in this report have provided a great deal of new information, particularly in an area that had been relatively poorly studied in the past.

In addition to the above, there are useful governance resources available for both surface and groundwaters including the 2009 IUCN Reforming Water Governance[14] document.

Advice from the Field

Use existing assessments Possible sources include international or regional organisations (UNDP, World Bank, regional development banks), universities, research institutes, NGOs, and private sector consultancies.

Try to go beyond the formal aspects of political and social interaction to the more revealing, decisive informal levels. For example, don't just describe the formal decision-making hierarchy but find out where decisions are really taken, and by whom, and why.

Use open-ended questions when developing interviews, questionnaires and surveys and try to get inputs from various perspectives.

Attend coordination meetings at key ministries or agencies in order to observe the dynamics – the informal 'rules of the game'. Inter-sectoral or inter-ministerial meetings are also very revealing.

Talk with in-house journalists at key ministries, and to journalists who cover political and sectoral areas.

Identify long-time staff members (mid-level or advisory roles), and interview them; often this is where the real institutional memory is deposited, the knowledge of what was done when, what worked and what did not – and why; similarly, these are the people who will know about the process of developing, implementing or evaluating a given policy.

Track down former staff members who have worked on key areas or programmes in order to get their perspective – they may be more open about past efforts, problems, mistakes and achievements.

14 Iza A. and Stein R. (Eds) (2009), RULE – Reforming water governance. Gland, Switzerland: IUCN

Introduction

The TDA should have a detailed stakeholder analysis as a thematic report, separate from the body of the TDA. The thematic report should be a full analysis that is summarized in the TDA highlighting the most important findings. The thematic report is valuable for reference in later stages of the project, as it establishes a critical baseline of attitudes, beliefs and opinions about the issues the project is addressing. LME projects will also benefit from the recent LME:LEARN Stakeholder Engagement toolkit that has been developed (REF).

A stakeholder analysis is necessary in order to understand the perceptions, needs, interests, and concerns of the stakeholder groups in the water system. It is important to include stakeholders from a wide range of socioeconomic status and education levels, from different locations, professions and equal gender balance. An example of good practice when carrying out a stakeholder analysis is presented in Box 5, below.

BOX 5: THE BLACK SEA ECOSYSTEM RECOVERY PROJECT STAKEHOLDER ANALYSIS – AN EXAMPLE OF GOOD PRACTICE:

The Black Sea Stakeholder Analysis involved conducting quantitative surveys of stakeholders throughout the region. This analysis identified stakeholders of the Black Sea Ecosystem Recovery Project and provided insights into the concerns, priorities, capacities and perceptions of stakeholder groups throughout the region in regards to specific transboundary environmental issues. It also identified where tensions or potential tensions could emerge as a result of different expectations and priorities for Black Sea resource uses.

The stakeholder analysis methodology involved identifying stakeholder groups through desk studies, consultation with project staff, and review of issues, thematic reports, historical project materials socio-economic and government structures throughout the region. Following this the survey was developed following consultation with earlier stakeholder analyses in the region, surveys conducted by NGOs, reports from the project. The conclusions of these were combined with the findings of the Causal Chain Analysis conducted within the scope of the current TDA. Based on these sources, survey questions were developed.

The survey was conducted in all six Black Sea countries among 42 different stakeholder groups. Surveys were translated into local languages and were administered by national level stakeholder consultants throughout the region. A total of 368 surveys were collected and statistically analyzed for trends among and between groups. Areas of notably high and low priority concern or high levels of variation within groups were detailed and analyzed for the potential causality and significance of these trends. Issues which showed potential for conflict between groups were highlighted.

Key Issues

In order to make the most of the stakeholder analysis it is worth hiring a professional social scientist to help with this process – it is unlikely a project would hire a biologist to write hydrology reports so ensure someone qualified is hired to do the stakeholder analysis for the project. This is a key component that will be very valuable to the project, and the TDA in particular, and when done correctly it is likely to significantly improve the success of the project.

The stakeholder analysis can involve surveys, group meetings, one-on-one meetings and if needed, an armchair analysis to speculate on who the key stakeholders are. It's important that at least two of these are used to make sure the results are accurate by cross checking the findings. In addition, stakeholders will be able to help identify other stakeholders that need to be included.

If surveys are used be sure to follow best practices for survey research for international situations. Surveys should include closed questions that are translated into local languages and then translated back to the original language. This will ensure that the questions are asking what the analyst meant to ask. When analyzing findings it's important to cross reference not only for professional and stakeholder groups but also for location, gender, age and education level.

Remember, when carrying out a survey make sure the people giving the survey are respectful at all times. Often the people interviewed for a particular stakeholder analysis will be the same people the project will want to work with in the future so keep that in mind when meeting them and working with them.

It is critical that the stakeholder analysis not show bias or forces the subjects to lean towards one particular approach or issue. It is important that the people giving the survey understand that the survey responses must be the opinion of the individuals not person giving the survey. All information from the survey should be completely confidential and no individual person should ever be identified. Stakeholders that are interviewed must be completely confident than what they share will not come back to them professionally in a negative way.

Make sure when surveys are collected and analyzed that the original surveys are disposed of discreetly so that they cannot be found later. While this may seem extreme it is worth doing so to protect stakeholders to help them feel more secure. It will also mean you are getting the most honest answers possible. This is good standard practice in all social sciences.

When the analyses of the stakeholder surveys are conducted, look for the averages of the stakeholder groups, as well as standard deviation. It is important to measure how strong the opinions are among the groups and where there is variation and the strength of that variation. In the analysis look at the stakeholder groups between countries and within countries to determine what is influencing their opinion. It may be a professional issue but it may also be a more political issue.

For example there may be common beliefs about the impacts of water quality among ecology ministry officials in different countries. And yet the belief of the severity of the impacts and their source may not be shared between countries and can become contentious. Finding these tensions through an unbiased stakeholder analysis can be very important within the TDA process.

Ultimately, the more people interviewed the better but this will often be determined by budget, time and human resource constraints. Whenever possible one-to one meetings with individuals to discuss the issues is preferable to group meetings for the initial stakeholder analysis to allow for candid responses. Later, as time and budgets permit, stakeholder meetings to review the TDA will also be beneficial as a check on the information collected and to share the information within the TDA with those who are directly involved with it.

Further involvement of stakeholders in the TDA/SAP process is addressed in the Project Managers Manual.

Gender mainstreaming

All projects should be sure to have awareness of gender issues. Gender issues do not just regard women, but encompass how different gender roles imply different approaches to the use and management of water resources. By not considering gender, the project may fail to address important issues which impacts one group of society more than others. The stakeholder analysis should ensure gender is included as a variable, as the consideration of gender issues is relevant for the success of all IW projects. The former may occur through gender analysis and the collection of sex-disaggregated water data, as part of the TDA, with the use of specifically developed indicators and guidelines. The lack of sex-disaggregated data is a major obstacle to the production of scientific evidence on gender inequalities related to water and to the formulation of evidence-based policies.

The New GEF Policy on Gender Equality (GEF/C.53/04 October 10, 2017) translates into concrete policy requirements the GEF's ambition to shift from a gender-aware, "do no harm" approach to a "do good", gender-responsive approach that seeks to seize opportunities to address gender inequalities and promote the empowerment of women. Specifically, the Policy:

- Clarifies the GEF's approach to mainstream gender and promote gender equality and the empowerment of women;
- Formalizes and provides clarity about GEF requirements for addressing gender equality in GEF-financed activities, including the mandatory requirement for Agencies to provide a gender analysis or equivalent socio-economic assessment at or prior to CEO Endorsement/ Approval, and for the Secretariat to assess whether adequate documentation is provided; and
- Introduces a clearer focus on results, including requirements for project- and program-level monitoring and reporting on gender by Agencies, and portfolio- level monitoring and reporting on performance and results by the Secretariat.

Through an in-depth gender analysis at the conception of a water-management project, gaps, opportunities and entry points for gender mainstreaming are identified, as well as why and how they occur. Doing so, the development of the subsequent action plan may include gender-responsive activities, implementation, and monitoring and evaluation. The use of baseline and monitoring tools for quantifying the impact of particular actions is critical here. An example of such gender baseline knowledge related to water and more in general a global standard for gender sensitive water monitoring through data collection is the UNESCO-WWAP Water & Gender Toolkit (http://www.unesco.org/new/en/natural-sciences/environment/water/wwap/water-and-gender/gender-sensitive-water-monitoring-assessment-and-reporting/).

Women and men need to be aware of the contribution both make to water management. In cases of traditional cultures in which men and women's roles vary significantly, respect for those differences and recognition of the respective contributions is important. In line with this, engagement of men and boys is key to challenging gender-based discrimination in the water realm as well as empowering women at the decision-making level is important. Here, the collection of disaggregated data may bring visibility to each community member and to identify the differences between the perceptions regarding water and its use from a females and males perception/perspective.

The expected outcome of the above set of actions will be: enhanced recognition of gender roles, and empowerment of women in water management through increased participation, which in turn is expected to improve IWRM and transboundary cooperation.

There are often advantages to having a gender expert involved in the project to help navigate these sensitivities and to build a stronger project that is inclusive of all stakeholder groups.

The GEF-funded IW:LEARN project has included in its fourth cycle a gender sub-component "Promotion of Gender Mainstreaming in the GEF IW Portfolio", with the scope of achieving increased recognition of gender issues and attention on gender equality throughout the GEF IW projects. The IW:LEARN Gender sub-component is executed by the United Nations World Water Assessment Programme of UNESCO (WWAP) and the World Wildlife Fund (WWF).

2.8.4 Socio-economic Analysis

The TDA can also benefit from having a detailed socio-economic analysis as a thematic report, again separate from the body of the TDA. The thematic report should be a full analysis that is summarized in the TDA highlighting the most important findings. LME projects will also benefit from the recent LME:LEARN Environmental Economics toolkit.

The socio-economic analysis should focus on the impacted project area in terms of the social and economic setting. Ideally the data should be standardized whenever possible when comparing between countries. National statistic agencies often have a great deal of information, though care should be taken to review how, where and when data was collected. It is best to have a national expert collect this data rather than an international expert if possible. This information can then be compared to the international level data available from the World Bank UNDP human development report and other databases including FAO, WHO and the International Labour Organization. When collecting this data be sure to read the description of what that data is actually asking and how that data is collected.

The data collected needs to be broken down into demographic information, social information and economic information as sectoral information. For demographic data it will depend on the type of water system and what the project trying to address. Issues such as overall population are important, as are other indicators such as average age of population, urbanization rates and population per square km.

It is important to have data disaggregated by sex, age, income, ethnicity, etc in accordance with the requirements to the countries of the Agenda 2030. Note: that for the SDGs the related Fundamental Principles of Official Statistics state that *"…(Sustainable Development Goal indicators should be disaggregated, where relevant, by income, sex, age, race, ethnicity, migratory status, disability and geographic location, or other characteristics"*. It is hence preferable that all data collected and processed by the countries be already in a disaggregated manner and the TDA process can assist where possible.

Public health information is also important to collect. This can be measured through life expectancy at birth, infant mortality, percentage of malnourished population, percentage of poverty, and percentage of access to health care of population.

BOX 6: POVERTY – A SOURCE OF INFORMATION

Poverty Reduction Strategy Papers (PRSP) are prepared by the member countries through a participatory process involving domestic stakeholders as well as development partners, including the World Bank and the International Monetary Fund (IMF). Updated every three years with annual progress reports, PRSPs describe the country's macroeconomic, structural and social policies and programs over a three year or longer horizon to promote broad-based growth and reduce poverty, as well as associated financing needs and major sources of financing.

Interim PRSPs (I-PRSPs) summarize the current knowledge and analysis of a country's poverty situation, describe the existing poverty reduction strategy, and lay out the process for producing a fully developed PRSP in a participatory fashion. The country documents, along with the accompanying IMF/World Bank Joint Staff Assessments (JSAs), have been made available on the World Bank and IMF websites by agreement with the member countries.

There may also be a need to collect wider demographic information such as ethnic diversity, religion, age of population, migration trends, population growth rate, urbanization rates, number of people per square kilometer, etc. This information presents a broader picture of the issues the project is dealing with as well as what conditions the wider stakeholder community is working within.

GDP per capita is often a very important overall indicator of income within individual countries and across the region. Also look at the wider issues of income distribution - the GINI index can be used for this because often a large degree of wealth can be concentrated in the hands of a few individuals. Again this helps obtain a better picture of the social aspects that the project is working within.

It is also important to examine economic data. This can include employment rates by sectors and income for GDP by sector, amongst others. In addition the analysis should focus on the different sectors that are important to the economies of the countries participating in the project. Again, this will vary according to the water system and what the project is trying to address. A trained social scientist or socio-economic expert can help to determine the best way forward for the project when conducting this analysis.

2.8.5 Economic valuation of goods and services

Introduction

In order to carry out an effective TDA and to design a SAP that is likely to be approved, there is a need to have at least an approximation of the economic value of ecosystem services of the water system. This is difficult, especially when it comes to considering the non-use values. However, the leverage points identified later during the TDA development process have to be based on an action that a government is prepared to finance.

Consequently, it would be beneficial if the TDA included a good economic analysis including an economic valuation services – although this will depend on the complexity of the project and the time and budget available. The thematic report should be a full analysis that is summarized in the TDA highlighting the most important findings. The report is valuable for reference in later stages of the project, particularly during SAP development as it creates a basis for sound decisions about the allocation of financial resources and allows for a more integrated decision-making approach than has commonly been the case to date.

In developing the thematic report on the value of ecosystem services, TDA development consultants are urged to use the recent IW:LEARN Guidance Documents on this subject and consider the merits of following the "screening" approach proposed for Tier 1 assessments within the TDA and performing more detailed, Tier 2 assessments, when developing options for the SAP (if resources are available).

As a preliminary screening to assess the values of ecosystem services, the recent Guidance includes the following steps as part of the Tier 1 procedure, some of which are included in the TDA process:

- Determination of the spatial boundaries of the area to be studied
- Identification of ecosystems and ecosystem services present.
- Identification of which ecosystem services can be assessed directly via (local) market prices, and which need a benefit transfer.
- Assess the values of provisioning services via local market prices.
- Assess the values of other ecosystem services using the simplified Benefit Function Transfer approach.
- Summing up the values and determining the Total Value.

The terms used (e.g. market prices, total value, benefit function transfer, etc. are explained in the detailed guidance on economic valuation.

As an example of good practice, Box 7 presents a brief outline of the economic valuation approach used in the Yellow Sea LME[15].

BOX 7: ECONOMIC VALUATION IN THE YELLOW SEA LME – AN EXAMPLE OF GOOD PRACTICE

During the initial project development phase from 1996 to 1999, a framework Strategic Action Programme (SAP) was developed for the Yellow Sea LME that not only formed the basis for the GEF approval of the project but was also somewhat innovative in including a cost benefit analysis of the benefits of action compared with non-action. The challenge facing the SCS project in 1999 was that the only "ecosystem values" readily available were those of Costanza *et al.* (1997) that were based on global data and have subsequently been challenged on both economic and scientific grounds. The Project Steering Committee, composed solely of participating government representatives, in approving the draft SAP and the SCS GEF Project, insisted not only that the project activities include the revision of the SAP but also the determination of regionally applicable economic values for environmental goods and services.

14 UNEP (2007), Procedure for Determination of National and Regional Economic Values for Ecotone Goods and Services, and Total Economic Values of Coastal Habitats in the context of the UNEP/GEF, Project Entitled: Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand, South China Sea Knowledge Document No. 3., UNEP/GEF/SCS/Inf.3

Initially, the plan was for each national working group to review the economic data and information relating to their areas of expertise (mangroves, coral reefs, seagrass, wetlands, fisheries and landbased pollution) and to assemble data sets that would enable some form of regional analysis of values to be undertaken by the regional working groups. It became apparent by the end of 2002, that the national working groups contained specialists in the subject matter with few or no economists amongst the members. The Project Steering Committee therefore decided to establish a Regional Task Force on Economic Valuation (RTF-E) consisting of nine economists from the region charged with providing economic assistance and advice to the national and regional working groups addressing habitat, fisheries and pollution issues and determining *"regionally applicable economic values for environmental goods and services"*

Different approaches and tools can help assess the benefits that flow from water systems by providing different and complementary information, including qualitative, quantitative, spatial and monetary approaches. Given their relevance to demonstrating value, each of the elements is presented below.

1. Qualitative analysis is based on non-numerical information, which describes values and benefits that are not easily translated into quantitative information (e.g. landscape beauty, impacts on security and wellbeing, cultural and spiritual values). For instance, determining which wetlands have particular cultural values to which communities is in itself an important means of communicating value.

2. Quantitative data are used to represent the state of, and the changes in, the ecosystems and the services they provide using numerical units of measurement (e.g. groundwater availability in a watershed in cubic metres; nitrogen and phosphorus in a water body in micrograms per litre; carbon annually sequestered in peatlands in tonnes per hectare per year; number of people who benefit from access to clean water). The value of ecosystems and their services can be demonstrated using physical stock and flow indicators as well as social indicators (e.g. proportion of households benefitting from access to clean water).

3. Geospatial mapping allows the quantitative data to be linked with geographical information (e.g. which community benefits from clean water provision from a given water body). It can also be the basis of modelling the outcomes of alternative water management decisions in specific locations. This can be integrated into local accounting and decision-making tools.

4. Monetary valuation can build on biophysical information on the services provided by ecosystems to derive values. The three most used categories of monetary valuation are:

a) Monetary valuation methodologies based on markets: for example using market prices to value services not in the market (e.g. non-marketed fish, timber, water).

b) Monetary valuation methodologies based on a benefit transfer, i.e. the transfer of value information from a different site to the one being analyzed.

c) Monetary valuation based on various stated and revealed preference methods, depending on the ecosystem service at hand.

In parallel to any assessments of ecosystem services using the approaches outlined above, the stakeholder analysis should ensure that ecosystem services are targeted that are of high priority for the different stakeholder categories. Participation can be important for both a provision of evidence (and hence quality of the analysis) and for the buy-in and acceptance of the decision (e.g. land use change, permits, investments, or payment for ecosystem services). This can help take into account qualitative indicators of importance and stakeholder preferences, thus complementing the quantitative and monetary indicators.

Understanding the values is only a first step in the process. Taking full account of these values requires a more integrated decision-making approach than has commonly been the case to date. Because of the significant economic benefits derived from water ecosystem services, there are consequences for many different decision makers. Hence there is a need for effective and integrated decision making. This will be discussed in more detail in Section 3.8.

Links between thematic reports

It is clear that in developing thematic reports there will be many linkages between different themes. This can be seen in a report on the economics of ecosystems and biodiversity for water and wetlands[15] that includes a chapter on improving measurement and assessment for better governance. This chapter offers a simple, stepwise approach that could be adapted to International Waters projects. An edited summary of the chapter is presented below.

An understanding of the values and benefits that people derive from water systems should be central to the development and implementation of regional, national and international policies addressing these assets as well as specific management decisions for individual sites. However, there has been a lack of consideration of the multiple values of water systems. The values of these ecosystems have seldom been adequately acknowledged or taken into account in policy making and decision making processes. This has been a contributing factor to the continuous loss and degradation of water-related ecosystems around the globe. A focus on ecosystem services in the management of water systems can help identify opportunities for:

1. Better harnessing and maintaining the multiple benefits that ecosystem services related to water provide
2. Developing more cost effective strategies than conventional technical solutions can offer
3. Avoiding costs related to the loss of biodiversity and ecosystem services

In order to unlock these potentials, it is necessary to recognise who benefits by how much from which ecosystem services and how this might improve with positive restoration and management activities - or these services risk being negatively affected by any subsequent ecosystem degradation.

14 Russi D., ten Brink P., Farmer A., Badura T., Coates D., Förster J., Kumar R. and Davidson N. (2013), The Economics of Ecosystems and Biodiversity for Water and Wetlands. IEEP, London and Brussels; Ramsar Secretariat, Gland

2.9 TDA to SAP Linkage

As described earlier in this manual, the TDA and the SAP are both part of the same process – the TDA/SAP Process. The TDA is the analytical component that identifies and analyses the transboundary problems, their impacts and causes. The SAP[15] is the strategic component that focuses on strategic thinking, planning and implementation.

Most TDA and SAP documents are developed during 2 separate processes often with poor linkage between the 'technical, non negotiated' TDA[16] and the 'political, negotiated' SAP. A number of practitioners, both project managers and international experts, have commented that the relationship and linkage between the TDA and SAP is not robust. As a technical document, the TDA works well but as a decision making tool it is often weak. Consequently, SAP interventions do not always match TDA priorities. This is particularly apparent where the TDA has been developed during one IW project and the SAP during a second IW project.

Failure to recognise that the 2 components are not separate entities; that they are in in fact part of the same strategic planning process, is likely to have a negative effect on the development and implementation of an effective and SAP. In order to ensure that there is a strong linkage between the TDA and the SAP, it is important to get the strategic thinking process underway during the final phase of the TDA process. This doesn't compromise the idea that the TDA is an objective assessment.

Ultimately, the TDA document should focus on the priority transboundary problems, their impacts and causes (including governance issues). However the TDA process can also include the first step in the strategic thinking process – the identification of Leverage Points. This critical linking step between the TDA and the SAP is dealt with in more detail below.

15 A short guide on 'best practices' for SAP development is currently being developed by IW:LEARN

16 Although the TDA will often require some form of political acceptance.

2.9.1 Leverage Points

A leverage point is a place within a complex system (in this case, a transboundary water system) where a small shift at one point can produce large changes elsewhere (Figure 11).

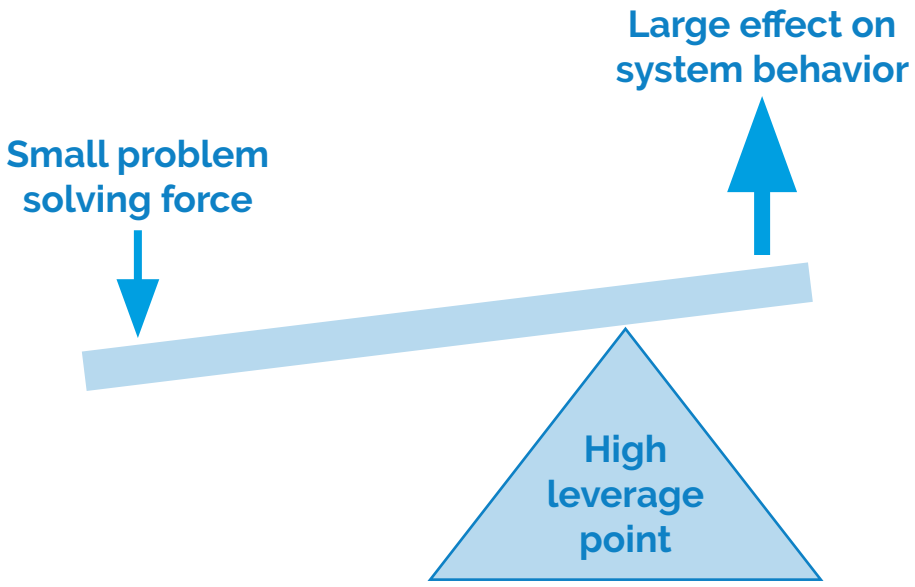


Figure 11: Description of a leverage point[17]

Leverage Points come in many different forms. Some are most appropriately addressed with a policy change - for example, when an existing policy is causing a "perverse incentive" driving industries to use water in excess of their actual need. Others are best approached with a change in technology or management practice - for example, when excessive water is being lost to evaporation due to out-of-date irrigation methods. Still others may require a change in attitude or simple habit, perhaps in conjunction with a technology change, so that actors in a system begin thinking differently and making different decisions at the user level on a daily basis14.

2.9.2 Identifying Leverage Points

The identification of leverage points is a crucial part of the TDA/SAP process –a critical linking step between the TDA and the SAP.

Until this point in the TDA/SAP process, the TDA has focused on the *analysis of problems*

Identifying leverage point pinpoints ***where changes can be made*** in the water system.

17 Meadows D. H. (1999), Leverage points: Places to intervene in a system, The Sustainability Institute, USA.

At this stage, it is not necessary to identify the specific changes or solutions to be introduced – this is part of the strategic thinking process.

The TDA development team needs to review the transboundary problems, impacts, causal chains and governance analysis and identify where, in this map of cause-and-effect relationships, would interventions appear that have the largest potential for the broadest possible, positive influence on water system. As with previous steps, this process can be carried out via a collaborative workshop, an example of which is given in Part 3 (Managing the TDA/SAP Process). Various tools and models to assist in evaluating options are being developed by the GEF Floods and Drought project (see annex 7).

2.10 Drafting the TDA

2.10.1 Integration of the Component Parts of the TDA

The various workshops, meetings and reports conducted during the TDA development will have produced a great deal of material, including:

Workshop Outputs

- Prioritised transboundary problems, complete with information on geographical scale
- Environmental and socio-impacts for the priority transboundary problems with information on linkages between impacts and problems
- Information on geographical location(s) of impacts
- Causal chain analysis information including lists of sectors, immediate, underlying and root causes for the priority transboundary problems with information on linkages between different levels
- A full list of leverage points with appropriate reference back to the TDA

Thematic Report outputs

- Specific thematic reports on transboundary problems (e.g. biodiversity, pollution, flooding, fisheries etc)
- Broader studies on aspects of the TDA (e.g. impact analysis, causal chain analysis, stakeholder, gender and, governance analyses, economic analysis, including a first approximation of the value of ecosystem services through a Tier 1 assessment, etc).
- The baseline data and the selection of indicators will be relevant for the future implementation of the SAP and should be selected with the expected monitoring of the SAP. TWAP has provide guidance to help with the identification of risks that threaten systems from biophysical, socio-economic and governance factors, through the use of quantifiable indicators. This will enable the comparison of baseline risks with the eventually aspirational goals of good ecosystem and socio-economic status (including SDG goals, national and regional goals)

All this information now needs to be integrated into one document.

The integration of this material will be conducted under the supervision of the Project Manager and staff of the Project Management Unit but the process is generally carried out in one of two ways:

- The appointment of a consultant, specialist, academic, or a consultancy to act as a single author reporting to the Project Manager (e.g. Lake Chad TDA, Rio de la Plata TDA, Yellow Sea LME TDA)
- Appointment of key TDA development team members to draft individual Chapters of the TDA, with an appointed Manager acting as a focal point reporting to the Project Manager (e.g. Black Sea TDA, Kura Aras TDA, Orange Sengu TDA, Caribbean Large Marine Ecosystem (CLME) TDA)

Both approaches work: appointing an individual or consultancy to draft the TDA is generally quicker and more efficient but there is a loss of stakeholder involvement and collaboration. Conversely, drafting the TDA using a team can be more demanding on time, funds and energy but is generally a more collaborative process.

2.10.2 What Should a TDA Look Like?

A typical high level content list for a TDA and examples of good practice are shown presented in annex 3. Irrespective of the layout, the TDA document should follow some general principles.

Executive Summary - There should be a relatively concise and jargon-free Executive Summary. A good executive summary will help promote the TDA. Remember, the TDA will be given to politicians, policy makers (national and international), donors and managers. It can almost be guaranteed they will not read the entire document.

The Main Text - The main text should be coherent and concise. An overly long document will be difficult to navigate and interpret. Worse still, it will not be read. Don't present too much text or equally too many figures and tables. Supporting data (either figures or tables) can be presented in separate Annexes.

Language - Generally, TDAs are written in the predominant UN language for the region. If the TDA is not written in English, a translation may be needed (for the GEF, UN implementing agencies, and many of the international donors). Therefore, it may be useful to hire a native English expert to fully edit the translated document; particularly one who has experience of the technical language is used.

Furthermore, it may be necessary to translate the English or UN language version of the TDA into the appropriate local languages for the project. This will take time and considerable financial resources so careful planning will be required.

Maps - It is important to include maps (either sketch, cartographic or GIS -derived) illustrating the geographic scale and scope of the priority transboundary problems, impacted areas and the location of immediate causes (such as hot spots, river diversions, urban developments, etc.).

Technical Reports - Complex technical reports should be published separately or as annexes.

Contents List - Provide a Content List and a Glossary of all terms employed. Make sure the pages are numbered and the content list numbering corresponds with the page numbering – this is a common and annoying mistake. An example of a typical content list is shown in Annex 3.

Acknowledgements - Include a full list of contributing specialists, and annexes containing lists of identified stakeholders.

Preliminary recommendations for SAP - Although the TDA should be objective and should not try to develop solutions for the analysed transboundary problems (this is the purpose of the SAP), it is acceptable to present a list of preliminary recommendations for the SAP. Be aware though that this is stepping into a more political arena and some form of negotiation might be required.

TDA for Decision Makers - A shortened version of the full TDA can also be produced. Often termed a TDA for decision makers, it provides a long executive summary, together with visuals and graphics summarising the key issues facing the water system and the participating countries.

Approximate size - The size of the TDA will vary from project to project and from water type to water type. Typically it should be between 80 and 150 pages (plus annexes) although there are examples with over 300 pages, although this should not be encouraged.

2.10.3 Next Steps

Adoption by the Steering Committee

The draft TDA document should be thoroughly reviewed by the TDA development team and key stakeholders to ensure it is fit-for-purpose and can be adopted by the project steering committee. It is advisable to ensure that copies of the TDA document are circulated well in advance of this meeting to ensure the review process is successful. This process is also described in Part 3.

To ensure that the TDA is adopted by the project steering committee, it is important for the Project Manager to carefully develop the meeting agenda and well manage the steering committee meeting. Key agenda points for the TDA should include:

- General overview of the TDA components
- The TDA development process
- Discussion of the TDA contents
- Linkage between the TDA and the SAP development process

Government Acceptance

According the GEF and the Implementing and Executing Agencies, the TDA should be a non-negotiated document – that is it should be a technical document, agreed to by the TDA development team and the PCU and adopted by the Steering Committee.

However, experience has shown that in reality, this is frequently not the case. Often, governments will want to examine and approve the TDA. Although this is not ideal, it is a reality and the project will need to take this into account.

3. How to Develop a SAP

3.1 The Strategic Component – The SAP

The SAP is a negotiated policy document that should be endorsed at the highest level of all relevant sectors. It establishes clear priorities for action (for example, policy, legal, institutional reforms, or investments) to resolve the priority problems identified in the TDA. The preparation of a SAP should be a highly cooperative and collaborative process among the countries of the region. The strategic component of the SAP process has 2 key phases:

1. Strategic Thinking:

- **a.** Defining the vision
- **b.** Setting goals to achieve the vision
- **c.** Brainstorming innovative ideas and opportunities to meet the goals
- **d.** Strategizing the new ideas and opportunities– prioritising alternatives

2. Strategic Planning:

- **a.** National and regional consultation processes
- **b.** Setting strategies for implementation
- **c.** Setting actions, timescales, priorities and indicators
- **d.** Drafting the SAP
- **e.** Steps towards SAP implementation

The 2 phases outlined above take the SAP process from a water system focus to a national focus and then back to a system focus. This process needs careful planning and is described in more detail in Part 3 (Planning the TDA/SAP Process).

3.2 Strategic Thinking

3.2.1 What is Strategic Thinking?

Strategic Thinking is a highly collaborative process that focuses on finding and developing unique opportunities by enabling a provocative and creative dialogue among people who can affect the direction of an organisation or system. It is the input to strategic planning—good strategic thinking uncovers potential new ideas and opportunities, so that when the plan is created, it targets these opportunities. Strategic thinking is a way of understanding the fundamental drivers of an organisation or system and rigorously challenging conventional thinking about them, in conversation with others.

The TDA/SAP process should be highly participatory and collaborative, encourage stepwise consensus building, and fully engage all key stakeholder groups. In order to ensure that the SAP adheres to these principles, a collaborative process such as strategic thinking is a good starting point.

This phase of SAP Development focuses on 4 key Strategic Thinking steps:

Step 1: Defining the vision and drafting a vision statement

Step 2: Setting goals to achieve the vision and reduce the impact of the transboundary problems

Step 3: Brainstorming innovative ideas and opportunities to meet the goals

Step 4: Strategizing the new ideas and opportunities– prioritising alternatives

3.3 Defining the Vision

3.3.1 What is a Vision?

Vision is a widely used term, but not well understood. Put simply, a vision outlines what an organisation wants to be, or how it wants the world in which it operates to be (an "idealised" view of the world). It is a long-term view and concentrates on the future. It can be emotive and is a source of inspiration.

In the context of the TDA/SAP Approach, the vision is a long-term view describing the way the stakeholders think the water system should look in the future. It should be:

Understandable	▪ It should be understandable to the general public as well as a scientific audience
Inspirational	▪ It should inspire those living in and around the water system to believe that they can improve the condition of their environment
Aspirational	▪ It should encourage the relevant parties to strive to reach the vision
Ambitious	▪ It must challenge those involved and really make a difference
Attainable	▪ It must not be impossible - this can be very discouraging and is likely to result in failure

Figure 12: Attributes of a long-term vision

3.3.2 Defining the Vision and Drafting a Vision Statement

This step can be successfully accomplished through two sub-steps:

Step 1: Collaborative development of a vision

This step can be accomplished through a collaborative workshop involving the SAP Development team supplemented with additional specialists if the Project Manager considers that it has too narrow a focus. An example of a visioning workshop is given in Part 3 (Managing the TDA/SAP Process). NB: when establishing both the SAP Development Team and undertaking workshops it is important to ensure that the groups are inclusive as possible. For example, ensuring balanced gender representation, when government representatives are present, ensuring ministries for women's affairs or social affairs are present together with ministries of water/environment. This will help the representation of women's interests, poor and marginalised groups in discussions on the development of the SAP.

Step 2: Drafting of the vision statement based on the outputs from Step 1

It is highly probably that the outputs from the visioning workshop will only provide a starting point for the Vision Statement. The SAP Development Team (or selected members of the team) will need to take the group vision statements and combine them into a single statement.

This task is not as daunting as it may seem. In most instances, the small groups will come up with very similar statements. Often, the only difficult part is wordsmithing the final statement. Once the statement is completed, it should be circulated amongst the SAP Team and others active in the visioning process to have an opportunity to make sure the statement captures what was actually said at the workshop. Any modifications should be done at this time.

3.3.3 Examples of Vision Statements

Historically, IW Projects have found defining the vision and drafting a vision statement for their respective water systems a challenging process. This has resulted in a considerable variation in quality.

In addition, many inspirational, aspirational, ambitious and understandable vision statements, developed during the strategic thinking process, are diluted over the consultation process in order to meet the demands of various stakeholders. Examples of vision statements from a range of projects are presented in Box 8, below.

BOX 8: EXAMPLES OF VISION STATEMENTS

The vision for the Black Sea is to preserve its ecosystem as a valuable natural endowment of the region, whilst ensuring the protection of its marine and coastal living resources as a condition for sustainable development of the Black Sea coastal states, well-being, health and security of their population.

Black Sea SAP (2009)

The vision for the NSAS adopted by the countries is: To assure rational and equitable management of the NSAS for sustainable socio-economic development and the protection of biodiversity and land resources whilst ensuring no detrimental effects on the shared aquifer countries.

Nubian Aquifer SAP (2012)

People of the region prospering from a healthy Western Indian Ocean.

Western Indian Ocean (2009)

An economically prosperous, socially just and environmentally sound Mekong River Basin.

Mekong River Basin SAP (2006)

A prosperous population living in a healthy and sustainable managed environment providing equitable opportunities and benefits".

Lake Victoria Basin SAP (2007)

The Lake Chad Region would like to see by the year 2025 the Lake Chad - common heritage - and other wetlands maintained at sustainable levels to ensure the economic security of the freshwater ecosystem resources, sustained biodiversity and aquatic resources of the basin, the use of which should be equitable to serve the needs of the population of the basin thereby reducing the poverty level.

Lake Chad SAP (2008)

3.4 Setting Goals

3.4.1 What is a Goal and What is an Objective?

Goals explain what you want to achieve in your water system - think of them as a target to be reached, or hit. They are usually long-term and represent global visions such as "reduce pollution by….." or "increase biodiversity by….."

Whereas ***Objectives*** define strategies or implementation steps to attain the identified goals – think of them as the ball you shoot towards your goal. Unlike goals, objectives are specific, measurable, and have a defined completion date. They are more specific and outline the "who, what, when, where, and how" of reaching the goals.

In terms of the SAP, the goals are long-term targets to achieve the vision and reduce the impact of each transboundary problem. The development of goals will be discussed in more detail below. Conversely, the objectives are strategies or implementation steps to achieve the goals. The objectives are developed from the outputs of the next step in the process - Brainstorming Innovative Ideas, Opportunities and Solutions to Meet the Goals. This is discussed in more detail in Section 3.5.

Goals should be reference to the baseline established under the TDA (e.g. recent regional data or TWAP global data) and should align with global and regional requirements (e.g. conventions, SDGs) and national ambitions. They should also be formulated in an accessible language to facilitate communication to a wide stakeholder audience.

3.4.2 Goals Vs. Ecosystem Quality Objectives

A number of different goal setting approaches have been used in the TDA/SAP process, two of which have been predominant: Those that use Ecosystem Quality Objectives (EcoQOs) and those that use a more conventional strategic management approach using Goals and Objectives.

EcoQOs, sometimes referred to as Environmental Quality Objectives (EQOs) or Water Resource Objectives (WROs) often comprise of long-term EcoQOs followed by shorter-term targets. They have generally used by projects focussed on enclosed seas, fresh water and groundwater systems. Examples include the Caspian Sea, the Dnipro River Basin, the Black Sea, Lake Victoria, Lake Chad, the Western Indian Ocean, and the Nubian Aquifer, amongst others.

Examples of EcoQOs from the Dnipro River Basin SAP are shown in the box 9.

Box 9: Examples of EcoQOs* from the Dnipro River Basin SAP (2009)

EcoQO 1: Sustainable Nature Use and Environment Protection in the Dnipro Basin

EcoQO2: Environment Quality that is Safe for Human Health

EcoQO3: Conservation of Biological and Landscape Diversity

**Defined as long-term Ecological Quality Objectives (LTEQOs) in the SAP*

The use of goals and objectives is widely used in organisational and environmental strategic planning. The terminology used varies (including goals and objectives, targets and objectives, targets and activities, targets and actions or combinations thereof) but in all cases they tend to comprise of longer term goals or targets followed by shorter-term activities or actions. More often, although not exclusively, this approach has been used by LME projects, including the Guinea Current LME, the Mediterranean LME, the South China Sea LME and the Mekong River Basin, amongst others.

Examples of Goals from the Yellow Sea LME SAP are shown in the Box 10, below.

Box 10: Examples of Goals from the Yellow Sea LME SAP (2009)

Goal 1: 25-30% reduction in fishing effort

Goal 2: Rebuilding of over-exploited marine living resources

Goal 3: Improvement of mariculture techniques to reduce environmental stress

Goal 4: Meeting international requirements on contaminants

Goal 5: Reduction of total loading of nutrients from 2006 levels

Goal 6: Reduced standing stock of marine litter from current level

Goal 7: Reduce contaminants, particularly in bathing beaches and other marine recreational waters, to nationally acceptable levels

Goal 8: Better understanding and prediction of ecosystem changes for adaptive management

Goal 9: Maintenance and improvement of current populations/distributions and genetic diversity of the living organisms including endangered and endemic species

Goal 10: Reduction of the risk of introduced species

Both approaches are valid, and as stated before will depend on the type of system and the cultural, political and economic realities of the region. However, for the purposes of this manual, a process using goals in conjunction with objectives will be described. However, the process described here could easily be adapted for developing EcoQOs/ECOs/WROs.

3.4.3 Defining Goals

Again this step can be successfully accomplished through two sub-steps:

Step 1: Initial collaborative identification of the goals

This step can be successfully accomplished through a collaborative workshop involving the SAP Development team supplemented with additional specialists if the Project Manager considers that it has too narrow a focus. An example of a workshop for the goals is given in Part 3 (Managing the TDA/SAP Process).

Prior to the workshop, the Project Manager and key SAP Development Team members will need to draft a list of provisional goals together with approximate timeframes, including information on which priority transboundary problem(s) to which they are linked.

Step 2: Further development of the goals based on the outputs from Step 1

It is highly probable that the outputs from this workshop will only provide a starting point for the development of more finalised goals. At the very most, it will produce a comprehensive list of potential draft goals, linked to transboundary problems (and possibly the causal chain analysis and governance analysis), with approximate time frames.

The purpose of this step is to finalise the goals and how progress to the goals can be monitored and reported to stakeholders. However, this is best accomplished after the workshops focussing on brainstorming new ideas and opportunities, and identifying alternatives, as all 3 steps are closely linked. This will be discussed in Section 3.5 and 3.6.

3.5 Brainstorming Innovative Ideas, Opportunities and Solutions

3.5.1 What is Innovation?

Once the leverage points from the TDA have been identified, and the vision and goals have been agreed, it is necessary to begin working on what to change. For strategic planning, vague or general ideas are not enough – ultimately, you need to choose actions to take.

The word innovation is used very broadly here to mean any kind of change introduced to a system, regardless of whether it's a new thing[18] . The kinds of changes introduced can include new policies, projects, programmes, technologies, attitudes etc. Ultimately, choices of innovation are based on a combination of criteria, such as expected reduction in the impact of the transboundary problems, chances of success, and capacity to sustain the change over the longer term – these are the basics of a 'good idea'.

18 AtKisson A. (2008), The ISIS Agreement: How sustainability can improve organizational performance and transform the world, Earthscan, UK

The purpose of this step in the strategic thinking phase is to brainstorm potential innovative ideas and opportunities that will target the leverage points, help achieve the goals, and reduce the impact of each transboundary problem.

3.5.2 What is Brainstorming?

Brainstorming is the rapid generation and listing of solution ideas without clarification and without evaluation of their merits.

Brainstorming works best with a varied group of people. Participants should come from a range of disciplines and have different backgrounds. Even in specialist areas, outsiders can bring fresh ideas that can inspire the experts.

A brainstorming session requires a facilitator, a relaxed environment and something on which to write ideas, such as a white-board or a flip chart. The facilitator's responsibilities include guiding the session, encouraging participation and writing ideas down.

Initial brainstorming encourages a quantity of solutions rather than quality; the clearly inappropriate solutions can be eliminated in subsequent discussion. Brainstorming produces a creative flow of ideas uninterrupted by critical reflection. The "golden rules" of brainstorming are shown in Figure 13 below:

Go for quantity and accept everything	▪ The greater the number of ideas generated, the greater the change of producing a radical and effective solution
Defer judgment	▪ Criticism or evaluation of ideas generated should be put 'on hod'. Instead, focus on extending or addig to ideas
Allow uncoventional ideas	▪ Look at the problem from new perspectives and suspend assumptions - new ways of thinking may provide better solutions
Build on each others ideas	▪ Good ideas may be combined to from a single better good idea
List every idea	▪ The person noting the ideas should not be a censor and should capture the ideas that the originator finds acceptable
Every person and every idea has equal worth	▪ Every person has a valid viewpoint and a unique perspective on the situatuion and solution

Figure 13: The golden rules of brainstorming

3.5.3 Process for Brainstorming Innovative Ideas, Opportunities and Solutions

Process

As described in Section 2.9, it is important to identify leverage points during the final stage of the TDA development process – thus linking the TDA and the SAP.

This step, aims to identify innovative ideas, opportunities or solutions that could be introduced, that target the leverage points and meet the goals identified in the previous section.

These could be innovative "new" ideas or opportunities; they may be defined as solutions or interventions. They could be "old" ideas – but they may have a new focus (i.e. replication of solutions or interventions from other regions; or applying a solution for one problem to another problem). The point is to be as creative as possible during this step – critical analysis of the proposed ideas or opportunities comes later.

There are numerous approaches to brainstorming, but the collaborative approach to brainstorming described in Part 3 (Managing the TDA/SAP Process) is highly effective because it is energetic, openly collaborative and allows the SAP development team members to build on each other's ideas.

Prioritisation

A key to the brainstorming process and the ultimate success of the SAP is the importance of prioritisation - an integral part of any strategic planning process. Because there are often limited available resources, prioritisation helps to identify which innovative ideas or opportunities should be considered further during the TDA/SAP process.

This is not about producing a strict ordering of the ideas or opportunities, rather the purpose is to distinguish those that should be considered further in the SAP process from those that need not.

The brainstormed ideas and opportunities can be assessed by reference to criteria. Examples include, amongst others:

- Level of certainty that implementation will produce the expected/desired outcome
- Level of expected impact
- Feasibility of implementation

3.5.4 Advice from the Field

Planning is everything Make sure you and key SAP development team members are familiar with the process before you deliver it.

Setting ground rules You will need to set some ground rules before beginning any effective brainstorming session. However, you must be careful not to set the rules so tight that you stifle creativity. You may find the best way to set the ground rules is to explain the objectives of the brainstorming and how it should work and then let the participants set the rules. This way they understand the rules and they will respect them more because they made them.

Brainstorming is more than putting people into a room and talking about ideas. You will need to ensure that the discussion focuses in the right direction while supporting a free flow of ideas. Ultimately, it is a tool for generating as many ideas or solutions as possible to resolve a problem or issue. It is not the tool you will use to determine the best solution. Your goal for a brainstorming session is to get as many ideas as possible out in the open. Discussion and analyzing these ideas will come later.

Taking records Make sure all ideas are recorded – if they are on a white board make sure there is a record. Once erased, they're gone forever.

3.6 Strategizing the New Ideas, Opportunities and Solutions – Identifying Options or Alternatives

3.6.1 The Importance of Alternatives

There are usually several different ways of resolving transboundary environmental problems and achieving global benefits. In formulating the SAP, all choices available to politicians must be documented. A particular solution should not be pre-selected.

An example of this is the choice of strategies for reducing the input of nutrients from sewage to aquatic systems. Such removal is often necessary to combat eutrophication on a local or transboundary scale.

One approach is to build tertiary treatment plants that remove nitrogen and phosphorus compounds as part of a more comprehensive sewage treatment and disposal strategy. An alternative would be to permit some discharge of nutrients but to enhance the natural capacity of the system to remove nutrients through the restoration or creation of wetlands.

The choice is not always simple. In the first option, the technical approach requires little land and can be managed

by a small number of specialists, but needs energy, skilled maintenance, the chemical products themselves, and subsequent disposal. In the second option, the wetlands benefit wildlife, require less skilled attention and have low requirements for chemicals and energy but use valuable space that may not be readily available.

The choice depends on the balance between costs and benefits. The balance depends on factors that vary from place to place (local economics, investment costs and the costs of operation and maintenance). It is also highly influenced by culture and worldviews: highly technological solutions are favoured in some societies whereas others prefer 'green' approaches. Both options must be explained to the policymakers. No particular 'lobby' can be allowed to insist on its own approach.

3.6.2 The effect of Climate change

It is also important to consider the impact of climate change when identifying options and alternatives and prioritizing actions for the SAP. NB: the gender analysis undertaken at the TDA stage will provide guidance on the differing impacts of climate change on women and men and guide the approaches to identifying alternatives taking account of the different stakeholder groups and the potentially differing adaptation strategies that will need to be developed to ensure benefits to all stakeholder groups.

In particular, the SAP should explicitly recognize that adaptation to climate variability and change needs to be mainstreamed into the specific activities that will be developed and implemented. Two criteria that could to be given particular consideration when analysing the options and alternatives are:

- How will the proposed options and alternatives contribute to increasing the resilience of the region and its people to climate variability and change, and
- How robust are the proposed solutions in a context of climatic uncertainty .

Specific and recent guidance has been delivered by the GEF 'Floods and Droughts' global project and a Guidance Manual is available for IW projects for marine and freshwater actions to adapt to climate change and variability impacts. In addition, there is a wealth of ecosystem and water adaptation reports from multiple sources. Recent sources (general and specific waterbodies) include.

- Climate Change Adaptation Technologies for Water: A Practitioner's Guide to Adaptation Technologies for Increased Water Sector Resilience
- The Lake Chad Development and Climate Resilience Action Plan
- UNFCCC
- UN Water
- GEF IW:LEARN (climate guidance for marine and freshwater)

3.6.3 Process for Identifying Options or Alternatives

Introduction

The purpose of this step is to select the ideas, opportunities or solutions that best meet the needs and realities of the region. The outcome is an elaborated table of specific alternative ideas, opportunities or solutions that will provide the basis for more detailed in-country consultations and discussions on options or alternatives. This approach is based on political pragmatism. The overall initial suggestion for ideas, opportunities or solutions will come from this step but their implementation will mostly be at the national level and it is important that governments do not feel imposed to take a particular approach.

These are suggested alternatives not decisions; all countries involved in the process are at liberty to propose additional solutions or to discount those coming from the SAP development team - it is an iterative process.

Reviewing process

An example of a review process for identifying options and alternatives is presented in Part 3 (Managing the TDA/SAP Process). In order to examine all the ideas, opportunities and solutions identified during the brainstorming step in a uniform and stepwise manner, a matrix or table with the headings shown in Figure 14 is useful. The table, completed by each group ensures that the process is consistent between groups.

The 'relative priority' column should be completed at the end of the sub-group sessions and then reviewed in plenary. The idea of this column is not to dictate which of the proposals will go forward but to provide an objective viewpoint on the feasibility of the proposals.

It is perfectly acceptable for a sub-group to argue that all of the proposals are high priority (or medium or low) if this can be substantiated by good reasoning. At a later stage however, some of the proposals must be subjected to economic analysis (see next section); these studies are time consuming and expensive and the purpose of the pre-screening is to avoid unnecessary effort on proposals that have limited chance of success.

At this stage however, no technically feasible proposal should be rejected, merely rated according to the opinion of the participants and passed on to the next stage of the process where it is considered by national teams.

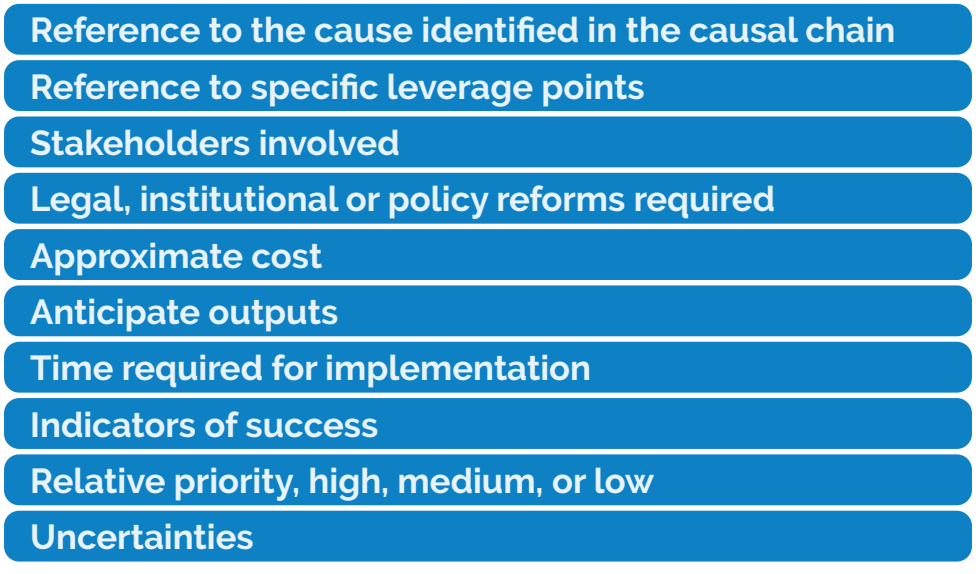


Figure 14: Suggested headings for a table for identifying options or alternatives

To this list of potential topics the recent IW:LEARN Guidance Document on Economic Valuation of Ecosystem Services would add 'Approximate costs and benefits' (including an assessment of the changes in ecosystem services values as result of action). This category should beyond ecosystem service values consider also the other costs and benefits, e.g. from employment/growth/investments, etc.)

3.7 Strategic Planning

3.7.1 What is Strategic Planning?

Strategic planning is a process of defining strategy or direction, and making decisions on allocating resources to pursue this strategy. Drawing distinctions between realities and objectives is at the heart of strategic planning - there will always be various options for bridging the gap between the current situation and the desired objective.

This phase of SAP development focuses on 4 key strategic planning steps:

Step 1: National and regional consultation processes

This step involves each country reviewing the outputs of the strategic thinking process - in particular the vision, goals and suggested options/alternatives - and conducting a thorough evaluation of the feasibility of the alternatives from a national perspective. In particular, the countries should examine how feasible the options/alternatives are from an economic, political and social perspective.

Step 2: Setting strategies for implementation

This step involves direct engagement with the national development planning processes in order to ensure the SAP is fully integrated into national development plans and vice versa.

Step 3: Action planning - Setting actions, timescales, priorities and indicators

This step involves action planning around actions, timescales, priorities and indicators. It is important that the SAP addresses not only the high-level initiatives and over-arching goals, but that they get articulated (translated) into short term actions that will be required to achieve the programme.

Step 4: Drafting the SAP

The final step is the integration of the various outputs of the TDA/SAP process into a single, concise document with clear goals, quantifiable timescales and unambiguous assignment of responsibilities.

3.8 National and Regional Consultation Processes

3.8.1 What is the Purpose of the Consultation Process?

The previous step in the SAP development process focussed on selecting ideas, opportunities or solutions that best meet the needs and realities of the region, the outcome of which was an elaborated table of specific options or alternatives that would provide the basis for more detailed in-country studies and discussions on options or alternatives.

These were purposely described as options or alternatives and not decisions - all countries involved in the process are at liberty to propose additional solutions or to discount those coming from the SAP development teams.

This step involves each country reviewing the outputs of the strategic thinking process - in particular the vision, goals and suggested options/alternatives - and conducting a thorough evaluation of the feasibility of the alternatives from a national perspective. In particular, the countries should examine how feasible the options/alternatives are from an economic, political and social perspective.

3.8.2 Economic Analysis of Options and Alternatives

Section 2.8.5 stated that in order to carry out an effective TDA and to design a SAP that is likely to be approved, there is a need to have at least an approximation of the economic value of the ecosystem services of the water system. Therefore, a good economic analysis is highly beneficial for the TDA/SAP process – although the detail of this analysis will depend on the complexity of the project and the time and budget available. Consequently, it may be necessary to plan this activity according the resources and capacity in the participating countries. To this end, there are three general approaches that can be used:

Cost Effectiveness costs each option and lists its multiple benefits. This is a relatively simple output based approach but says little about the ultimate outcome. Further, the judgement on which option should be implemented is left to the decision maker. It is by far the most straightforward to use but is ultimately judgement based.

Cost Benefit Analysis (CBA) is based on the evaluation of all costs and benefits in a common measure, monetary units. It is a much more complex outcome based approach but it enables all available options to be assessed on an equal, objective footing so that they can be prioritised rather than relying on the judgement of a decision-maker as to whether the benefits of a option justify its costs. CBA can be difficult to develop, particularly in regions where data is scarce. However, it is a mature approach used by many governments and businesses to evaluate the desirability of a given policy. Consequently, there are many methodologies that can be used that are likely to be country specific.

Economic Valuation of Ecosystem Services (as described in Section 2.8.5) assigns quantitative or monetary values to the goods and services provided by ecosystems, whether or not market prices are available to assist in the process. It is the most comprehensive approach, but does provide an empirical account of the value of the ecosystem services and amenities or of the benefits and costs of proposed actions in a way that CBA doesn't. However, understanding the economic valuation of ecosystem services is only a first step in the process. Taking full account of these values requires a more integrated decision-making approach than has commonly been the case to date, particularly because economic benefits derived from water ecosystem services will affect many different decision makers (see Box 11).

A detailed assessments of ecosystem services using the methodology as presented in the Guidance Documents on Economic Valuation will provide input to assist both cost-effectiveness and cost-benefit analyses that can guide the overall evaluation of different options. The IW:LEARN Guidance Manual on Economic Valuation of Ecosystem Services indicates that the broad range of transboundary co-operation actions can result in economic benefits. The initial "screening" assessments probably performed during a TDA can strengthen the basis for the prioritisation of environmental problems. Through the more detailed Tier 2 assessment methodology, the specific options for management actions in the SAP can be better assessed in terms of the ecosystem services they provide in monetary units that may assist in getting high-level national acceptance of proposed strategies and actions in the SAP. For example:

- An economic valuation as a "hotspot analysis", i.e. an in-depth analysis of very biodiversity rich and important ecosystems or areas (e.g. the Great Barrier Reef in Australia). Such a hotspot analysis would also follow the tier 2 methodology.

- An economic valuation as an analysis of the impacts on ecosystems and ecosystem services of a planned, concrete project, i.e. an in-depth assessment of the economic costs and benefits in a specific area that will be impacted by the project - positively or negatively. Thus, while some development/infrastructure projects may lead to the deterioration of important ecosystem services, a conservation project such as the establishment of a new Marine Protected Area (MPA) - as in the example below - could result in maintained or improved provision of ecosystem services by the ecosystem in question. Consequently, such an analysis could have the objective of demonstrating the economic values at risk or the economic values that can be maintained/increased by the project to be analyzed, with the aim of influencing policy decisions, and would also use the tier 2 methodology. Such an analysis could also support the identification of options and alternatives in a TDA/SAP process.

- An economic valuation focusing on a single ecosystem type of special interest (e.g. mangroves in the Niger basin) and the ecosystem services it provides (using the tier 2 methodology).

- Similarly, an economic valuation can be dedicated to one specific ecosystem service of relevance (e.g. carbon sequestration) in the project area of interest (e.g. river basin/LME) and will be also conducted based on the tier 2 methodology.

- Finally, in certain cases it may be of interest to consider an important singular pressure or an impact resulting from a pressure, and the resulting losses in ecosystem services. Examples of pressure are e.g. climate change, high levels of nitrates in the water body, whereas sea level rise, increased flood risks and eutrophication could be the resulting impacts. Such in-depth analyses are also using the tier 2 methodology.

More information on the approach to economic valuation of ecosystems recommended by GEF IW:LEARN is presented in a in Annex 5 as brief summary of the Guidance Document.

Box 11: The challenge of economic valuation of goods and services in an integrated decision-making approach

Taken from: The Economics of Ecosystems and Biodiversity for Water and Wetlands: IEEP12

Improving the state of water systems can have a positive effect on poverty alleviation, by ensuring food, water and energy security. By addressing several policy objectives, it creates a more robust foundation for management action to protect and enhance water and wetland ecosystem services. It can help with meeting the MDGs and also the Rio+20 endorsement that access to water is a human right and be a core element of local, regional and international development cooperation.

It is important to prioritise the protection of these ecosystems and restore them where possible. Further loss of such systems is very likely to lead to a net loss in ecosystem services and economic value to local communities and will have a negative impact on human well-being.

Engagement with people is critical in transforming the management approach. Understanding ecosystem values often requires discussion with communities to determine the services derived from water and wetlands, not least taking account of traditional knowledge. Such knowledge is often also critical for developing good management solutions to protect and enhance ecosystem services. Awareness raising and education is also crucial for the transition. It can help with water and wetland protection and improvement, since it increases acceptance and participation. This is critical for stakeholder buy in and for transition management. It is important to be able demonstrate that the transition is one to an overall improvement for all.

Collective action between governments, business, NGOs, local communities and indigenous peoples is needed to ensure the long-term sustainability of water and wetlands, and the global economy. Given the increasing human population and its dependence on water and wetlands, full recognition of the values and benefits of nature is a pressing imperative.

Whichever approach is used, it is likely that the project will need to hire particular expertise to undertake this process in each country.

3.8.3 Political and Social Analysis of Options and Alternatives

The results of the economic analysis should not be seen as "the decision" – economic analysis provides only one form of input to the policymaker's final decision. The purpose of the economic analysis is to create a basis for sound decisions about the allocation of financial resources. In addition, the analysis needs to consider political and social acceptance of each alternative.

Ultimately, the SAP is a negotiated policy document. This means that while the TDA and the first phase of the SAP was predominantly a technical process, this phase of the SAP is largely a political process. The aim of the SAP is to achieve commitment at the highest levels possible in order to move forward on a selected set of priority actions and strategies within the framework of agreed goals.

Gender-balanced stakeholder engagement during the project development phase and the early stages of project implementation, as well as during the TDA development process should have paved the way for this political phase in so far as it will have developed an institutional and policy map, identified and engaged key people, and initiated a participatory process. The SAP strategic thinking sessions, which should have engaged the key stakeholders, continued this build-up of political and social acceptance. At both the regional and national levels they should have ensured that stakeholders are supportive of, and willing to implement and monitor, the selected options.

However, as the options are further defined, and in parallel to the economic feasibility analysis, it is necessary to ensure social and political acceptability of each option. This is necessary at both the regional and national levels. At the regional level a given option might not be particularly attractive to a specific country but, when weighed in against the complex political agenda that characterizes bilateral or multilateral relations, may constitute an important bargaining chip. An understanding of regional relations is therefore important.

At the national level, options may directly affect a specific sector or community, or may entail added responsibilities for certain government agencies. Stakeholders that may be directly impacted by an option or that will play a role in its implementation will need to be consulted.

3.8.4 Advice From the Field

- **Is there a risk that the SAP will be perceived as a 'wish list'** during the national/ regional consultation process? Make sure the focus is on priority issues and try not to present shopping lists.

- **How will the project convince finance, planning and development ministries to invest?** Prioritisation based on the economic valuation of ecosystem services in particular can help convince these ministries, as they will see a return on their investment.

- How important is **private sector/civil society commitment** (with gender-balanced participation and involvement)and acceptance for a given option? Without commitment, implementation will be difficult.

- Do key stakeholder representatives have a **clear understanding** of the TDA/SAP process and in particular, of the given options developed during the strategic thinking phase? Do they know what they are letting themselves in for?

- Do stakeholder groups **understand the potential benefits and/or costs** of a specific option? Some stakeholders will benefit, others will lose out. Again, without full understanding and agreement from the stakeholders, it will make SAP implementation more difficult.

- **Are there misconceptions** based on imprecise or fragmented information or previous negative experiences regarding a proposed option?

- **Have all relevant stakeholders been identified?** Ensure that women and men are equally represented. Perhaps a given option affects a specific interest group or isolated community that was not identified in during the project development phase. These would need to be contacted, and given means for providing inputs.

- **What sectors are involved?** Are there conflicting interests? Are there mechanisms to address them adequately? Should an inter-sectoral response/approach be negotiated within the SAP?

- **Is there a good understanding of gender roles?** Understanding and quantifying through scientific approach the gender roles during the analysis of options and alternatives will lead to improved buy-in and will help focus the SAP and it will also inform future programs and will provide the baseline of information to enable gender transformative actions, including in water policies and reforms.

3.9 Setting strategies for implementation - How to integrate with national planning processes

3.9.1 Introduction

This step of the SAP development process involves direct engagement with the national development planning processes in each country in order to ensure the SAP is fully integrated into national development plans and vice versa.

The undertaking of a detailed (e.g. Tier 2) economic valuation of ecosystem services may provide further arguments for seeking the national endorsement of the SAP and ensuring strong links with on-going and planned national planning process. See Annex 5 for a brief summary of the GEF IW:LEARN approach to economic valuation of ecosystems.

In particular, it should focus on:

- Legal and Institutional Frameworks
- Institutional Architecture
- Examples of Integration/Implementation strategies

3.9.2 Legal and Institutional Frameworks

Legal and Institutional Frameworks are the backbone within which the SAP will operate in the long term, thus having effective arrangements in place is important not only for the duration of the SAP, but also to ensure that the institutions are sufficiently rooted so that the outcomes are sustainable in the longer term. The role of legal and institutional frameworks in good governance of international waters has been extensively studied in a recent report[19] , a summary of which is outlined below.

19 Good Practices and Portfolio Learning in GEF Transboundary Freshwater and Marine Legal and Institutional Frameworks - A report reviewing the legal and institutional frameworks of the 28 most important international water bodies of world

3.9.3 Institutional Architecture

Introduction

A key component of this being realized is having appropriate institutional architecture. Institutional architecture in this context refers to all global/regional institutions or organizations providing support or that have an interest in the transboundary water resource management, the national water management institutions that implement water management for these resources, and the tools, training programmes and knowledge systems available to help build capacity and to support the implementation of transboundary water resources management.

Designing appropriate institutional architecture is a critical step in the sustainable use of international waters. The institution developed will ultimately define not only what 'sustainable use' is, but also what uses are reasonable and equitable (something that is especially important when dealing with freshwater resources). At the core of institutional architecture is the development of an understanding of the needs or issues driving the creation of a transboundary institution. This is the context for its creation. Effective institutions are those that address a functional necessity.

Following from an understanding of the context, is an identification of the institutional objectives, or the underlying purpose of the institution. Form should follow function. Put another way, it is the institutional objectives that should dictate the final institutional architecture. The elements influencing the effectiveness of the regime and institution will depend on how well those objectives have been met.

Different organisational structures can help address means objectives, which in turn determine regime effectiveness. There are a variety of models that have been set up to address transboundary resource management. As each transboundary resource will have its own unique characteristics, there is no single 'model' or recipe for success in developing effective regimes. The singular physical, social, and political geography will determine constraints and opportunities available to determine the institutional architecture.

Examples of institutional architecture

Though each situation is unique, there are some common threads when bringing multiple states together to manage a resource. In general, most structures that deal with transboundary resources will have some higher-level authority for final decision-making, a mid-level group for more technical and scientific analysis (i.e., a joint management committee), and a secretariat for implementation. There are, however, stark differences in how this broad tri-body structure is applied.

One of the major trade-offs in developing architecture is balancing the operational needs and the desire for minimum bureaucracy with the need for building trust and equity. This can be illustrated by simply looking at the different models of how and where a secretariat is run and placed. For the Lake Tanganyika Authority, the secretariat is in Bujumbura, Burundi, and meetings of the Council of Ministers are held in different states, with the Chair being from the host country. In the case of the Mekong River Commission, not only is there a clear tri-body hierarchy, but the secretariat is split between two locations: Vientiane (Lao PDR) and Phnom Penh (Cambodia).

Having a split secretariat incurs greater costs, as some functions will be duplicated; and is more bureaucratic, lending itself to increasing time in dealing with logistics, as well as decision-making. The choice of having a split secretariat was a conscious trade-off between a more efficient organisational structure and other needs, such as increased political equity. A model for addressing political equity is the secretariat for the Caspian Sea Environmental Program,

which is currently in Astana, Kazakhstan. However, this will only be for a three to four-year period before moving to another location. The secretariat is rotated through the littoral states on the basis of alphabetical order. This was deemed necessary to ensure equity and build trust amongst the states of the Caspian Sea.

In the case of the Columbia River, a physical secretariat is not needed as the system is run with a virtual secretariat and a Permanent Engineering Board that meets annually as needed to review the implementation. There is no ministerial council or political body to make final decisions per se. The incremental costs of managing these transboundary resources are thus minimal. The institutional architecture stems from the solid relationship that is enjoyed between Canada and the United States. However, it should be made clear that trust and equity were key issues when negotiating the Treaty, as both countries requested the assistance of the International Joint Commission to help determine the possibilities for the locating of facilities, as well as the principles behind the agreement.

Built-in flexibility in the organisational structure can serve political, as well as scientific interests, and encourage confidence building. The ability to invite observers to the Council and Joint Committee of the Mekong River Committee is intended to accommodate the participation of China and Myanmar so including them in the discussions of the development of the Mekong. By attending the various meetings, China and Myanmar may become more comfortable with the goals and objectives of the Mekong River Committee. This assists the exchange of data and information while possibly aligning the interests of the nations.

Other trade-offs need to be considered in institutional architecture, particularly with respect to data and information exchange. In most circumstances, data is gathered at the national level and forwarded by each country to one another or through a central secretariat. In other circumstances, joint fact-finding may be conducted, as is the case of the Joint Technical Committee of the Bering Sea Pollock agreement.

In the case of the PAGEV project in Burkina Faso and Ghana, information exchange occurred at local as well as national levels, and it was a clear attempt to develop a new architecture to incorporate local values in decision-making. The importance of incorporating local values at the international level is key to the success of water use in many circumstances. However, equally important is the design of decision-making at the appropriate level. This sense of decentralisation is aimed at effective management through a fine-tuning of information; more relevant details can be observed at a lower level, closer to the end-user. Further, direct stakeholder participation can be facilitated more effectively in a system of decentralised decision-making that impact the local community.

Conclusions

In conclusion, while there is no single model to apply to the development of a suitable institutional architecture, the key means objectives need to be addressed to develop effective regimes. More often than not, it is political constraints rather than technical limits that hinder cooperation over transboundary resource management. In the case of the Danube River Protection Convention, progress was hampered by the limited ability of the commission members to influence the policy makers of the need for and benefits of cooperation. Paramount to all efforts will be garnering political will to the goals of the institutions.

3.9.4 Examples of Key Integration/Implementation Strategies

There is no agreed blueprint for the integration of the SAP into national and regional development planning processes. A number of approaches have been used over the last decade and tend to reflect the economic, political, institutional and regulatory frameworks of the countries where the integration is being carried out. Often, the SAP will use more than one approach to ensure that it is fully integrated with both national and regional processes.

The main approaches are outlined below and presented in more detail in Box 12.

- Embedding into existing National Action Plans
- Strategic partnerships with other regional initiatives
- Sub-regional and bi-lateral Agreements
- Regional coordination networks
- Development of water system-based National Action Plans (NAPs)

BOX 12: KEY INTEGRATION/IMPLEMENTATION STRATEGIES

Embedding into existing National Action Plans (e.g. Lake Victoria Basin SAP pp53)

To ensure sustainability of SAP activities, it may be necessary to mainstream them into national priorities and relevant regional initiatives. Mainstreaming will pave the way for respective institutions to eventually capture SAP activities in their annual budgets, especially for purposes of leveraging external funding.

Strategic partnerships with other regional initiatives (Mekong River Basin SAP pp31)

In order to reduce the replication of effort; waste of resources (financial, time and knowledge); and conflict between approaches, the SAP process should fully collaborate and integrate with other strategic partnerships and national and regional initiatives. Examples could include engaging and collaborating with on-going national Integrated Water Resource Management Plans, River Basin Management Plans or Integrated Coastal Management Plans, amongst others.

Sub-regional and bi-lateral Agreements (e.g. South China Sea SAP p 61)

Countries could be encouraged to enter into sub-regional and bi-lateral agreements to address issues relating to the implementation of the SAP. The Memorandum of Understanding signed by all participating countries in the SAP can form the umbrella under which these sub-regional and bilateral agreements are negotiated and implemented.

Regional coordination networks (e.g. Yellow Sea LME SAP, Lake Victoria Basin SAP, Lake Chad Basin SAP, Nubian Aquifer SAP)

Often, regional Commissions are created, strengthened or revised as part of the SAP process and are given the responsibility for promoting and coordinating the implementation of priority actions that the participating countries have defined in the SAP.

National Action Plans (NAPs) (e.g. Lake Chad SAP, GCLME SAP, Freplata SAP, Dnipro SAP, Caspian SAP)

The SAP can be supported to a large extent by national interventions contained in specific water system-based National Action Plans (NAPs) developed during the SAP process. Whilst the NAPs feed into the SAP, they are also cohesive, independent documents detailing national objectives, targets and interventions to be achieved. Without commitment to implement the national actions, the regional interventions of the SAP would have no foundation and their implementation would be undermined. Some countries will place the NAP higher in the political process than others (i.e. at a parliamentary level rather than ministerial). Therefore no two NAPs will have quite the same appearance, scope or focus.

3.10 Action Planning: Setting actions, timescales, priorities and M & E indicators

3.10.1 What is an Action Plan?

An action plan is a framework of objectives and actions for achieving strategy goals. It should state clearly how each action contributes to one or more given objective and may suggest a relative rating (e.g. high, medium or low). The following types of objectives and actions, and their sequencing may be outlined in broader detail:

- New policies, policy changes and links showing coordination and consistency
- New and changed legislative, economic or other instruments which assist implementation of policies or build capacity
- Major programmes and pilot projects, including: technical interventions; capacity development; and/or knowledge generation and management processes
- Guidelines and standards for sector activities and institutional roles

The action plan should also include means to periodically undertake monitoring to measure progress on SAP implementation through a formal monitoring and evaluation (M&E) programme. Monitoring will be required to underpin assessments of progress and to update the TDA baseline where needed. Consideration should also be given to utilising the GEF Corporate indicators (as presented in PIF/CEO documents) to facilitate basin commissions, countries, etc. providing feedback on the overall achievement of the SAP to the donor.

3.10.2 What Does Action Planning Mean in Terms of the SAP?

One of the core outcomes when drafting a SAP is to develop it in a way that is easily translatable into action. It is important that the SAP addresses not only the high-level initiatives and over-arching goals, but that they get articulated into short-term actions that will be required to achieve the programme.

Key to this step is the translation of the agreed options and alternatives into Objectives and Actions. This step will need to be carefully managed by the Project Manager and the SAP Development Team.

Action planning also includes specifying responsibilities, timelines and priorities with each objective and action, or who needs to do what and by when. It should also include methods to monitor and evaluate the SAP. Monitoring and Evaluation indicators are described in more detail in Section 3.10.4 below and Section xx of the Project Management Manual.

Usually, some form of budget is also included in the SAP. Budgets specify the money needed for the resources that are necessary to implement the SAP. Budgets also depict how the money will be spent, for example, for human resources, equipment, materials, etc.

3.10.3 Key Action Planning Steps

As with many aspects of SAP development (and strategic planning in general), there is no right or wrong approach in terms of defining the key action planning steps. The list below gives a set of examples but this list can be expanded or contracted according to the needs of the project.

- **Goals** are general guidelines that explain what you want to achieve in your water system - they are usually long-term and represent global visions such as "reduce pollution by….." or "increase biodiversity by….." (see Section 3.4)
- **Objectives** define strategies or implementation steps to attain the identified goals. Unlike goals, objectives are specific, measurable, and have a defined completion date. Together with the Actions (below), these will be based the outputs from the economic, political and social analysis of options and alternatives described in Section 3.8.
- **Actions** What are the actions, activities or tasks that must be carried out? Again these will be based the outputs from the economic, political and social analysis of options and alternatives described in Section 3.8.
- **Time required for implementation** How long will each Goal, Objective and Action take to complete? Usually, these are defined as short term (1 to 3 years), medium term (3 to 5 years) and long term (5 years +)
- **Financing requirement.** How much will it cost to complete the action? This can be a grand total or broken down per country.

- **Priority** Can the actions be ranked in terms of their priority? For example, High, Medium, Low
- **Stakeholders involved.** Which stakeholder will be responsible for carrying out the task? (e.g. which government agency, local community, international agency etc).
- **Indicator of success** There will be a requirement from the GEF to evaluate the success of each action in terms of making progress toward strategic goals using GEF process, stress reduction and environmental status indicators.
- **Uncertainties.** What are the main assumptions that have to be made for the action to be carried out? What are the main risks that will stop the action being completed?

Examples of the key action planning steps, similar to those described above can be found in a number of SAP documents.

3.10.4 Monitoring and Evaluation

Monitoring and evaluation (M&E) is a management tool used to support decision-making, ensure accountability, measure results and impacts of projects and programmes, and extract lessons from a given programme and its projects.

Monitoring and evaluation (M & E) indicators are long-term monitoring tools used to verify the implementation of the SAP. There are three types of GEF M & E indicator:

Process Indicators	▪ Focus on **outputs** that are likely to lead towards a desirable outcome
Stress Reduction Indicators	▪ Relate to project objectives or **outcomes**
Environmental Status Indicators	▪ **Goal orientated** and focus on improvements of ecosystem quality

Figure 15: GEF monitoring and evaluation indicators

The essential part that indicators play in the assessment of all waterbodies has long been recognised by the GEF in the formulation of the indicators for the GEF Tracking Tool to the use of indicators for assess the 'status' of a waterbody. The GEF 'core' types of indicators (process, stress reduction and ecosystem and socio-economic status) are described below. Recent GEF (and other) projects have led to a growth of interest in further explaining indicators (initiated during the 6th GEF IW Conference) and the information they can convey to multiple stakeholders. The

growth stimulated an in-depth presentation and workshop at the GEF IW Conference in Sri Lanka. Further information is available in the LME:LEARN toolkits (e.g. the Strategic Approach) and the work of the CLME and ASCLME SAP development.

All SAP M&E plans should have a few specific gender responsive indicators that have high relevance to both the SAP and national priorities (e.g. reporting of SDG 5). The M&E system should also propose continuing to collect sex-disaggregated data wherever possible that will be important in reporting differential impacts of the SAP implementation (e.g. policies, laws, actions, etc.) on various stakeholder groups.

UN Environment – DHI document (together with WWF, CI, GEF University of Maryland and Luc Hoffmann Institute) have prepared a detailed guide 'Using indicators for improved water resources management: Guide for basin managers and practitioners' ()

As emphasised in the TDA section of this manual that forms a key baseline to the SAP, understanding what can be monitored and reported will be important in presenting progress of the SAP implementation to stakeholders (including funding agencies). The GEF has supported key global actions (e.g. GEF TWAP and indicators for improved water resources management) that will provide both baseline information and practical advice on the selection of appropriate indicators at the regional/national levels. It is important that the selection of indicators is highly relevant at the national and regional levels (to assist with national priorities and reporting to the global level, e.g. SDGs), and encompasses the experience and lessons from these global projects that will also aid the GEF with assessing global results.

During the Action Planning step of the SAP development a set of process, stress reduction and environmental status indicators need to be produced for each goal, objective and action. Examples of each are described in more detail below.

Process Indicators

Process indicators focus on the outputs or actions that are likely to lead towards a desirable outcome. A particular characteristic of international waters projects is the length of time that is generally required before actual changes can be detected in the transboundary water environment. Process indicators demonstrate actual on-the-ground institutional and political progress in the step-by-step process to the resolution of these complex problems. They should assist in tracking the institutional, policy, legislative and regulatory reforms necessary to bring about change, and reflect key aspects of changes to gender involvement at national/regional level. Examples of process indicators are shown in the Box 13.

BOX 13: GENERAL EXAMPLES OF PROCESS INDICATORS

- Establishment of a basin-wide Commission for promoting and coordinating the implementation of priority actions that the participating countries have defined in the SAP
- Completion of a country-endorsed SAP containing both regional and country-specific policy/legal/institutional reforms and priority investments that address the top transboundary priorities
- Adoption of specific water, environment, or sector-related legal reforms, policies, institutions, standards, and programs necessary to address the transboundary priority issues
- Country ratification of the regional or global conventions/protocols pertinent to the project
- Sustainable cross-border cooperation on environmental issues, based on existing bilateral agreements signed between the riparian countries.

Stress Reduction Indicators

Whereas process indicators are *output based* and relate to needed reforms or programs, stress reduction indicators relate to project objectives or outcomes. In particular, they focus on concrete actions that reduce environmental stress. Stress reduction indicators indicate the rate of success of specific on-the-ground actions implemented by collaborating countries. Often a combination of stress reduction indicators in several nations may be needed to produce detectable changes in transboundary waters. Examples of stress reduction indicators are shown in the Box 14.

BOX 14: GENERAL EXAMPLES OF STRESS REDUCTION INDICATORS

- Point source pollution reduction completed (kg pollutants)
- Non-point source pollution programs implemented (area treated with best management practices; kg reduced)
- Amount of underwater or wetland area placed into protected management, including the establishment of no fishing zones
- Amount of eroded land stabilized by tree planting (est. sedimentation reduction)
- Amount of fishing fleet removed (through alternative livelihoods)
- Added value to fish catch via certification schemes leading to lower catch volumes
- Larger mesh fishnet policy enforced, fishing restrictions, reduced, TAC documented
- Reduced releases of pollution to groundwater recharge zones
- Additional releases of water from dams for environmental purposes.

Environmental Status Indicators

Environmental status indicators are *goal orientated* and focus on improvements of ecosystem quality that usually extend beyond the lifetime of the project. It can take a number of years before sufficient stress reduction measures are implemented in a sufficient number of countries to detect a change in the transboundary water environment. Social indicators may also be appropriate to measure whether communities and stakeholders benefit from the changes in environmental conditions brought about by the project. Examples of environmental status indicators are shown in the Box 15.

BOX 15: GENERAL EXAMPLES OF ENVIRONMETAL STATUS INDICATORS

- Measurable improvements in trophic status
- Changes in trophic level (e.g. fisheries resources or food webs)
- Improved (measurable) ecological or biological indices
- Improved (measurable) chemical, physical, or biological parameters
- Improved recruitment classes of targeted fish species/diversity/keystone species
- Demonstrable reduction of persistent organic pollutants (POPs) in the food chain
- Changes in local community social conditions as a result of improvements in environmental conditions
- Stakeholder awareness raised and involvement documented

3.11 Drafting the SAP

3.11.1 Integration of the Component Parts of the SAP

The various workshops, meetings and consultations conducted during the SAP development will have produced a great deal of material including:

Documents

- The Transboundary Diagnostic Analysis
- The Thematic Reports

Workshop Outputs

- A full list of leverage points with appropriate reference back to the TDA
- The vision statement
- Finalised goals
- Country agreed options and alternatives
- Action plan outputs
- M & E indicators
- Country integration/implementation strategies
- Legal and Institutional Frameworks

All this information now needs to be integrated into one document.

The integration of this material should be conducted under the supervision of the Project Manager and staff of the Project Management Unit but the process is generally carried out in one of two ways:

- The appointment of a consultant, specialist, academic, or a consultancy to act as a single author reporting to the Project Manager (e.g. Lake Chad SAP, Nubian Aquifer SAP)
- Appointment of key SAP development team members to draft individual Chapters of the SAP, with an appointed Manager acting as a focal point reporting to the Project Manager (e.g. Black Sea SAP, Dnipro River Basin SAP, Rio de la Plata TDA

Both approaches work: appointing an individual or consultancy to draft the SAP is generally quicker and more efficient but there is a loss of stakeholder involvement and collaboration. Conversely, drafting the SAP using a team can be more demanding on time, funds and energy but is generally a more collaborative process.

3.11.2 Advice From the Field: What Should a SAP Look Like?

There is no single approach or model used for the SAP document structure. However, irrespective of the approach used, it should be a concise jargon-free document with clear goals and actions, quantifiable time-limited milestones and unambiguous assignment of responsibilities. It is likely that the SAP will contain:

- An undersigned agreement
- Executive summary
- Description of the water system
- A statement of the priority problems taken from the TDA
- Principles adopted for solving them
- Rationale and opportunities for regional cooperation
- Any joint planning and dispute settlement mechanisms
- Institutional arrangements
- Any policy and legal reforms
- Public participation strategies
- The vision, goals and priority actions
- Monitoring and review arrangements and reporting

The SAP can also include a series of annexes giving:

- Full details of agreed measures at the national and regional levels (including national policy/legal/institutional reforms and investments) and their implementation mechanisms
- A roadmap or schedule with realistic timelines
- Process, stress and environmental status indicators
- Stakeholders and their involvement in the implementation and review process
- Contact points for the authority responsible for implementation in each country.

A typical high-level content list for a SAP is shown in Annex 4. Irrespective of the layout, the SAP document should follow some general principles:

Executive Summary: The SAP should have a concise and jargon-free executive summary. A good executive summary will help promote the SAP. Remember, the SAP will be given to politicians, policy makers (national and international), donors and managers. It can almost be guaranteed they will not read the entire document.

Main Text: The main text should be coherent and concise. An overly long document will be difficult to navigate and interpret. Worse still, it will not be read. Don't present too much text or equally too many figures and tables. Supporting data (either figures or tables) can be presented in separate Annexes.

Language

As with the TDA, SAPs are generally written in the predominant UN language for the region. If the SAP is not written in English, a translation may be needed (for the GEF, UN implementing agencies, and many of the international donors). Therefore, it may be useful to hire a native English expert to fully edit the translated document; particularly one who has experience of the technical language is used.

Furthermore, it may be necessary to translate the English or UN language version of the SAP into the appropriate local languages for the project. This will take time and considerable financial resources so careful planning will be required.

Technical or workshop Reports

Reports should be published separately or as annexes.

Contents List

Provide a Content List and a Glossary of all terms employed. Make sure the pages are numbered and the content list numbering corresponds with the page numbering – this is a common and annoying mistake.

Acknowledgements

Include a full list of contributing specialists, and annexes containing lists of identified stakeholders.

SAP for Decision Makers

A shortened version of the full SAP can also be produced. Often termed a SAP for decision makers, it provides a long executive summary, together with visuals and graphics summarising how the SAP will benefit the water system and the participating countries.

Approximate size

As with the TDA, the size of the SAP will vary from project to project and from water type to water type. Typically it should be between 80 and 150 pages.

3.11.3 Steps Towards SAP Implementation

Review Process

The draft SAP document should be thoroughly reviewed by the SAP development team and key stakeholders to ensure it is:

- Fit-for-purpose;
- At a stage to be adopted by the project steering committee; and
- Likely to be endorsed by the participating countries.

It is advisable to ensure that copies of the SAP document are circulated well in advance of this meeting to ensure the review process is successful. The process is also described in Part 3.

Endorsement

The steps towards SAP endorsement will be different for each project and the process can quite often be difficult and time-consuming. However, to ensure that the process is as straightforward as possible, it is important to ensure that the Project Manager, key members of the SAP development team, country focal points and the steering committee carefully coordinate the steps towards endorsement.

This could include the arrangement of high-level meetings with senior officials from the key ministries in each country to ensure that there is general consensus towards the SAP and its endorsement.

Annex 1: Examples Transboundary Environmental Problems

Enclosed Seas and LMEs

SYSTEM	Transboundary Environmental Problems
Black Sea	• Nutrient over-enrichment/eutrophication • Decline in natural resources (e.g. fisheries) • Chemical pollution • Habitat and biodiversity changes - including alien species introduction
Guinea Current LME	• Decline of fish stocks • Loss of ecosystem integrity and yields in a highly variable environment including the effects of global climate change • Deterioration in water quality from land and sea based activities, eutrophication and harmful algal blooms • Habitat destruction and alteration
Mediterranean Sea	• Decline in biodiversity • Decline in fisheries • Decline of seawater quality
South China Sea LME	• Modification of habitats • Overexploitation of living aquatic resources • Pollution of aquatic environments
Yellow Sea LME	• Pollution problems – Eutrophication; Contaminants and their effects; Increased risks to human health • Ecosystem problems – Changes in biomass; Changes in species composition; Increased frequency of HABs; Loss of benthic habitats • Fisheries problems – Decline in landings of traditional commercially important species; Unsustainable mariculture practices • Biodiversity problems: Habitat loss/degradation; Pollution; changes in river discharge; Over-exploitation of marine and coastal living resources; Alien species; decline of endemic species
Bay of Bengal LME	• Overexploitation of marine living resources • Degradation of critical habitats • Pollution
Caribbean LME	• Unsustainable fisheries • Habitat degradation • Pollution

Groundwaters and Aquifers

SYSTEM	Transboundary Environmental Problems
Nubian Aquifer	• Declining Water Levels • Water Quality Deterioration • Changes in the Groundwater Regime • Damage or Loss of Ecosystem and Biodiversity
Guarani Aquifer	• Pollution • Over exploitation of resources • Management issues

River Basins and Estuaries

SYSTEM	Transboundary Environmental Problems
Rio de la Plata	• Chemical pollution (including oil) • Microbiological pollution • Eutrophication and harmful algal blooms • Suspended solids • Introduction of exotic species • Alteration / Destruction of natural habitats • Loss of biological diversity
Dnipro River Basin	• Chemical pollution • Radionuclide pollution • Eutrophication • Loss/modification of ecosystems or ecotones • Flooding events and elevated groundwater levels • Modification of the hydrological regime
Kura-Aras River Basin	• Variation and Reduction of Hydrological Flow • Deterioration of Water Quality • Ecosystem Degradation in the River Basin • Flooding events
Cubango-Okavango River Basin	• Variation and reduction of hydrological flow • Changes in the abundance and distribution of biota • Changes in sediment dynamics • Changes in water quality
Orange-Senqu River Basin	• Stress on ground and surface water resources • Changes to Hydrological Regime • Deterioration of water quality • Land degradation

Lakes

SYSTEM	Transboundary Environmental Problems
Lake Peipsi	• Eutrophication • Fishery management • Groundwater pollution and water distribution • Mining pollution from oil-shell activities
Lake Chad	• Variability of hydrological regime and fresh water availability • Water pollution • Decreased viability of biological resources • Loss of biodiversity • Loss and modification of ecosystems • Sedimentation in rivers and water bodies and
Lake Tanganyika	• Unsustainable Fisheries • Increasing Pollution • Excessive Sedimentation • Habitat Destruction
Lake Prespa	• Nutrient Enrichment • Native Fish Stock Decline • Reduction in the water level in Macro Prespa • Sediment Transport • Deforestation and changes in forests • Organic Pollution • Hazardous Substance Pollution

Annex 2: Examples of Causal Chains

Bay of Bengal LME Causal Chain (Ca. 2011)

Overexploitation of marine living resources

Transboundary nature of the concern	Issues	Proximate causes	Intermediate causes	Root causes
Many fish stocks shared among BOBLME countries either through transboundary migration of fish or larvae; Fishing overlaps national Jurisdictions, both legally and illegally - overcapacity and overfishing In one location forces a migration of fishers and vessels to other locations; All countries (to a lesser or greater degree) are experiencl rig difficulties In implementing fisheries management, especially the ecosystem approach.	Decline in overall availability al fish resources	Excessive fishing effort and overcapacity; Unselective fishing practices and gear	Increasing fishing effort. especially trawlers and purse seiners; Illegal, unregulated and unreported (IUU) fishing, hoth national and international; Weak fisheries MCS and enforcement	"Open access" regime; Strong incentives to encroach into areas with better returns; High consumer demand for food fish
	Changes in species composition of catches	Excessive fishing effort and overcapacity; Unselective fishing practices and gear	Increasing fishing effort, especially trawlers and purse seiners; Illegal, unregulated and unreported (IUU) fishing, both national and international Weak fisheries MCS and enforcement	'Open access' regime; Strong Incentives to encroach into areas with better returns; High consumer demand for food fish; High consumer demand for seed and fish meal for aquaculture
	High proportion of juvenile fish taken	Unselective fishing practices and gear	Weak fisheries MCS and enforcement	"Open access" regime; High consumer demand for food fish; High consumer demand for seed and fish meal for equaculture;
	Changes in marine blodiversity plus vulnerable/ endangered spp	Destructive fishing methods	Weak fisheries MCS and enforcement	"Open access" regime; High consumer demand for food fish

Brief analysis

- Good level of detail
- No linkage between causes but very logical
- Links causes to impacts – a good idea
- Easy for a decision maker to translate into action

TABLE 7.7: CAUSES AND CONSEQUENCES OF CHANGES IN SEDIMENT DYNAMICS

Locations	Primary Causes	Issue		Impacts	Locations
In headwaters of Cubango, along river on common Namibia Angola border	Land cover change - overgrazing fires, deforestation and land transformation for farming			Causes hidrological change with associated changes in river morphology - channel formation and reduced flood spillage	Throughout basin
Longa, Culto, Lupire	Cultivation of rice sugar in floodplains			Loss of floodplain and delta dynamics	Culto, Namibia, delta
Cuchi & Mucundi	Doms for Irrigation and hydropower (stop bedload transport)			Sediment hungry flows downstream of dams Increase riverbank and bed erosion	Angola
Angola, Namibia	Increase in sediment and dissolved solids in returned waters from Irrigation		Decrease in sediment bedload transport	Impacts on river, floodplain, panhandle and delta ecosystem functioning	Throughout basin
Angola, Namibia	Sand mining	Change in sediment dynamics		Increased salinization	Delta
Common Namibia-Angola section and areas with higher human population	Destruction of riparian belt	Key indicators		Riverbank erosion	Mid section between Mucundi and the panhandle
Throughout basin	Pert-urban (small duster settlements) population Increases	• Bedload annual quantties transported		Impacts on Infrastructure - roads, water abstraction schemes	Throughout basin
		• Suspended solids (TSS, turbidity		Increase in total suspended solids (TSS) decreases aquatic productivity • In severe cases leading to decline in aquatic vegetation	Throughout basin
Culto headwaters	Climate change	• Dissolved solids (conductivity)		• Increase in floating algae	Throughout basin
				• Declining potability and gastro problems in people and animals	Throughout basin
			Increase in wáter columna sediments (increase in turbidity)	• Blocks fish gills - fish kills, reduced productivity	Throughout basin
				• Reduces hunting efficiency of fish and macro-invertebrate species hunting by vision	Throughout basin
				Increased deposition downstream on floodplains, panhandle and delta	Panhandle, delta
				Smothering of habitats and sedentary communities (mainly rocky areas)	Angola, Namibia, esp. Popa Falls
				Increased water treatment costs	Throughout basin
				Impacts on infrastructure	Throughout basin

Brief analysis

- Too much detail
- No linkage but reasonably logical
- Links causes to impacts and locations
- Could be confusing for a decision maker to translate into action

Brief analysis

- Highly detailed and complex
- Required a great deal of time and expertise to complete
- Difficult to analyse and consequently difficult for a decision maker to translate into action

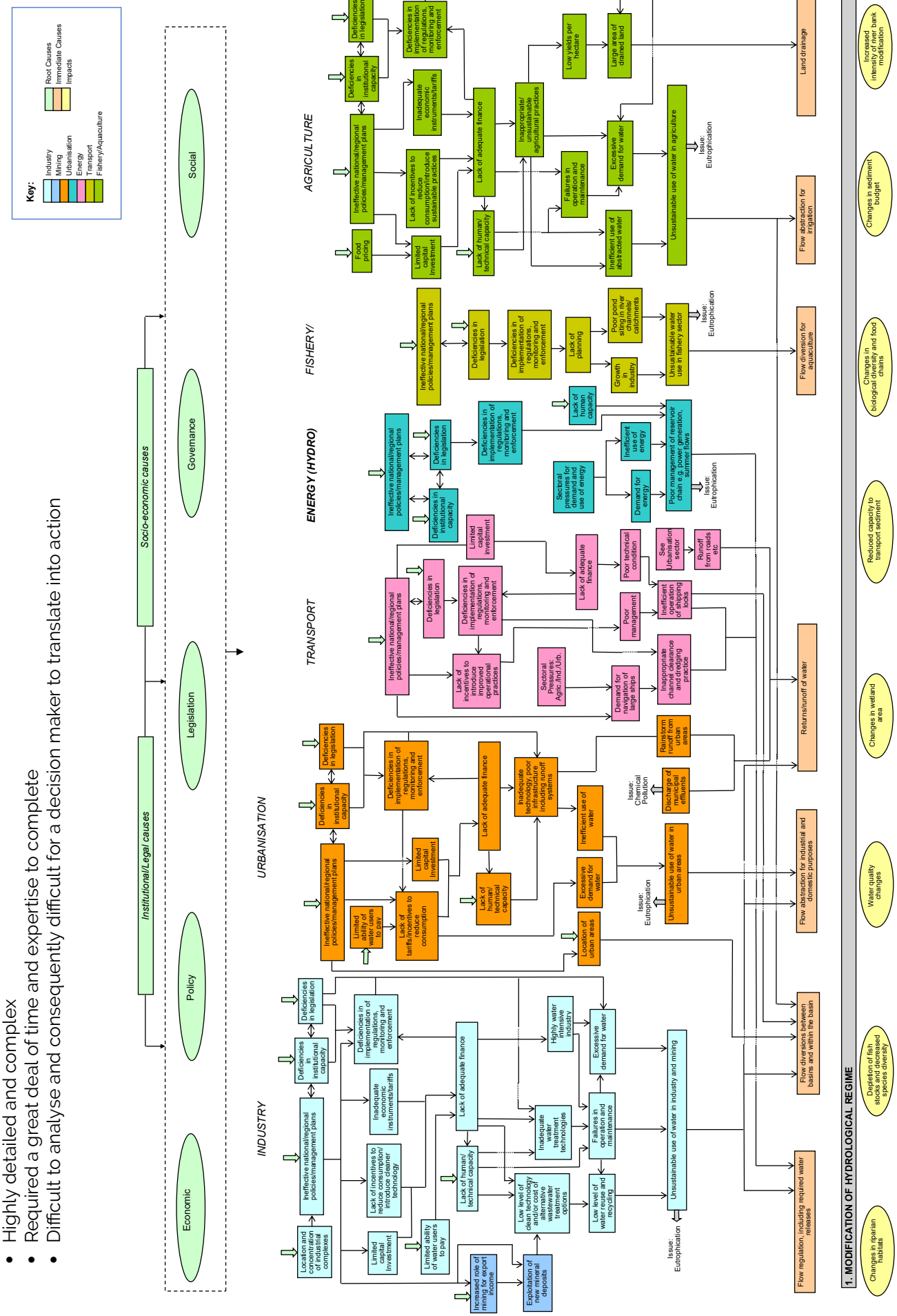


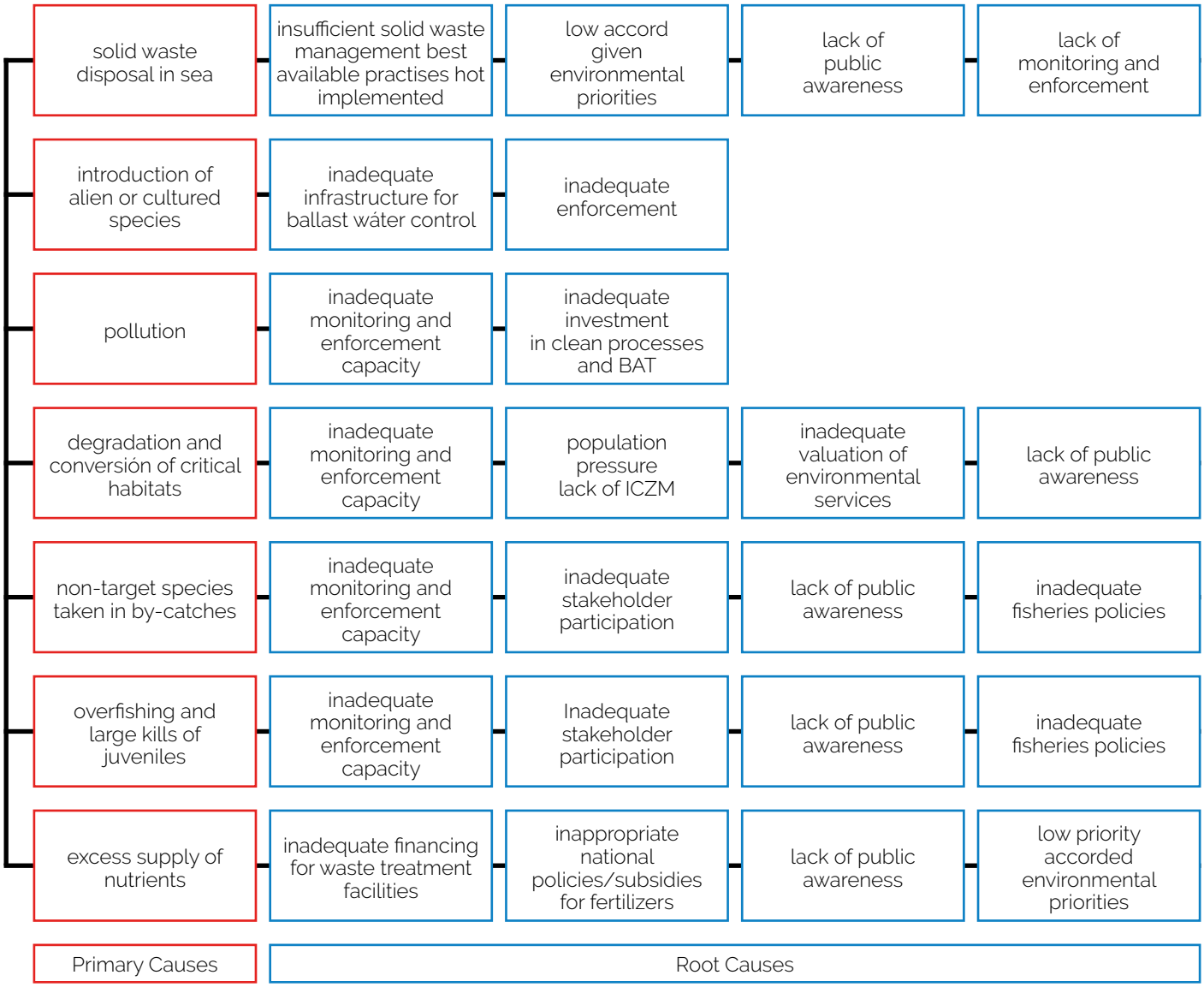
Figure 2.1.1 Causal Chain Analysis: MPPI 1: Decline of Biodiversity

Environmental Impacts:

- Disruption of biocenoses
- Change in structure of marine communities
- Reduction of fin- and shell-fisheries
- Decline in critical seabed habitats
- Ripple effects through food web
- Loss of unique global biodiversity resources
- Loss of forage, nesting, and/or resting areas for migratory species
- Possible loss of unique wetlands habitats

Socio-economic Impacts:

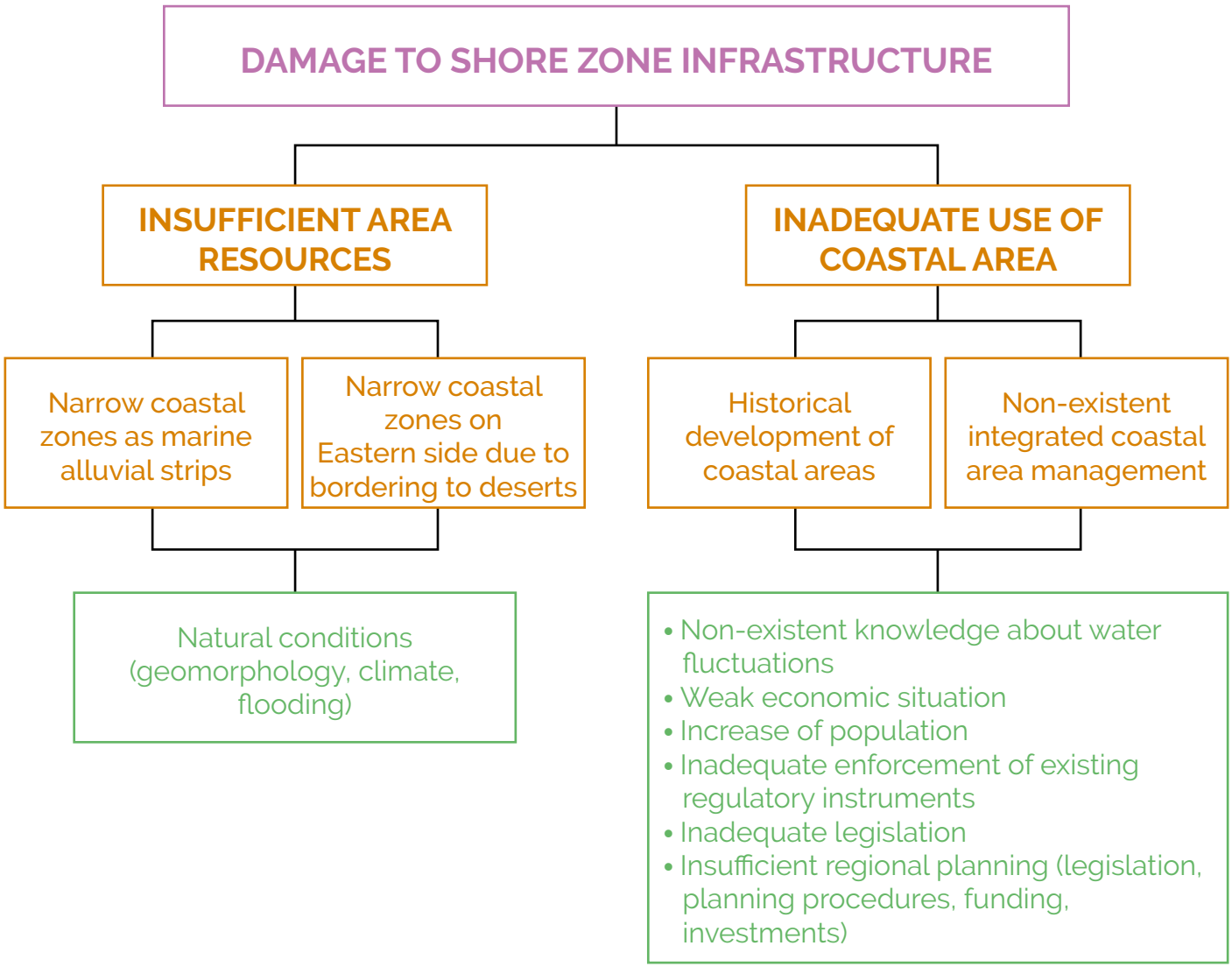
- Loss of high value ecological services from wetlands
- Income decline from fisheries
- Changes in the employment with a shift away from fisheries
- Loss of aesthetic value
- Loss of income from the tourism industry
- Loss of cultural heritage



Brief analysis

- Lack of detail
- No linkage – No logical flow
- Lack of detail makes it difficult to interpret
- BUT could a decision maker translate into action?

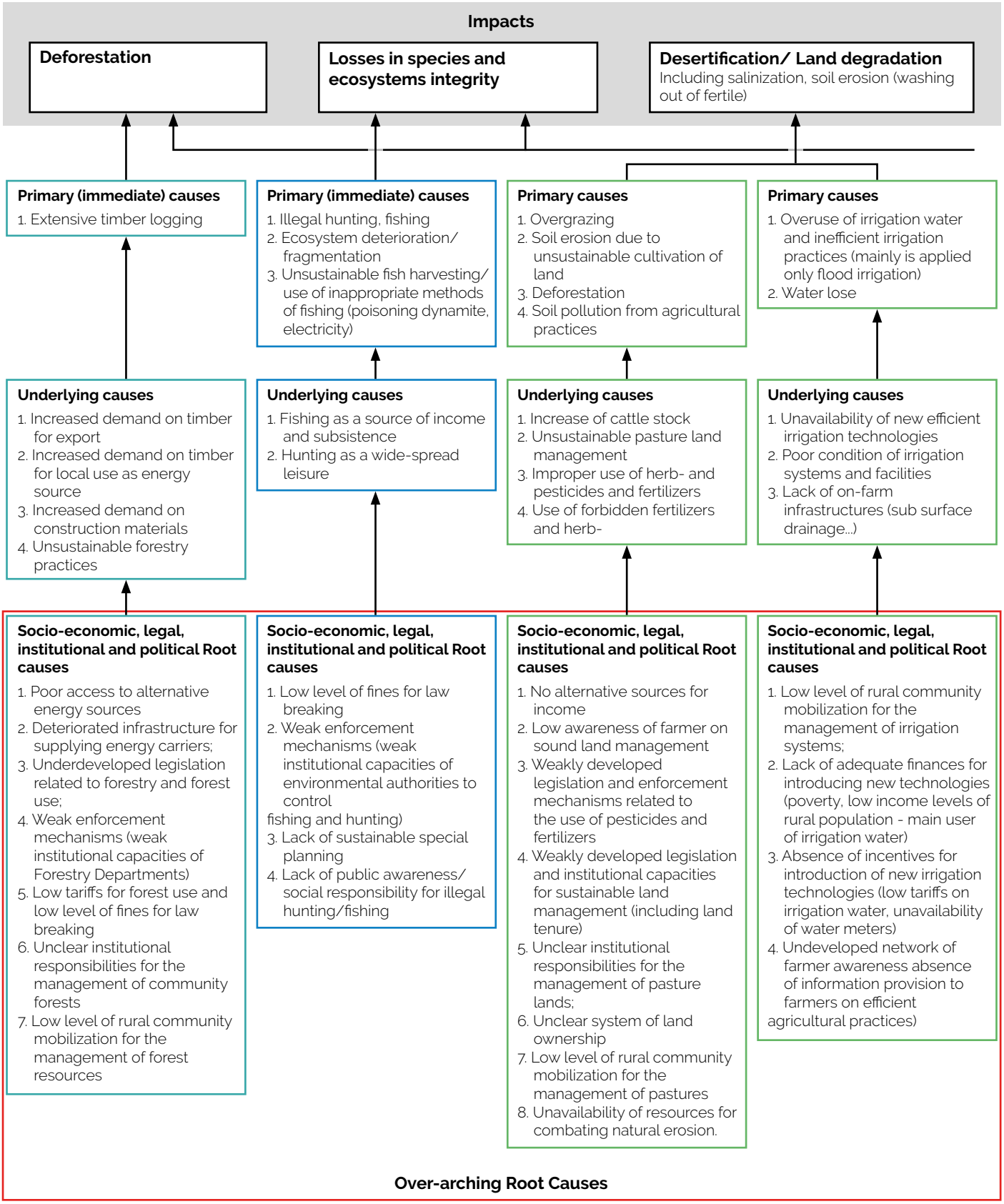
Caspian Sea Causal Chain (Ca. 2001)



Brief analysis

- Very little detail
- Perceived lack of understanding of CCA methodology
- Lack of logic
- Difficult for a decision maker to translate into action

Kura Aras River Basin Causal Chain (Ca. 2006)



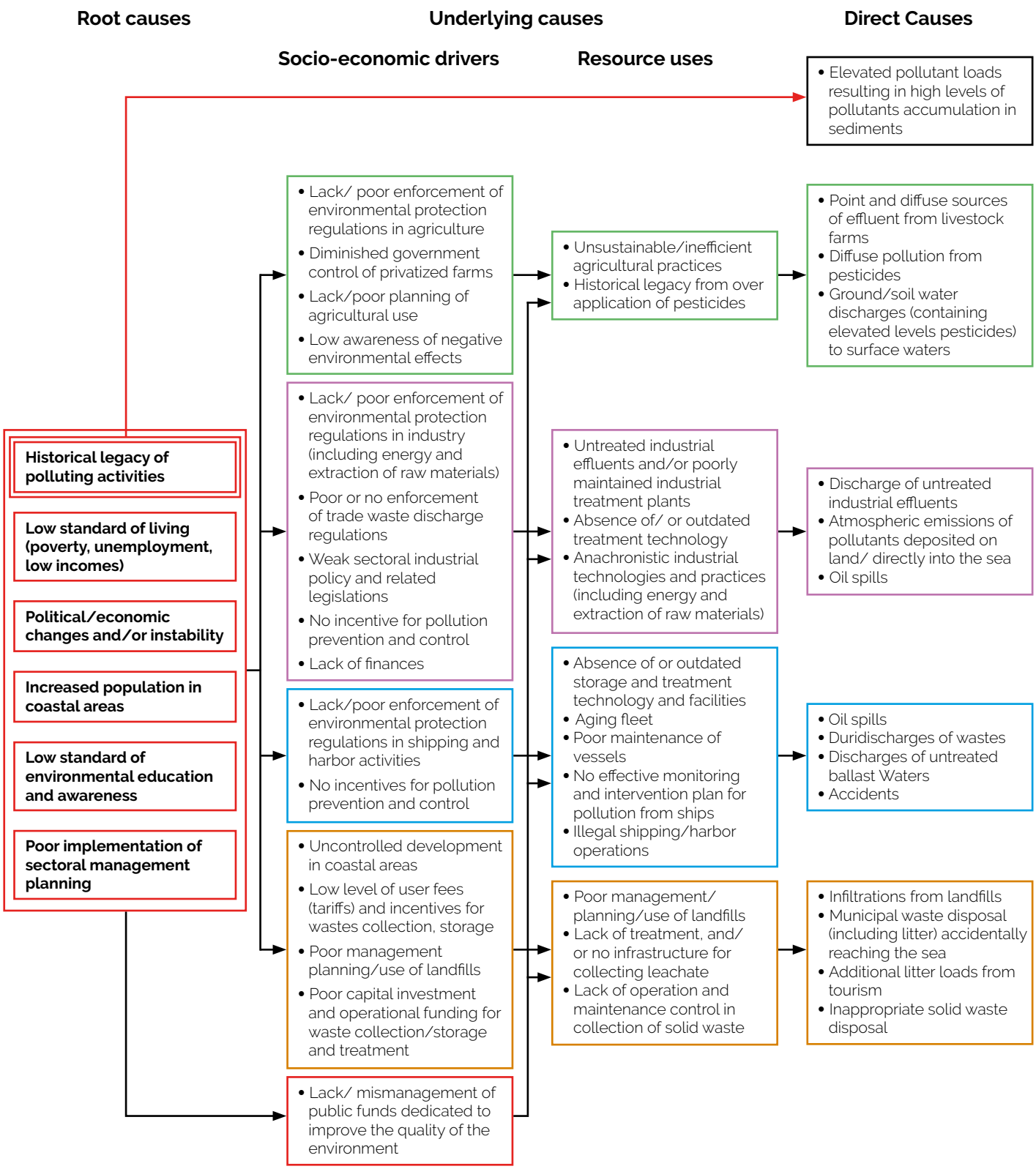
Brief analysis

- Good level of detail
- Some linkage and logical
- Links causes to impacts – a good idea
- Easy for a decision maker to translate into action

Natural causes

1. Natural erosion
2. Climate change)
3. Landslides
4. Mudflows and flooding

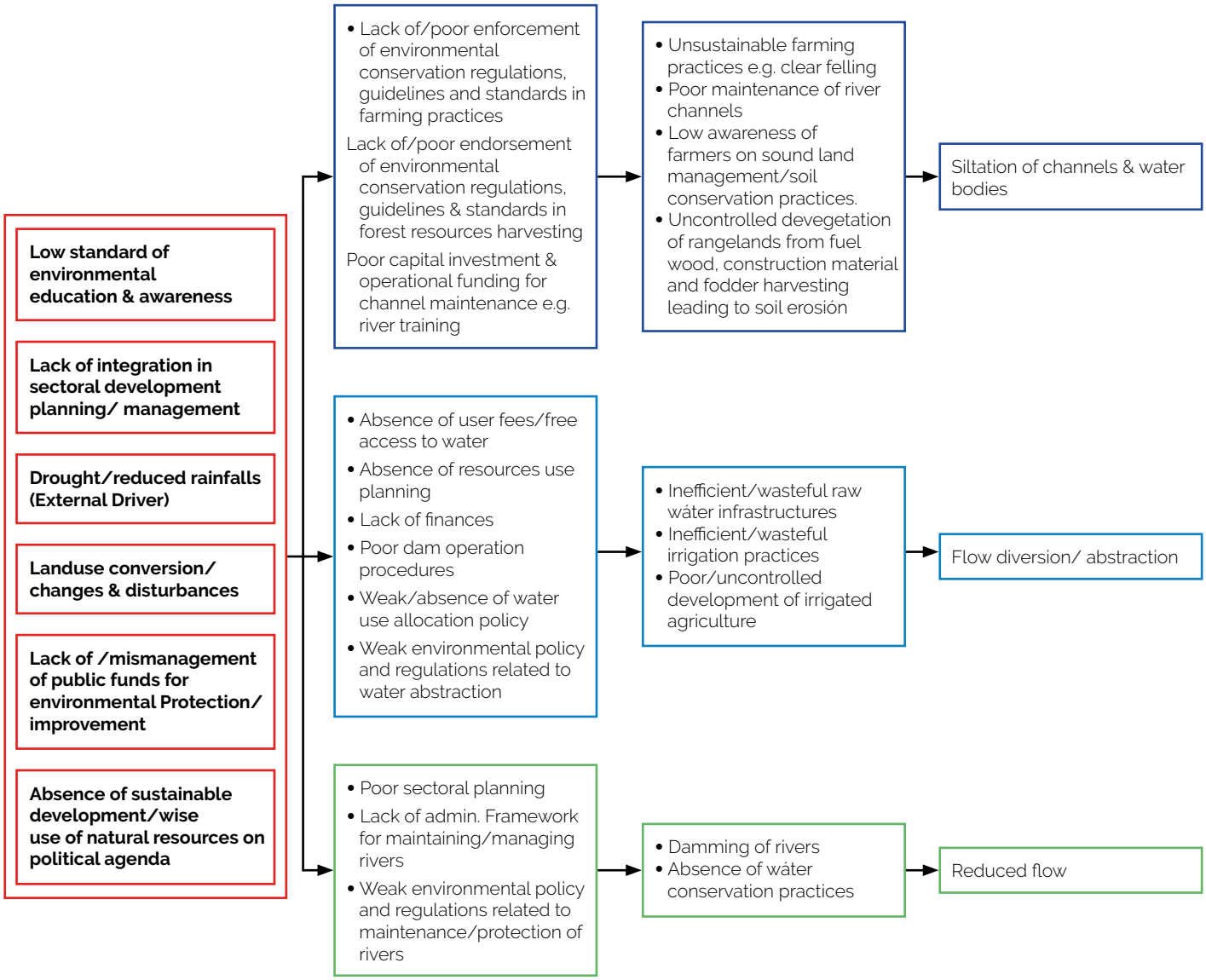
Causal Chain Analysis for Chemical Pollution



Brief analysis

- Good level of detail
- Some linkage and logical
- Links causes to impacts – a good idea
- Easy for a decision maker to translate into action

Lake Chad Causal Chain (Ca. 2007)



Brief analysis

- Reasonable level of detail
- Not much linkage but logical
- BUT could a decision maker translate into action?

Orange River Causal Chain (Ca. 2008)

Casual Chain Analysis for declining water quality

IMPACTS

Socio-economic
- Loss of potable water source
- Contaminated agricultural products
- Increased irrigation costs
- Blue-green algal blooms
- Increase in alien vegetation, increasing land degradation
- Increased salinity and sodicity in soil, groundwaters and rivers

Socio-economic
- Decrease in agricultural production
- Decreased recreational potential
- More expensive water (cost of treatment) Increase in invasive alien species
- Loss of amenity value for tourism
- Impact on human health (microbiological Aquatic mortalities pollution)

Ecological
- Degradation of equatic ecosystems
- Degradation of riparian ecosystems
- Bioaccumulation of toxins
- Increase in invasive alien species
- Increase in POP's
- Aquatic mortalities

Ecological
- Eutrophication
- Deoxygenation of water
- Accumulation of radio-nuclides in water, sediments and biota

DETERIORATING WATER QALITY

URBAN / HOUSEHOLD	MINING INDUSTRY	TOURISM	AGRICULTURE
Primary (immediate) causes 1. Leaching of metals and salts from land fills and cemeteries 2. Runoff and seepage from sewage sludge disposal 3. Lack of sewerage infrastructure in informal settlements 4. Non-compliant discharges from WWTW's 5. Diffuse runoff from gardens, Parks and recreational facilities	**Primary (immediate) causes** 1. Pumping of polluted water from mines 2. Decant and seepage from closed mines 3. Seepage from waste dumps / polluted areas 4. Atmospheric deposition of pollutants 5. Direct discharge of effluents to rivers	**Primary (immediate) causes** 1. Direct discharge of sewage from riverside tourist facilities and activities	**Primary (immediate) causes** 1. N & P in return flows and seepage 2. Runoff and leaching out of POP's from pesticides in irrigation return flows 3. Direct / indirect aerial deposition of pesticides into water courses 4. Saline return flows and seepage 5. Runoff and leaching out of trace metals from fertilizers and pesticides in irrigation return flows
Underlying causes 1. Poor landfill and cemetery site design,maintenance and management 2. Poor planning / EIA 3. Remediation and maintenance unaffordable 4. Operating over design capacity (high demand) 5. Informal settlements outside planning framework	**Underlying causes** 1. Socio-economic imperative to keep mines open 2. Abandoned mines and inadequate closure 3. Inadequate env. control measures 4. Lack of awareness of the problem 5. Low levels of compliance 6. Lack of commitment 7. Cost to correctly store and dispose of pollutants 8. Lack of monitoring data 9. Unrehabilitated slimes dams 10. Incomplete combustion of hospital and other hazardous waste 11. High cost of correct disposal of hazardous waste	**Underlying causes** 1. Cumulative impacts not considered in granting operating licenses 2. Lack of alternative facilities	**Underlying causes** 1. Over- and incorrect applicaion of fertilizers, pesticides and irrigation 2. Illegal disposal of pesticides / fertilizer containers 3. Artificial leaching of root zone to reduce salinity and excess nutrients 4. Cost of water not internalised
Socio-economic, legal and political Root causes 1. Ineffective enforcement and control 2. Shortage of skills at local government 3. HIV/AIDS as a result of por government health policies 4. Government BEE policies 5. Rapid population increase without upgrading WWTW'S 6. Insufficient funds and commitment at local government level 7. Lack of affordable housing 8. Lack of awareness of problems	**Socio-economic, legal and political Root causes** 1. High cost to government to rehab abandoned mines 2. Ineffective enforcement and control 3. Lack of commitment to EMPR as a result of high costs of corrective measures 4. High cost of appropriate technology 5. Shortage of skills and capacity in the industry to deal with the problem	**Socio-economic, legal and political Root causes** 1. Inadequate legislation 2. Magnitude of problem not recognised 3. High cost of alternatives	**Socio-economic, legal and political Root causes** 1. Poor management 2. Lack of awareness 3. Limited monitoring 4. Inadequate extension services 5. High cost of monitoring and water analyses 6. High cost of waste disposal 7. Ineffective enforcement and control 8. High salinity of irrigation water 9. Use of arginal soils for agriculture 10. Natural geological conditions 11. Low levels of technical knowledge 12. Inefficient irrigation systems 13. Govt. policy and pricing mechanisms

IMPACTS

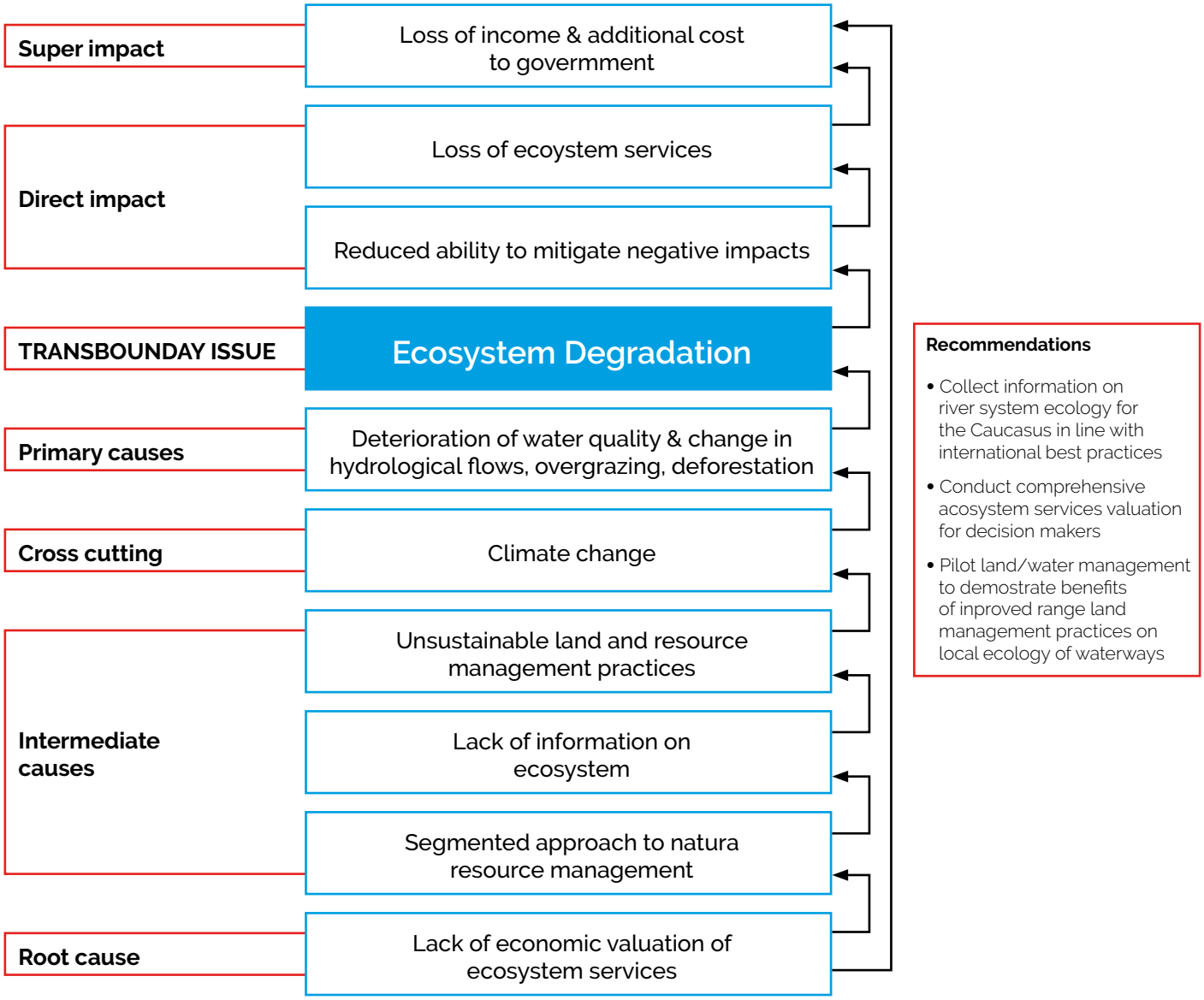
Inadequate government funding, inadequate allocation of government funding

Brief analysis

- Good level of detail
- Some linkage and logical
- Links causes to impacts – a good idea
- Graphics make it difficult to interpret
- BUT could a decision maker translate into action?

Kura Aras River Basin Causal Chain (Ca. 2013)

Ecosystem Degradation



Brief analysis

- Reasonable level of detail
- Some linkage and logical
- Links causes to impacts – a good idea
- Graphics make it slightly difficult to interpret
- Linking root causes to impacts and identifying some key recommendations helps in the decision making process

Annex 3: An example of a typical TDA content list

TDA Content List

4. Priority Transboundary Problems

4.1 Introduction

4.2 Transboundary problem 1

- 4.2.1 Description of the problem and its transboundary importance
- 4.2.2 Major environmental impacts and social-economic consequences
- 4.2.3 Linkages with other transboundary problems
- 4.2.4 Immediate, underlying and root causes (with diagrams)
- 4.2.5 Knowledge gaps
- 4.2.6 Conclusions and recommendations

4.3 Transboundary problem 2

- 4.2.1 Description of the problem and its transboundary importance
- 4.2.2 Major environmental impacts and social-economic consequences
- 4.2.3 Linkages with other transboundary problems
- 4.2.4 Immediate, underlying and root causes (with diagrams)
- 4.2.5 Knowledge gaps
- 4.2.6 Conclusions and recommendations

4.3 Transboundary problem 2

- 4.3.1 Description of the problem and its transboundary importance
- 4.3.2 Major environmental impacts and social-economic consequences
- 4.3.3 Linkages with other transboundary problems
- 4.3.4 Immediate, underlying and root causes (with diagrams)
- 4.3.5 Knowledge gaps
- 4.3.6 Conclusions and recommendations

4.4 Transboundary problem 3 etc

- 4.4.1 Description of the problem and its transboundary importance
- 4.4.2 Major environmental impacts and social-economic consequences
- 4.4.3 Linkages with other transboundary problems
- 4.4.4 Immediate, underlying and root causes (with diagrams)
- 4.4.5 Knowledge gaps
- 4.4.6 Conclusions and recommendations

5. Stakeholder analysis

6. Governance analysis

7. Summary, conclusions, recommendations

Annexes

Annex 4: An example of a typical SAP content list

TDA Content List

Forward
Table of contents, figures and tables
Acknowledgements
Participating institutions
Acronyms and Abbreviations

Executive Summary

1. Introduction

1.1 Global and Regional Significance of the system

1.2 The need for a coordinated and integrated approach

2. STEPS TOWARDS THE PREPARATION OF THE SAP

2.1 The TDA/SAP Methodology

2.2 TDA Findings

2.3 The SAP Approach

3. THE STRATEGIC ACTION PLAN

3.1 Long term vision

3.2 Goals

3.3 Objectives

3.4 Actions and Interventions

4. SAP IMPLEMENTATION ARRANGEMENTS

5. MONITORING AND EVALUATION

6. FINANCIAL NEEDS, POTENTIAL SOURCES AND MECHANISM

ANNEXES –Including detailed supporting tables for the SAP

Annex 5: Economic Valuation of Ecosystem Services

Economic Valuation of Ecosystem Services

The IW:LEARN Guidance Document to Economic Valuation **of Ecosystem Services** is aimed at GEF International Waters project managers, economic experts and other stakeholders involved in GEF International Waters projects and more generally those interested in including the economic valuation of ecosystem services into Transboundary Diagnostic Analyses (TDA) and Strategic Action Programmes (SAP) and linked processes, such as policy and decision makers and environmental and development planners.

Setting the Scene - what are Ecosystem Services?

"Ecosystem services" are the many and varied benefits that humans gain from the natural environment and from properly-functioning ecosystems - for free. The present idea and concept of ecosystem services was developed and described in several important reports and publications, starting in the late 1990s with publications by, for example, Costanza et al. (1997) and Daily (1997, 2000). The concept was covered globally in considerable detail by the United Nations´ "Millennium Ecosystem Assessment" (MEA 2005), and in an increasing number of publications from that point forward. More recently, the TEEB Report[20], particularly the "TEEB for Water and Wetlands" (Russi et al. 2013). These initiatives include the UN´s Intergovernmental Platform on Biodiversity and Ecosystem Services/IPBES, the EU´s Common International Classification of Ecosystem Services/CICES and the EU´s Mapping and Assessment of Ecosystems and their Services (MAES) initiative, all of which are underlining the potential of the concept for sustainable policy and decision making.

www.iwlearn.net/valuation

20 The Economics of Ecosystems and Biodiversity"; De Groot et al. 2009

In the TEEB Report, ecosystem services are categorized into four broad categories, representing different "services" or "goods" that are provided by different ecosystems/habitats. The TEEB categorization is used in the GEF Guidance Documents:

	Main service-types
	PROVISIONING SERVICES
1	**Food** (eg, fish, game, fruit)
2	**Water** (e.g. for drinking, inrigation, cooling)
3	**Raw materials** (eg, fiber, timber, fuel wood, fodder, fertilizer)
4	**Genetic resources** (e.g. for crop improvement and medicinal purposes)
5	**Medicinal resources** (e.g. biochemical products, models & test organisms)
6	**Ornamental resources** (eg, artisan work, decorative plants, pet animals, fashion)
	REGULATING SERVICES
7	**Air quality regulation** (e.g. capturing (fine)dust, chemicals, etc.)
8	**Climate regulation** (incl. C-sequestration, influence of vegetation on rainfall, etc.)
9	**Moderation of extreme events** (e.g. storm protection and flood prevention)
10	**Regulation of water flows** (e.g. natural drainage, irrigation and drought prevention)
11	**Waste treatment** (especially water purification)
12	**Erosion prevention**
13	**Maintenance of soil fertility** (incl. soil formation)
14	**Pollination**
15	**Biological control** (e.g. seed dispersal, pest and disease control)
	HABITAT SERVICES
16	**Maintenance of life cycles of migratory species** (incl. nursery service)
17	**Maintenance of genetic diversity** (especially gene pool protection)
	CULTURAL SERVICES
18	**Aesthetic information**
19	**Opportunities for recreation & tourism**
20	**Inspiration for culture, art and design**
21	**Spiritual experience**
22	**Information for cognitive development**

The typology for ES according to the TEEB Report (Source: De Groot et al. 2009).

Ecosystem services can be also divided into "use values" and "non-use values", according to the concept of the "Total Economic Value" (TEV). The TEV is an approach to create a single monetary metric that combines all activities within an area and to express the levels of each activity in units of a common monetary measure, such as US dollars.

Before the concept was introduced, economic values have quite narrowly been defined as "benefits". Values of ecosystems have been attributed only to raw materials and physical products that ecosystems generate for human production and consumption. These direct uses however represent only a small proportion of the total value of

ecosystems, which generate economic benefits far in excess of just physical or marketed products. Instead of focusing only on direct commercial values, the TEV also encompasses the subsistence and non-market values, ecological functions and non-use benefits. Broadly defined, the TEV includes:

- ***Direct use value:*** Individuals make use of a resource in either a consumptive way (e.g. the fishing industry and agriculture) or a non-consumptive way (e.g. cooling water).
- ***Indirect use value:*** Individuals benefit from ecosystem services supported by a resource rather than actually using it (e.g. watershed protection for flood mitigation, cycling processes for agriculture or carbon sequestration).
- ***Non-Use Values*** are associated with benefits derived simply from the knowledge that the natural environment is maintained. By definition, non-use values are not associated with any use of the resource or tangible benefit derived from it, although users of a resource might also attribute a non-use value to it. Non-use value can be split into three basic components:
- ***Altruistic value:*** Derived from knowing that contemporaries can enjoy the goods and services the natural environment provides.
- ***Bequest value:*** Associated with the knowledge that the natural environment will be passed on to future generations.
- ***Existence value:*** Derived simply from the satisfaction of knowing that ecosystems continue to exist, regardless of use made of them by oneself or others now or in future (also associated with "intrinsic value").

For simplicity, the IW:LEARN Guidance Documents continuously speak of "ecosystem services", which also includes raw goods, and of "ecosystems", which could also mean "habitats" or "landscape".

Why and when to conduct Economic Valuation of Ecosystem Services

Ecosystem services are crucial for the well-being of people, but their contribution to economic systems is difficult to quantify in monetary terms. Since some of them are not traded in commercial markets, they are often given too little or no weight in decision making, e.g. for development of big infrastructure projects. Thus, final decisions may favor outcomes which do have a commercial value, turning unsustainable use of ecosystems more profitable in a short term while having considerable economic long term costs. Economic valuation is a tool for valuing ecosystems and their services in monetary terms. It quantifies the benefits provided by ecosystems and the impact of ecosystem changes on the wellbeing of people.

However, economic evaluations can be resource-intensive, and significant expert´s knowledge is needed to conduct an analysis "from scratch" (an "original valuation study"). In cases where such knowledge and resources are limited, the "benefit transfer" method is often used to estimate economic values for ecosystem services that cannot be valued otherwise, by transferring available information from detailed original studies already completed in another location and/or context. Benefit transfer is hence used when it is too resource intensive (in terms of money and expertise) and/or there is too little time available to conduct an original valuation study (i.e. an independent, individual assessment of e.g. a hotspot ecosystem), yet some measure of benefits is needed.

In the scope of GEF IW:LEARN, such situations are referred to as "tier 1" projects, i.e. areas/regions which can only provide limited resources towards an economic valuation. The methodologies for a benefit transfer in tier 1 projects and a database of reference studies (the "repository") are presented in a respective "tier 1 section" in the IW:LEARN Guidance Document.

Projects with more resources at hand, i.e. projects which can dedicate adequate funds for an original valuation of ecosystem services, are referred to as "tier 2" projects. In such tier 2 projects/areas, IW managers can conduct a study/studies on the value of a specific ecosystem at risk of being damaged or destroyed, on the ecosystem services provided by a hotspot ecosystem, or on ecosystem services which are endangered by a specific pressure, such as eutrophication. Options and methodologies for tier 2 projects are presented in the "tier 2 section" of the IW:LEARN Guidance Document.

Depending on the policy context of the assessment, or the current situation the project area is in, in terms of a starting or running TDA/SAP process, each economic valuation will be an individual and specific exercise from any other EV performed before or thereafter. For example and as described above, the resources available for an EV will differ, making it necessary to conduct a rather "rough" screening of the ecosystems, or to prioritize certain ecosystem services above others. Alternatively, the specific objectives of the EV could make it necessary to concentrate on a very specific, localized ecosystem of high value (e.g. a biodiversity "hotspot"), or on a certain pressure affecting a region or system.

The later utilization of the results also depends on the resources, the time and expertise invested in the economic valuation. A tier 1 economic valuation using the benefit transfer methodology will generate values that provide a rough overview of potential values of ecosystem services in the region. Hence, these can be used for communication and awareness raising purposes, but should be handled with care and transparency when introduced into decision making processes. Also, assessments of all ecosystem services in a large region, such as a Large Marine Ecosystem (LME), will be less precise than assessments on a subnational or even local scale.

Policy Appraisal Context

Depending on the specific situation and circumstances in the IW project area, any economic valuation will be embedded in an individual "policy appraisal context", which could also be part of a TDA or SAP. The tier 1 and tier 2 approaches are flexible, to be usable in all kinds of policy situations. The most common policy appraisal contexts, or "use cases", are:

- An economic valuation as a "screening analysis", assessing the overall value of all ecosystem services in a whole LME or transboundary river basin in a resource-efficient way, i.e. without conducting resource-intensive in-depth analyses. Such a screening will most likely be conducted using the easier tier 1 methodology, and be used mainly for communication and awareness raising purposes, possibly in the context of a TDA. Such a "screening" could also form the basis for a following in-depth analysis of all or some ecosystem services in the LME/river basin, which would then follow the tier 2 methodology.

- An economic valuation as a "hotspot analysis", i.e. an in-depth analysis of very biodiversity rich and important ecosystems or areas (e.g. the Great Barrier Reef in Australia). Such a hotspot analysis would also follow the tier 2 methodology.

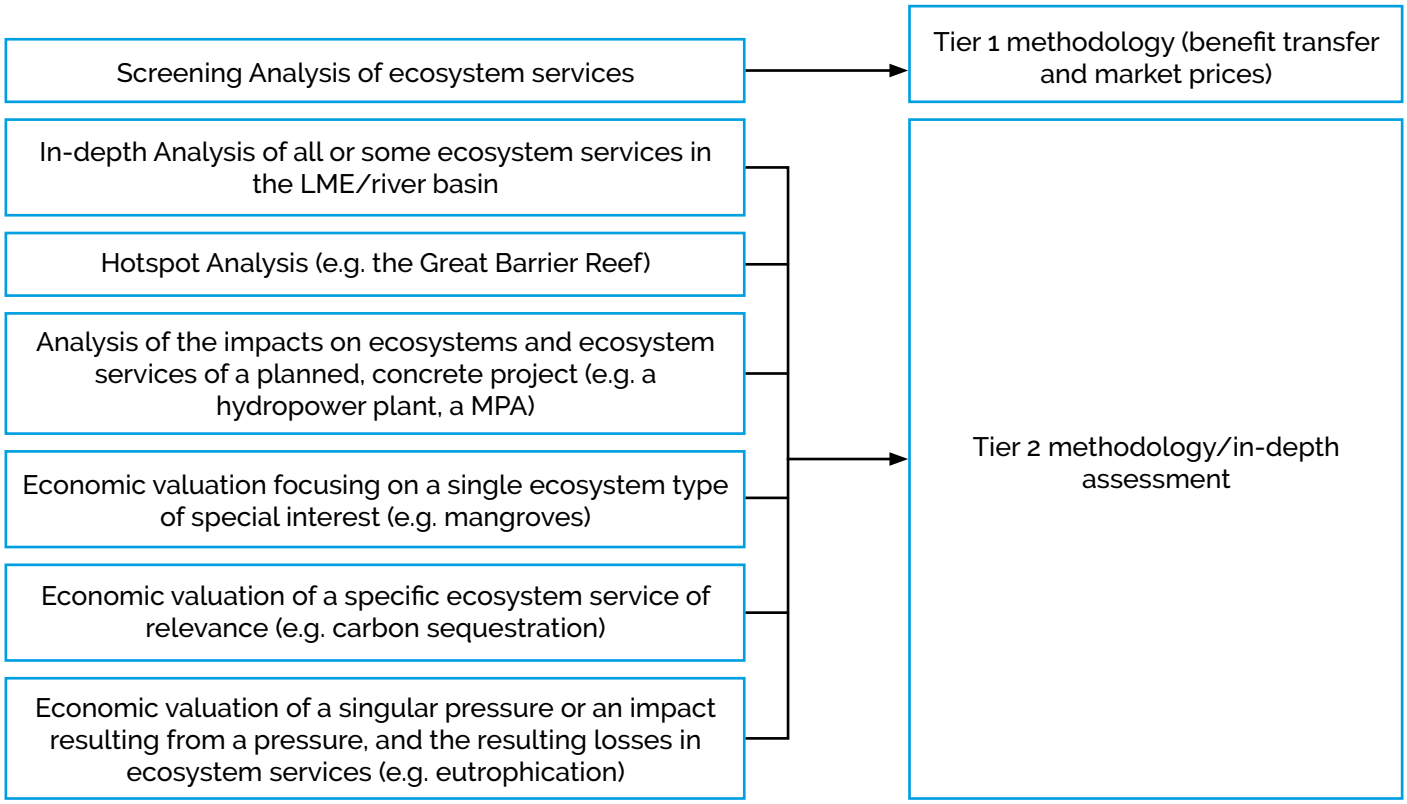
- An economic valuation as an analysis of the impacts on ecosystems and ecosystem services of a planned, concrete project, i.e. an in-depth assessment of the economic costs and benefits in a specific area that will be impacted by the project - positively or negatively. Thus, while some development/infrastructure projects may lead to the deterioration of important ecosystem services, a conservation project such as the establishment of a new Marine Protected Area (MPA) - as in the example below - could result in maintained or improved provision of ecosystem services by the ecosystem in question. Consequently, such an analysis could have the objective of demonstrating the economic values at risk or the economic values that can be maintained/increased by the project to be analyzed, with the aim of influencing policy decisions, and would also use the tier 2 methodology. Such an analysis could also support the identification of options and alternatives in a TDA/SAP process.

- An economic valuation focusing on a single ecosystem type of special interest (e.g. mangroves in the Niger basin) and the ecosystem services it provides (using the tier 2 methodology).

- Similarly, an economic valuation can be dedicated to one specific ecosystem service of relevance (e.g. carbon sequestration) in the project area of interest (e.g. river basin/LME) and will be also conducted based on the tier 2 methodology.

- Finally, in certain cases it may be of interest to consider an important singular pressure or an impact resulting from a pressure, and the resulting losses in ecosystem services. Examples of pressure are e.g. climate change, high levels of nitrates in the water body, whereas sea level rise, increased flood risks and eutrophication could be the resulting impacts. Such in-depth analyses are also using the tier 2 methodology.

The following flow diagram depicts the various policy appraisal contexts and whether tier 1 or tier 2 methodologies will be used.



Annex 6: GEF Transboundary Waters Assessment Programme (TWAP)

The Transboundary Waters Assessment Programme (TWAP) has involved a series of GEF projects aimed at developing agreed methodologies for assessing transboundary aquifers, lakes, rivers, LMEs and the open ocean, and providing global assessments (2015) of the status and trends in these key waterbody types.

The TWAP assessments were global in scope, covering 199 transboundary aquifers, groundwater systems in 42 small island developing states, 206 transboundary lakes and reservoirs, 286 transboundary river basins, 26 deltas, 66 large marine ecosystems, and the open ocean – a total of 758 international water systems. The assessments for each water body type were designed to be able to compare all transboundary waters within type, and the level of detail was an appropriate for a global assessment. Therefore, the extent to which TWAP methodologies and results can be used in a TDA/SAP of an individual water body depends on the amount of prior assessment undertaken at the water body level. However, it is expected that TWAP methodologies and results will be useful as a starting point for many of the water bodies likely to undertake a TDA/SAP project, though the TDA/SAP process will go into much more detail.

The TWAP outputs can assist TDA/SAP projects with multiple aspects, including by providing:

- Identification and delineation of water bodies. A key output of the TWAP has been to update and improve the delineation of transboundary water bodies. In particular, the identification and delineation of transboundary aquifers has been greatly improved through the TWAP.
- Background data and information on the relevant transboundary aquifers, lakes, rivers and LMEs, such as biophysical, geographic, socioeconomic, and governance information (analysis of arrangements and effectiveness).
- Indicator results which can be used as a starting point, particularly in the TDA, to identify some of the key issues in the relevant water bodies, as well as an initial assessment of their severity and potential priority. Indicator results include both a baseline assessment, as well as projected scenarios for the 2030s and 2050s.
- Indicator frameworks, and underlying indicator methodologies and data sources, which can be used as starting points for undertaking assessments during a TDA and providing baseline for the subsequent implementation of the SAP to complement national and regional indicators specific to the TDA/SAP region.

- Access to data partners and stakeholders. Partners involved in TWAP may be able to assist with filling data gaps. Though much of the data used was primarily assessed at a global resolution, a significant amount of data is likely to be available at a resolution that is applicable at the individual water body level. In some cases, partners may have updated datasets to a finer resolution since the completion of the TWAP baseline (2015). In some cases, TWAP assessments involved local stakeholders who could contribute to the TDA/SAP processes. This was particularly true in the case of transboundary aquifers and lakes.

The TWAP web portals provide information and contact details of significant value to projects undertaking TDA/SAPs in providing waterbody-type specific guidance and potential indicators that can be utilised.

Results and waterbody specific guidance from TWAP will be useful to projects during the TDA development (e.g. in preparing thematic reports on the status of the transboundary system, governance or socio-economic assessments) and within the SAP (e.g. in developing long-term M&E approaches to monitor and report the implementation of the SAP to donors, building on the baseline data collected during the TDA). These indicators will assist projects identify indicators that will enable inter-comparability between transboundary systems that will need to be supplemented by national and regional specific indicators identified by the TDA Technical Task Team.

The TWAP assessment is the first global assessment that uses quantified indicators of system states, pressures and impacts under three broad themes: biophysical, socioeconomic, and governance. Results are summarized into five relative levels of system risk - lowest, low, moderate, high, and highest - which are amenable to system and regional scale comparisons. As such, TWAP is poised to help identify core indicators to support national monitoring and reporting of targets required to realize the Sustainable Development Goals for the period 2015 - 2030. TWAP freshwater indicators map to SDG 6 on Clean Water and Sanitation, notably Target 6.6 (protection and restoration of mountains, forests, wetlands, rivers, aquifers and lakes). TWAP marine indicators support SDG 14 on Oceans, Seas and Marine Resources, and all its targets.

The assessment results are organized into five technical reports (accompanied by a Summary for Policy Makers) and a sixth volume that provides a cross-category analysis of status and trends:

- Volume 1 - *Transboundary Aquifers and Groundwater Systems of Small Island Developing States: Status and Trends*
- Volume 2 - *Transboundary Lakes and Reservoirs: Status and Trends*
- Volume 3 - T*ransboundary River Basins: Status and Trends*
- Volume 4 - *Large Marine Ecosystems: Status and Trends Volume 5 - The Open Ocean: Status and Trends*
- Volume 6 - *Transboundary Water Systems: Crosscutting Status and Trends*

Examples of the indicators used in the TWAP assessments include (full lists of indicators used in TWAP are available through www.geftwap.org):

Transboundary Aquifers

- Quantity (groundwater recharge, depletion, etc.)
- Quality (natural background, pollution, etc.)
- Socio-economic (population density, dependency on groundwater, groundwater development stress, etc.)
- Governance (legal and institutional frameworks)

Transboundary Lakes

- Catchment disturbance (cropland, livestock density, wetlands connectivity, etc.)
- Pollution (nitrogen, phosphorus, salinization, etc.)
- Water Resources Development (Dams, consumptive loss, etc.)
- Biotic factors (non-native fish, aquaculture, etc.)
- Governance

Transboundary Rivers

- Water Quantity (Environmental. Human and agriculture water stress)
- Water Quantity (nutrient, wastewater pollution)
- Ecosystems (wetland disconnection, impacts of dams, extinction risk, threat to fish)
- Socio-economic (dependence on water resources, floods and droughts exposure, etc.)
- Governance (legal framework, hydro-political tension, enabling environment)

Large Marine Ecosystems

- Socio-economics (e.g. coastal population within coastal zone, fisheries revenue, tourism, HDI, sea rise threats and other climate change potential impacts)
- Productivity (primary productivity, chlorophyll a concentration and trends, sea surface temperature and trends)
- Fish and fisheries (marine trophic index, fishing in balance index, fishery production potential, etc.)
- Pollution and Ecosystem health (plastic, coastal eutrophication, mangrove extent, reefs at risk index, cumulative human impacts index etc.).
- Governance

TWAP undertook governance assessments within all the water body types that could be adapted to evaluate the state of current transboundary governance and provide recommendations for the SAP. The CLME project made extensive use of the governance assessment framework adopted by TWAP and serves as a good example within an LME environment of a governance effectiveness assessment.

Projects developing TDA/SAP are strongly encouraged to utilise the methods proposed by TWAP for assessments and to seek, when necessary, support from the project partners on downscaling the methods and indicators to transboundary systems. All TWAP publications are available at www.geftwap.org. To provide access to the quantitative data that underpin the assessments, a central data portal can be explored at http://www.geftwap.org/data-portal. Contact details can be found through the TWAP website (www.geftwap.org) or via the GEF IW:LEARN (www.iwlearn.net).

Annex 7: GEF Floods and Droughts project

The growing need to recognize and address flood and drought risks has created a demand for climate information. In response to this the Flood and Drought Management Tools, http://fdmt.iwlearn.org/, project is developing a package of technical applications that are accessible through the Flood and Drought Portal, http://www.flooddroughtmonitor.com/. The tools or technical applications can be used individually or together at the basin and local levels, providing users with a scientific approach focused on identifying and evaluating the impact and risk of flood and drought hazards, and planning for mitigation or adaptation measures. The outcome enables stakeholders to compile information, from models, indicators and existing planning approaches, so as to develop future planning scenarios that are resilient and pragmatic.

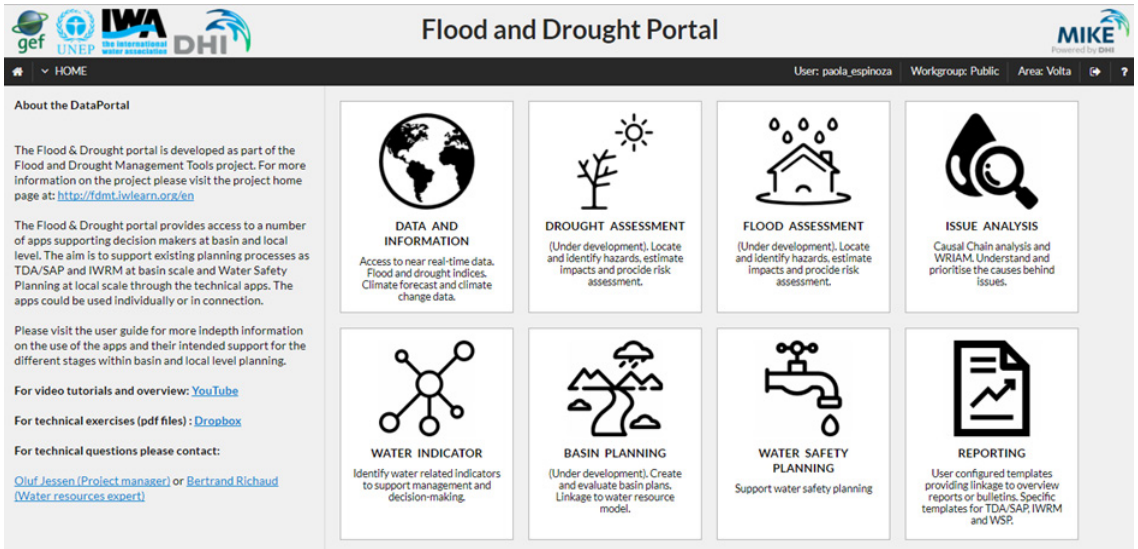


Figure 1: The Flood and Drought Portal, www.flooddroughtmonitor.com

Released applications

The project is developing a package of technical applications to support decision making across scales.

- **Data and Information:** access to climate data such as rainfall, temperature, evapotranspiration, vegetation, and soil water. This is available as near real time satellite data, short term and seasonal forecast data, climate change information and flood and drought indices for basin and local level planning.
- **Issue Analysis:** aims at analysing environmental issues and the causes behind the impacts from the environmental issues. The application is based on the Causal Chain Analysis (CCA) method and the Water Resource Issues Assessment Method (WRIAM). The application is used to evaluate the key issues and assess the causes behind the environmental impacts and prioritise the environmental impacts based on the WRIAM rapid assessment.
    - Introductory video: https://youtu.be/Hu437GZeXZY
    - Article: http://fdmt.iwlearn.org/news/we-all-have-issues-to-analyse
- **Water Indicator:** provides information about indicators to support management and decision-making. Default frameworks have been developed which users can use as a starting point to develop their own framework for their respective organisations.
    - Introductory video: https://youtu.be/SxzGavlV1Ps
    - Article: http://news.iwlearn.net/why-measure-introducing-the-water-indicator-application
- **Drought Assessment:** Identification of the timing and location of a drought event is an important step in a drought assessment and drought management process. The application helps to identify and locate hazards and estimate its impact. It is typically based on different types of drought indices each representing the state of a specific drought related issue at different times. These include rainfall, soil moisture, temperature and vegetation.
    - Presentation (latest training in Thailand): https://goo.gl/mSBZ3f
- **Flood Assessment:** Access to flood related information as historic flood data and tools for analysing flood hydrographs based on a rainfall-runoff model.
- **Basin planning:** The planning application targets decision makers without any modelling expertise, and the overall concept is to utilize an existing water resources model, for evaluation of plans by stakeholders in the water sectors. The planning application links closely to the TDA work flow and will enable decision makers to evaluate the impact of potential impacts and strategies. Use of the planning application rests on the concepts listed below:
    - Investments: these are investments decision makers want to implement within a specific plan; investments are limited to water supply, irrigation schemes, other types of water supply, hydropower, reservoirs and storage; investments are described as water user nodes in the water resources model, or as hydropower or reservoir nodes.
    - External factors: these are climate change and population growth; the external factors influence the model in different ways as they impact either the climate or the water demand simulated.

- Plans: a plan is a collection of investments and external factors combined into a plan or scenario; each plan is represented by a set of inputs to the model.
- Indicators: planning results are all indicators derived from the model result files, i.e. actual model results will not be shown but only indicator values.
- Strategies: weighting system attributed to indicators expressing different policy and strategic focuses.

- **Reporting Tool:** Provides configured templates that provide linkage to overview reports or bulletins. Reports are critical for easily disseminating technical information in a more accessible way. The applications allow users to generate automated reports (defined by the user) addressing key issues (e.g. drought reports, flood reports, TDA/SAP reports, etc.).

Annex 8: Gender Mainstreaming

UNESCO WWAP Gender Toolkit

The United Nations World Water Assessment Programme (WWAP) ground-breaking project for 'Gender Sensitive Water Monitoring Assessment and Reporting', has developed and tested an indicator-based methodology for collection and analysis of key sex-disaggregated water data. The project has proven the value of sex-disaggregated data, in providing strong support for the monitoring of post-2015 development goal, building capacity for collection of sex-disaggregated water data at the national level, making the case (to national leaders and policy-makers) for gender mainstreaming and creating baseline knowledge related to water, from which gender progress can later be evaluated.

WWAP Toolkit includes a comprehensive list of priority gender-sensitive indicators that fall under five broad topics: i) water governance, ii) safe drinking water, sanitation and hygiene, iii) decision-making and knowledge production, iv) transboundary water resources management, and v) water for income generation for industry and agriculture. More specifically, the indicators relate to women's water empowerment and participation in water decision- making, income generation, and unaccounted for water-related working hours. The Toolkit also provides a comprehensive methodology for collecting data and information. Introductory webinars on the use of Toolkit for sex-disaggregated data collection and the conduct of gender analyses were delivered by WWAP as part of IW LEARN 4, and are available at https://www.youtube.com/watch?v=ow2x653Mik4&playerapiid=ytplayer&fs=1

No water assessment or diagnostic can be realistic without a gender perspective. And no decision- making is inclusive unless both women and men participate in the process. The gender toolkit for collection of sex-disaggregated data will provide the first step towards initiating a transformative process in the way water – including transboundary waters - is managed in the future.

Website: http://www.unesco.org/new/en/natural-sciences/environment/water/wwap/water-and-gender

A Gendered Critique of Transboundary Water Management (SIWI 2013)

Most of the international transboundary water management processes taking place globally are driven by 'the hydraulic mission' — primarily the construction of mega-infrastructure such as dams and water transfer schemes. The paper argues that such heroic engineering approaches are essentially a masculinized discourse, with its emphasis being on construction, command and control. As a result of this masculinized discourse, the primary actors in TWM processes have been states — represented by technical, economic and political elites operating in what generally gets termed 'the national interest'. Left out are the local communities relying on the resource directly: the water users; the poor; women; and other important groups. Instruments such as the UN Watercourses Convention of 1997 make an effort to present an attempt at a gender-balanced approach through asserting the importance of the 'no-harm rule' and the 'equitable share approach'. However, they end up supporting the status quo through the omission of any reference to gender issues. The paper provides an overview of the masculinized discourse on TWM institutions, proposing that this is the case because of the intersection of two masculinized fields - water resource management and the disciplines engaged in the research of transboundary water management, namely, political science and international relations.

It is concluded that the laws and organizations responsible for transboundary water management currently do not yet reflect a gendered approach, despite the international recognition given to the necessity of including women in water management structures at all levels.

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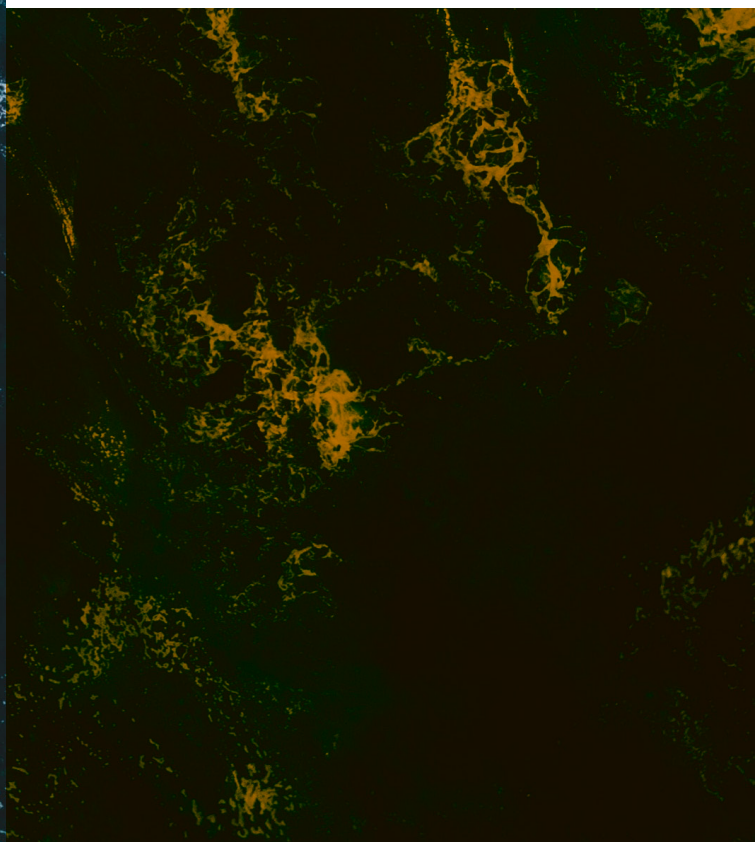
Part 3 Planning the TDA/SAP Process



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Summary

This is the second of three parts that makes up the GEF Transboundary Diagnostic Analysis/ Strategic Action Programme (TDA/SAP) Manual.

Part 1 presents an introduction to International Waters and the TDA/SAP approach. It describes what International Waters are and why are they important, and why the GEF is interested in them. It then outlines the TDA/SAP approach as a tool for IW management, presents a brief history of the TDA/SAP approach, gives examples of the TDA/SAP approach in action and finally describes the current GEF approved version of the TDA/SAP approach.

This Part delves deeper into the TDA/SAP process. It presents a 'How to' Guide to TDA/SAP development – a simple, non-prescriptive stepwise approach that many projects have followed over the last 10 years, including references and links to best practices and experiences from a wealth of completed and on-going projects.

Part 3 focuses in on planning the TDA/SAP process. In particular, it looks at the key steps in managing the TDA and the SAP and meeting/workshop design to ensure the TDA and the SAP processes are as collaborative as possible.

- The TDA/SAP Guidance Manual has been updated by GEF IW:LEARN in 2018 to enhance the information and to incorporate guidance on ecosystem valuation approaches, gender mainstreaming and links to ecosystem specific considerations and indicators. These updates are based-on recent GEF global projects that have led to increased understanding of these issues and best practices from SAP implementation. GEF projects delivering this additional guidance, which is summarised in the TDA/SAP manual, include:
- GEF LME:LEARN (with specific tools and guidance for LME projects)
- GEF Transboundary Waters Assessment Programme (TWAP) information and guidance from an application of methodologies to assess transboundary water bodies (aquifers, lakes, rivers, and LMEs) including indicator for these waterbodies;
- GEF Floods and Droughts (delivering tools and approaches for freshwater assessments and management that are highly relevant to the development of TDA/SAPs and their subsequent implementation)

Links and summary details are presented throughout the guidance document supported by four annexes to provide additional brief information on the IW:LEARN supported work on Economic valuation of ecosystems, Gender Mainstreaming, and the GEF TWAP and Floods and Drought projects.

1. Introduction

Crucial to the development of an effective TDA and SAP is the planning process that underpins it. Each project will manage the TDA and SAP development processes differently. This Chapter describes a simple stepwise process for planning for and managing the TDA and the SAP based on the experiences of a number of recent IW projects. Its intention is not to be prescriptive, rather to give an indication of the planning and management activities required.

This Chapter describes the key planning steps both for the TDA and SAP development phases, including:

- Key milestones
- Finance and budgeting
- Setting up the development teams
- Meetings and workshops
- Stakeholder/public involvement/participation

It also introduces checklists of actions that are required during the TDA and SAP phases with an indication of who is likely to be the lead individual or organisation for the action, who else is involved and who approves the action.

BOX 1: MANAGING EXPECTATIONS

A key aspect of planning the TDA/SAP process is about managing expectations.

The complexity and level of detail of the TDA and SAP developed during the project will be a reflection of the time, funds and human resources available and it may be necessary to carefully manage the expectations of not only project staff and TDA/SAP Development Team members but also the steering committee, key stakeholders in the participating countries and the respective implementing and executing agencies.

More details on managing expectations can be found in the ›› Project Management Manual

2. Key TDA management steps

2.1 Setting Key TDA milestones

The key milestones for the development of the TDA are:

- Create workplan and budget[1]
- Form TDA development team and hire consultants
- Training workshop on the TDA/SAP process
- TDA launch meeting
- Causal chain analysis workshop
- Development of thematic reports
- Thematic report meeting
- Drafting the TDA
- Final TDA review meeting and SAP linkage
- Adoption by steering committee

These milestones are presented in a simple checklist in Table 1, below, together with an indication of who is likely to be the lead individual or organisation for the action, and who else is involved and approves the action.

1 This should include an agreement on how the TDA process will be undertaken and at what level. For example, will the TDA be conducted nationally and then combined at the water system level or will it start at the water system level? This will impact the workplan and budget.

Activity	PM	PSC	DT	EC	Countries
Create workplan and budget	L	X			
Form TDA development team	L	X			X
Training workshop on the TDA/SAP process	X		X	L	X
TDA Launch meeting	L		X	X	
Causal chain analysis workshop	X		X	L	
Development of thematic reports	L		X	X	X
Thematic report meeting	X		X	L	
Drafting the TDA	X		X	L	
Final TDA review meeting and SAP linkage	X		X	L	
Adoption by steering committee	L	X			

Key:
PM - Project Manager; **PSC** - Project Steering Committee: **DT** - TDA Development Team;
EC - Expert/ Consultant; **Countries** - Participating countries

L - Lead; **X** - Involved

Table 1: Checklist of milestones and responsibilities for TDA development

A generic Gantt chart showing key TDA development milestones for a typical 5-country project is shown in Table 3 below.

2.2 Defining the timeframe for TDA development

The time frame for the development of the TDA will vary from project to project. Some projects have completed the activity within a year whilst other projects can take much longer. Much will depend on the number of participating countries, the complexity of the project and the budget available. However, it is important to remember that the TDA is not the main outcome of the TDA/SAP Process - it's just one step on the path to develop and endorse the SAP - so ensure the time is used efficiently and effectively. Ideally the TDA process should take around 12 - 15 months to complete. Examples of typical TDA development times are presented in the Table 2.

Project	TDA Development time (months)
Black Sea (BSERP)	22
Kura-Aras River Basin	12
Guinea Current LME	24
Yellow Sea LME	18
Orange Sengu River Basin	12
Lake Chad	16
Dnipro River Basin	15
Rio de la Plata (FREPLATA)	18

Table 2: Typical TDA development times

	Month											
Activity	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Develop workplan and budget												
Form TDA development team and hire consultants												
Training Workshop on the SAP Process		*										
TDA Inception meeting		*										
Causal Chain Analysis Workshop				*								
Development of thematic reports												
Thematic Report Meeting							*					
TDA Drafting process												
Final TDA review meeting and SAP linkage										*		
Review by Steering Committee												
Adoption by Steering Committee												*

* Denotes a meting or workshop

Table 3: Gantt chart showing key TDA development milestones for a typical 5-country project

2.3 Finance and Budgeting

Good financing and budgeting is a challenge to most IW projects and consequently TDA/SAP development. The Project Implementation Plan will have already defined the budget for the TDA component. Consequently, it is important not to be over ambitious - be realistic with the funds available.

More information on Money Matters can be found in the **GEF IW Project Management Manual**

2.4 Setting up the TDA development team

The TDA Development Team should be a broadly representative technical body that represents the countries participating in the project and that will participate in the key development steps for the TDA. It is likely that this team will also participate in early development steps of the SAP.

Broad representation does not mean selection of the best academic scientific experts- academia generally represents one stakeholder group - it is important to ensure that the TDA Development Team is representative of all key stakeholders. There are two important reasons for this, outlined in the Box 2 below.

BOX 2: STAKEHOLDER INCLUSION DURING THE SAP PROCESS

There are 2 key reasons why it is important that all key stakeholder groups are engaged during the SAP process (either through consultation or direct participation):

1. If the TDA or SAP development process is captured by a particular stakeholder group or groups, the consensus building process will be compromised

2. SAP implementation can fail if stakeholders (for example, industries being regulated) are excluded from either the TDA or the SAP development.

Experts for the Development Team can come from a range of organisations, including:

- Key ministries or government departments
- Government agencies
- Corporate entities
- Trade organisations
- NGOs
- Civil society
- Academia and research organisations
- Regional Commissions

The make up of the Development Team should be as interdisciplinary as possible. It should include, or have access to:

- Natural scientists –based on appropriate disciplines for the water system in question
- Social scientists – including social assessment/participation and gender experts
- Economists – e.g. fisheries economists; environmental economists (including experts on economic valuation of ecosystem services)
- Legal experts – water based legislation and regulations
- Policy experts – Governance and institutions

If additional expertise is required, the Development Team and the Project Manager should recommend it.

It is important that the TDA Development Team is well represented by all the above groups. Often, it is difficult to find suitable economists. In contrast, it is usually easy to find willing natural scientists, and it is tempting to form the Development Team from this group. However, economists and social scientists play a key part in describing the socio-economic consequences of the transboundary problems.

In general the TDA Development Team will number between 10 and 20 participants (depending on the number of participating countries, the complexity of the project and the budget available), although it is likely that not all team members will be active at any one time. An example of the expertise in the Black Sea TDA Development Team is given in Figure 1, below. As can be seen, there is a disparity between the numbers of team members from each participating country, in part due to the level of political buy-in from the countries.

Figure 1: Expertise Types for the Black Sea TDA Development Team (2007 BSERP Project)

2.5 Meetings and Workshops

A series of meetings or workshops are likely to be held during the TDA development phase – the number and style of which will vary from project to project according to the time, funds and human resources available.

This Section presents an example of a meeting and workshop programme that contains 5 events to be run during the TDA development phase, although it is possible to reduce that number to as little as 2 events by undertaking more tasks at a particular meeting or increasing the length of the meetings or workshops. The 5 events are:

1. Training Workshop on the TDA/SAP process
2. TDA Launch Meeting
3. Causal Chain Analysis Workshop
4. Thematic or National Report Meeting
5. TDA Review Meeting

2.5.1 Training Workshop on the TDA/SAP process

During this workshop, the TDA development team participate in a 2 to 3 day training course[2] on the GEF TDA/SAP process. The training course is based on this manual and will give the participants a good working understanding of the key steps for both the TDA development and SAP formulation.

The training course is ideally delivered at the water system level (i.e. involving all the participating countries) to allow the participants to gain insights and different perceptions on the water system and the TDA/SAP process. However, it is possible to deliver the training at a national or even sub-national level as a means of selecting key national representatives to the process.

2 Please visit http://manuals.iwlearn.net/tda-sap-methodology for more information.

2.5.2 TDA Launch Meeting

The TDA Launch (or kick-off) meeting, often combined with the TDA/SAP Training Workshop described above brings together key national representatives from the participating countries, many of which will have been involved in the TDA/SAP training course and are likely to continue to work on the development of the TDA and the subsequent SAP. The main objectives of the meeting, through two workshops will be to initiate the process of:

- Identifying the priority transboundary problems
- Identifying the impacts of the priority problems

More details on the structure of these workshops can be found in Annex 1. Whilst the TDA Development Team and the Project Manager are together it is also sensible to have a TDA Planning meeting during which the team:

- Identifies the next steps in the TDA development process
- Agrees the scope of the TDA document
- Develops a high level table of contents.

An example of a TDA table of contents is given in Annex 2.

2.5.3 Causal Chain Analysis Workshop

The objective of this workshop is to produce a comprehensive list of immediate, underlying and root causes for the priority transboundary problems with information on linkages between different levels, which the TDA development team has reached a consensus on.

The Causal Chain Analysis Workshop could be combined with the inception meeting if time allows, although in order to ensure that the outputs from the transboundary problem and impacts workshops are more fully developed, a separate causal chain meeting is advisable.

To compromise, it is possible to get basic causal chain information during the inception meeting and then either run a more focused causal chain meeting further into the process or task a regional consultant to produce first draft causal chains, to be presented at the thematic report workshop (see below for more details on this workshop).

More details on the structure of the causal chain workshop can be found in Annex 1.

2.5.4 Thematic/National report workshop

The main source of supporting information for the TDA will be national or thematic (synthesis) reports. These are likely to be drafted by selected consultants or national experts from the TDA development team with each report using a similar structure.

The purpose of the Report Workshop is to enable the TDA development team to: review and comment on the draft thematic or national reports presented by the consultants; to make suggestions for improvement; and if possible accept the reports as concrete inputs to the next phase of the TDA development. More details on national or thematic (synthesis) reports can be found in Part 2.

2.5.5 TDA Review meeting

The objective of this meeting is two-fold:

- To review the draft TDA document
- To identify the key leverage points in the TDA

Review of the draft TDA document. The various workshops, meetings and reports conducted during the TDA development will have produced a great deal of material that will be integrated into one document – the TDA. Details on the integration and TDA drafting can be found in Part 2. The draft TDA document should be thoroughly reviewed by the TDA development team and key stakeholders to ensure it is fit-for-purpose and can be adopted by the project steering committee. It is advisable to ensure that copies of the TDA document are circulated well in advance of this meeting to ensure the review process is successful.

There may also be a need for a national consultation on the TDA document, either before or after the TDA development team has reviewed it. Potentially, this could add a great deal of time to the process but it would ensure that there is full consensus between the participating countries.

Identification of the key leverage points in the TDA. This workshop is a critical linking step between the TDA and the SAP. The TDA development team, and other key stakeholders need to review the transboundary problems, impacts, causal chains and governance analysis and identify key leverage points. For example, where in this map of cause-and-effect relationships, interventions could appear that have the largest potential for the broadest possible, positive influence on water system. More details on the structure of this workshop can be found in Annex 1.

2.5.6 Adoption by the Steering Committee

The draft TDA document should be thoroughly reviewed by the TDA Development team and key stakeholders to ensure it is fit-for-purpose and can be adopted by the project steering committee. It is advisable to ensure that copies of the TDA document are circulated well in advance of this meeting to ensure the review process is successful.

To ensure that the TDA is adopted by the project steering committee, it is important for the Project Manager to carefully develop the meeting agenda and well manage the steering committee meeting. Key agenda points for the TDA should include:

- General overview of the TDA components
- The TDA development process
- Discussion of the TDA contents
- Linkage between the TDA and the SAP development process

GOVERNMENT ACCEPTANCE

According to the GEF and the Implementing Agencies, the TDA should be a non-negotiated document – that is it should be a technical document, agreed to by the TDA development team and the PCU and adopted by the Steering Committee. However, experience has show that in reality, this is frequently not the case. Often, governments will want to examine and approve the TDA. Although this is not ideal, it is a reality and the project will need to take this into account.

3. Key SAP management steps

3.1 Setting key SAP development milestones

TThe key milestones for the development of the SAP are:

- Develop workplan and budget
- Form SAP development team and hire consultants
- Training workshop on the TDA/SAP process
- Strategic thinking workshop 1 (visions and goals)
- Strategic thinking workshop 2 (Ideas and opportunities and options)
- National and regional consultation process
- Drafting the SAP
- Final SAP review meeting
- SAP endorsement

These milestones are presented in a simple checklist in Table 4, below, together with an indication of who is likely to be the lead individual or organisation for the action, and who else is involved and approves the action.

Activity	PM	PSC	DT	EC	Countries
Develop workplan and budget	L	X			
Form SAP development team and hire consultants	L	X	X		X
Training workshop on the TDA/SAP process			X	L	X
Strategic thinking workshop 1 (visions and goals)	X		X	L	
Strategic thinking workshop 2 (Ideas and opportunities and options)	X		X	L	
National and regional consultation process	X	X	X		L
Drafting the SAP	L		X	X	
Final SAP review meeting	L		X	X	
Adoption by steering committee	X	L			
SAP endorsement	X	X			L

Key:
PM - Project Manager; **PSC** - Project Steering Committee: **DT** - TDA Development Team;
EC - Expert/ Consultant; **Countries** - Participating countries

L - Lead; **X** - Involved

Table 4: Checklist of milestones and responsibilities for SAP development

A generic Gantt chart showing key SAP Development milestones for a typical 5-country project is shown in the Table 5 below.

	Month														
Activity	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Develop workplan and budget															
Form SAP development team and hire consultants															
Training Workshop on the SAP Process		*													
Strategic thinking workshop 1 (Visions and Gaols)		*													
Strategic thinking workshop 2 (Ideas and opportunities and options)				*											
National and regional consultation precess															
SAP Drafting process															
Final SAP review meeting												*			
Review by Steering Committee													*		
SAP Endorsement*															

* Denotes a meting or workshop

* This figure is indicative. It is likely that SAP endorsement will take longer than 2 months.

Table 5: Gantt chart showing key SAP Development milestones for a typical 5-country project

3.2 Defining the timeframe for SAP development

As with the TDA development process, the time frame for the development of the SAP will vary from project to project. Some projects have completed the activity within a year whist other projects can take much longer. Again, much will depend on the number of participating countries, the complexity of the project and the budget available. Ideally SAP development should take about 12 to 18 months, although it might span more than one GEF intervention (e.g. the SAP document, or a technical draft of the SAP might be produced during one GEF project, along with the TDA, whilst further SAP development, endorsement and implementation might occur during subsequent projects. Examples of typical SAP development times are presented in Table 6.

Project	TDA Development time (months)
Black Sea	12*
Guinea Current LME	24
Yellow Sea LME	24
Nubian Aquifer	12*
Lake Chad	12*
Dnipro River Basin	18
Rio de la Plata	18

* Technical draft only – not endorsed

Table 6: Typical SAP development times

3.3 Finance and Budgeting

Good financing and budgeting is a challenge to most IW projects and consequently TDA/SAP development. The Project Implementation Plan will define the budget for the SAP component of any given project. Consequently, it is important to be aware of what is possible and what is not in terms of SAP ambition and have a good understanding of how the respective governments will use the SAP. For example, can the SAP be an outline or technical SAP such as those produced for the Prespa Lakes or the Black Sea? Or does it need to be a much more detailed with specific actions to implement (e.g. Dnipro River Basin)?

In other words, how the SAP is developed and how it will be used will have a significant effect on the budget needed. More information on Money Matters can be found in the GEF IW Project Management Manual.

3.4 Setting up the SAP development team

The SAP Development Team is a broadly representative body of experts and stakeholders that will participate in the key development steps for the SAP. The SAP Development Team should contain key members of the TDA Development Team to ensure continuity within the overall TDA/SAP process – in fact it is very likely that the first steps in the SAP development will be solely undertaken by the TDA Development team.

As with the TDA Development Team, broad representation does not mean selection of the best academic scientific experts. It is important to ensure that the SAP Development Team is representative of all key stakeholders. Two key reasons for this are outlined in the Section 2.4 above. Experts for the SAP Development Team can come from a range of organisations, including:

- Key ministries or government departments
- Government agencies
- Corporate entities
- Trade organisations
- NGOs
- Academia and research organisations
- Regional Commissions

The make up of the Development Team should be as interdisciplinary as possible. It should include a good mix of natural scientists, social scientists, economists, legal experts and policy experts. It is important that the SAP Development Team is well represented by all the above groups. In particular, the Team will need good economists, policy, and legal experts – these specialists are likely to play key roles in the SAP development. If additional expertise is required, the Development Team and the Project Manager should recommend it.

In general the SAP Development Team will number between 10 and 20 participants (depending on the number of participating countries, the complexity of the project and the budget available), although not all team members will be active at any one time.

3.4.1 Training Workshop on SAP Development

In this workshop, the SAP development team participate in a 2 day training course on the GEF TDA/SAP Process and in particular the SAP development steps[3]. The training course is based on this manual and will give the participants a good working understanding of the key steps for both the TDA development and SAP formulation.

The training course is ideally delivered at the water system level (i.e. involving all the participating countries) to allow the participants to gain insights and different perceptions on the water system and the TDA/SAP process. However, it is possible to deliver the training at a national or even sub-national level as a means of selecting key national representatives to the process.

Whilst the SAP Development Team and the Project Manager are together it is also sensible to have a SAP Planning meeting during which the team:

- Agrees the scope/limitations of the SAP process
- Identifies the next steps for the SAP development
- Develops a high level table of contents (an example of which is given in Annex 3).

3.4.2 Strategic thinking workshop 1: Vision and Goals

The first SAP strategic thinking meeting brings together the SAP Development Team, made up of key national representatives from the participating countries, many of which will have been involved in the TDA development phase. The meeting consists of 2 workshops based around:

- Defining a Vision for the water system; and
- Developing draft Goals to achieve the Vision

More details on the structure of the workshops can be found in Annex 1 This meeting should also be used to brief the SAP development team on the next steps in the SAP development process. Feedback on the proposed process should be actively encouraged.

3 Please visit http://manuals.iwlearn.net/tda-sap-methodology for more information.

3.4.3 Strategic thinking meeting 2: Ideas and opportunities and setting options

The second strategic thinking meeting consists of 2 workshops based around:

- Brainstorming Innovative Ideas, Opportunities and Solutions that could be introduced that target the leverage points and meet the goals identified in the previous meeting
- Identifying Options or Alternatives that best meet the needs and realities of the region.

The overall outcome of the meeting will be an elaborated table of specific alternative ideas, opportunities or solutions that will provide the basis for more detailed in-country studies and discussions on options or alternatives.

It is possible to combine this meeting with the first strategic thinking meeting, although in order to ensure that the outputs from the vision and goals workshops are well developed, a separate strategic thinking meeting for brainstorming ideas and opportunities and setting options is advisable.

More details on the structure of the workshops can be found in Annex 1

3.4.4 National Consultation Process

There are likely to be three types of meeting during this phase:

- Economic (including assessment of options on the basis of economic valuation of ecosystem services), political and social evaluation of alternatives
- SAP integration
- Action planning

Meetings to evaluate alternatives

In order to ensure that each participating country reviews the outputs of the strategic thinking process - in particular the vision, goals and suggested options/alternatives - and conducts a thorough evaluation of the feasibility of the alternatives from a national perspective.

A series of country-based meetings, attended by SAP Development Team members representing the particular country, key national stakeholders, and the Project Manager and Project staff should be initiated.

It is likely that further in-depth meetings will be needed at key ministries and other stakeholders in each country. The level of input from stakeholders will vary between countries and consequently the approach used will need to be customised accordingly.

More details on the national and regional consultation process can be found in Part 2.

SAP integration meetings

There will need to be high-level meetings with key ministries and stakeholders involved with national development planning to ensure the SAP is fully integrated into national development plans and vice versa.

In particular, the meetings should focus on:

- Integration/Implementation strategies
- Legal and Institutional Frameworks
- Investment priorities

As with the national consultation meetings described above, the level of input from stakeholders will vary between countries and the approach used will need to be customised accordingly in terms of meetings, workshops etc. More details on SAP integration can be found in Part 2.

National action planning meeting

One of the core outcomes when drafting a SAP is to develop it in a way that is easily translatable into action, both regionally (at the water system level) and nationally. It is important that the SAP addresses not only the high-level initiatives and over-arching goals (predominantly at the water system level), but that they get articulated (translated) into short term actions that will be required to achieve the programme (predominantly at the national level). Action planning also includes specifying national responsibilities, budgets, timelines and priorities with each objective and action. It should also include methods to monitor and evaluate the SAP.

Therefore, it is advisable at this stage to ensure there is high-level national input to the action planning process. Again, the level of input from stakeholders will vary between countries and the approach used will need to be customised accordingly in terms of meetings, workshops etc.

3.4.5 SAP action planning meeting

This meeting should bring together key SAP Development Team members, together with the Project Manager and staff of the Project Management Unit to synthesise the outputs from the strategic thinking phase and national consultation process described above (evaluation of alternatives, SAP integration, action planning) and finalise the action planning process. Details on action planning can be found in Part 2 (Action Planning).

3.4.6 SAP Review meeting

The various workshops, meetings and consultations conducted during the SAP development will have produced a great deal of material that will need to be integrated into one document – the SAP. Details on SAP drafting can be found in Part 2. The objective of this meeting to ensure that, once drafted, the SAP document is thoroughly reviewed by the SAP development team and key stakeholders to ensure it is:

- Fit-for-purpose;
- At a stage to be adopted by the project steering committee; and
- Is likely to be endorsed by the participating countries.

It is advisable to ensure that copies of the SAP document are circulated well in advance of this meeting to ensure the review process is successful.

3.4.7 Steps towards SAP endorsement

The steps towards SAP endorsement will be different for each project and the process can quite often be difficult and time-consuming. However, to ensure that the process is as straightforward as possible, it is important to ensure that the Project Manager, key members of the SAP development team, country focal points and the steering committee carefully coordinate the steps towards endorsement.

This could include the arrangement of high-level meetings with senior officials from the key ministries in each country to ensure that there is general consensus towards the SAP and its endorsement.

Annex 1: Workshop Examples

Contents:

Workshop Example 1: Identifying and prioritising transboundary problems

Length of workshop:
Approximately 3 hours of the first TDA Development Workshop.

Structure:
Plenary with the full TDA Development Team.

Purpose:
To reach a consensus between the TDA Development Team of the priority transboundary problems affecting the water system.

The task:

1. With the aid of a good facilitator, the TDA Development Team is encouraged to brainstorm a complete list of the transboundary problems for the water system. The facilitator should prompt and write ALL answers on a flip chart or white board.
2. Once a list has been created, encourage the team to focus in on the real transboundary environmental problems (many in the list are likely to be governance causes or impacts).
3. If time is available, identify the geographical scale of each problem and how strongly transboundary the problems are – a number of problems are likely to be shared rather than transboundary.
4. Finally get the team members to prioritise the problems based on a set of easily understandable criteria using printed score sheets. Each team member should score the transboundary problems individually.

Transboundary Problem Prioritisation Criteria:
Examples of prioritisation criteria are shown below. This list is not prescriptive – types of criteria will be dependent on the transboundary system being studied.

- Transboundary nature of a problem – geographical and temporal scale.
- Future risk of the problem.
- Relationship with other transboundary problems.
- Expected multiple benefits that might be achieved by addressing a problem.
- Lack of perceived progress in addressing/solving a problem at the national level.
- Recognised multi-country water conflicts.
- Reversibility/irreversibility of the problem

Based on a set of defined criteria, assign a score to each transboundary problem between 0 (no importance), 1 (low importance, 2 (moderate importance) and 3 (high importance) to determine the relevance of the problem from the perspective of the present day and a pre-defined point in the future (e.g. 25 years) based on a business as usual scenario.

Report back and discussion:
Summarise the results in a spreadsheet and present to the team for discussion. Conduct a critical discussion on the outputs and ensure a rapporteur captures all comments.

Outputs:

- List of transboundary problems, complete with information on geographical scale
- Agreed set of Transboundary Problem Prioritisation Criteria
- Detailed list of prioritised transboundary problems with scoring dataAnnotated list of comments from TDA Development Team

Workshop Example 2: Determining environmental and socio-economic impacts

Length of workshop:
Approximately 4 hours of the first TDA Development Workshop.

Structure:
Initially in plenary to describe the process followed by small breakout groups. After plenary, TDA Development Team members divide into groups of between 3 and 8. Groups can be by discipline, transboundary problem or mixed. It is important not to organise by country if at all possible.

Preferably, the Project Manager will define the groups prior to the workshop. At the end of the group work, each working group should report back in plenary.

Purpose:
To reach a consensus between the TDA Development Team of the key environmental and socio-economic impacts for each priority transboundary problem.

The task:

1. Each group: Decide on a facilitator/chair, a rapporteur and ensure all members know each other.
2. Take one of the priority transboundary problems and identify:
    - The environmental impacts
    - The direct and indirect socio-economic impacts
    - Make linkages between impacts and other transboundary problems
    - Identify geographical location(s) of impacts/consequences
3. Allow a set time period for each transboundary problem, e.g. 30 minutes

Report back and discussion:
In plenary, ask for feedback from each group. Limit the time for each group (e.g. 5 minutes) and keep a close eye on timekeeping. Allow time for a critical discussion within the group and ensure a rapporteur captures all comments.

Outputs:

- Comprehensive list of environmental and socio-impacts for the priority transboundary problems with information on linkages between impacts and problems
- Information on geographical location(s) of impacts
- Annotated list of discussion comments from TDA Development Team

Workshop Example 3: Developing causal chains

Length of workshop:
At least one-day of the second TDA Development Workshop

Structure:
Initially in plenary to describe the process followed by small breakout groups. After plenary, TDA Development Team members divide into groups of between 3 and 8 each taking responsibility for a transboundary problem. Mixed discipline groups work well – ensure that the group members working on this process cover all the areas of expertise needed. In addition to natural scientists, social, legal, political and economic experts will be required. Preferably, the Project Manager will define the groups prior to the workshop. At the end of the group work, each working group should report back in plenary.

Purpose:
To reach a consensus between the TDA Development Team of the immediate, underlying and root causes for each priority transboundary problem.

The task:
Each group:

1. Decide on a facilitator/chair, a rapporteur and ensure all members know each other.
2. Review the priority transboundary problems and their associated environmental and socio-economic impacts.
3. For each transboundary problem, identify and list:
    - The key sectors (e.g. industry, agriculture, fisheries etc)
    - The immediate causes
    - The underlying resource uses and practices that contribute to each immediate cause
    - The underlying social, economic, legal and political causes of each immediate cause
    - Link the resource uses and practices, and social, economic, legal and political causes
    - Determine the root causes

The groups will also need to make linkages so provide white boards, flipchart paper or Post It notes as available.

Note: There might not be enough time to do all of the steps. The task can be reduced according to the level of engagement of the groups, their energy levels and the time available.

Report back and discussion:
In plenary, ask for feedback from each group. Limit the time for each group (e.g. 10 minutes) and keep a close eye on timekeeping. Allow time for a critical discussion within the group and ensure a rapporteur captures all comments.

It might be useful for a second round of group work to incorporate any ideas from the whole group. This would need to be agreed by the project manager, prior to the workshop. If a second round is decided, consider moving team members between groups.

Outputs:

- Comprehensive list of sectors, immediate, underlying and root causes for the priority transboundary problems with information on linkages between different levels
- Annotated list of discussion comments from TDA Development Team

Workshop Example 4: Identifying leverage points

Length of workshop:
Approximately 3 - 4 hours

Structure:
Small group (approximately 5 -7) of key TDA Development Team members – ensure that the group members working on this process cover all the areas of expertise needed.

Purpose:
To identify leverage point where changes can be made in the water system.

The task:
In a small group, or individually:

- Review the the transboundary problems, impacts, causal chains and thematic reports.
- Where, in this map of cause-and-effect relationships, would an intervention appear to have the largest potential for the broadest possible, positive influence on water system?
- Identify the leverage points – either graphically in the TDA materials and/or in list form

Remind the Teams, if necessary, that the Leverage Points are places to make change in the system, and not the specific changes or solutions to be introduced. Identifying what changes to introduce in the system is part of the strategic thinking process.

Outputs:

- A full list of leverage points with appropriate reference back to the TDA
- Annotated list of discussion comments from TDA Development Team

Workshop Example 5: Vision for the water system

Length of workshop:
Approximately 2 to 3 hours of the first SAP strategic thinking meeting.

Structure:
Initially in plenary to describe the process followed by small breakout groups. After plenary, SAP Development Team members divide into groups of between 3 and 8. Mixed discipline groups work well – ensure that the group members working on this process cover all the areas of expertise needed. In addition to natural scientists, social, legal, political and economic experts will be required.

Preferably, the Project Manager will define the working groups prior to the workshop. At the end of the group work, each working group should report back in plenary.

Purpose:
To develop first drafts of potential Vision Statements.

The task:
Each group:

1. Decide on a facilitator/chair and a rapporteur and ensure all members know each other.
2. The facilitator/chair to ask the group:
    - What are your best hopes for the water system?
    - How would you like to see the water system in 20 years?
3. The timeframe for answering these questions will vary from project to project. Typically, most projects incorporate a twenty-year timeframe.
4. The facilitator should encourage an open discussion of the questions above and should discourage participants from focusing on "how" issues. The facilitator should also stay clear of any discussion about funding and feasibility since these matters stifle creativity. The "how" questions are typically addressed further into the strategic thinking process.
5. After a short break, the working groups meet again to begin writing a vision statement. Using the responses from the first session, SAP Development team members are asked to write a short one to two paragraph statement on how they would like to see the water system in 20 years .
6. Each group should develop its own statement. Because the statements will ultimately be combined, the groups should not get overly concerned about the quality of the text. At this point, it's important to flesh out the best hopes for the water system.

Report back and discussion:
In plenary, ask for a 5 to 10 minute report from each group. Limit the time for each group and keep a close eye on timekeeping. Allow time for a critical discussion within the group and ensure a rapporteur captures all comments.

It might be useful for a second round of group work to incorporate any ideas from the whole group. This would need to be agreed by the project manager, prior to the workshop. If a second round is decided, move team members between working groups.

Outputs:

- A set of draft 'vision statements'
- Annotated list of discussion comments from SAP Development Team

Workshop Example 6: Review and development of draft goals

Length of workshop:
Approximately 2 to 3 hours of the first SAP strategic thinking meeting.

Structure:
Initially in plenary but followed by small breakout groups. After the plenary session, SAP Development Team members divide into groups of between 3 and 8 (possibly based around priority transboundary problems). Mixed discipline groups work well – ensure that the group members working on this process cover all the areas of expertise needed. In addition to natural scientists, social, legal, political and economic experts will be required. Preferably, the Project Manager will define the groups prior to the workshop. At the end of the group work, each working group should report back in plenary.

Purpose:
Introduction of provisional goals that achieve the vision and reduce the impact of each transboundary problem and agreement on finalised set of draft goals

The task:
Before the workshop, the Project Manager and key SAP Development Team members should draft a list of provisional Goals together with approximate timeframes, including information on which priority transboundary problem(s) they are linked.

In Plenary:

1. Initial Briefing by the chair or facilitator on the purpose of this workshop.
2. Presentation of the provisional Goals followed by a short open discussion (10 - 15 minutes). All comments should be minuted.
3. Disperse into breakout groups.

In Breakout groups:

1. Decide on a facilitator/chair and a rapporteur and ensure all members know each other.
2. Review the goals associated with each specific transboundary problem and ensuring they:
    - Achieve the vision; and
    - Reduce the impact of the given transboundary problem or problems
3. The facilitator should encourage an open discussion of the goals and should discourage participants from focusing on "how" issues. In addition, the facilitator should also stay clear of any discussion about funding and feasibility since these matters stifle creativity. The "how" questions will be addressed further into the strategic thinking process.
4. Make sure all review comments and suggested alterations are noted by the rapporteur – there will need to be feed back to the plenary group.

Report back and discussion:
In plenary, ask for a 5 to 10 minute report from each group. Limit the time for each group and keep a close eye on timekeeping. Allow time for a critical discussion within the group and ensure a rapporteur captures all comments.

It might be useful for a second round of group work to incorporate any ideas from the whole group. This would need to be agreed by the project manager, prior to the workshop. If a second round is decided, move team members between working groups.

Outputs:

- Draft list of goals together with approximate timeframes, including information on which priority transboundary problem(s) they are linked.
- Annotated list of discussion comments from TDA Development Team

Workshop Example 7: Brainstorming ideas and opportunities

Length of workshop:
Approximately 4 to 8 hours of the second SAP strategic thinking meeting.

Structure:
Initially in plenary to describe the process but followed by small breakout groups. After the plenary session, SAP Development Team members divide into groups of between 3 and 8 (possibly based around priority transboundary problems or goals). Mixed discipline groups work well – ensure that the group members working on this process cover all the areas of expertise needed. In addition to natural scientists, social, legal, political and economic experts will be required. Preferably, the Project Manager will define the groups prior to the workshop. At the end of the group work, each working group should report back in plenary.

Purpose:
Identification of innovative ideas and opportunities that target the leverage points and meet the identified vision and goals.

The task:
In Breakout groups:

1. Decide on a facilitator/chair and a rapporteur and ensure all members know each other.
2. Get each group to review the leverage points associated with a specific transboundary problem. Using this information, together with the Vision Statement and the Goals, ask the question: 'With reference to the leverage points, what do you think would be some really exciting ideas and opportunities to achieve the goals?
3. Brainstorm new ideas and opportunities in this area - remember the "Golden rules" of brainstorming. Limit the time for each brainstorming session (20 - 25 minutes is recommended but experience will show how much time is required).
4. Once the brainstorming starts, participants are encouraged to give their ideas and opportunities while the facilitator writes them down – usually on a white board or flip-chart for all to see. There must be absolutely no criticizing of ideas. No matter how silly or how impossible an idea seems, it should be written down. Laughing is to be encouraged. Criticism is not.
5. Once the time is up, encourage the group to identify the top ideas (normally between 3 and 10). Make sure everyone involved in the brainstorming session is in agreement.
6. Once the group has completed the task for the first transboundary problem and/or goal, get them to move on to the subsequent problems or goals. Repeat the process until all group have had the chance to brainstorm ideas and opportunities for all problems and/or goals.

Report back and discussion:
In plenary, ask for a 5 to 10 minute report from each group to present the priority ideas and opportunities. Make sure that the whole SAP Development Team has ample time to review the resulting prioritized lists. Discuss whether the lists accurately reflect the thinking of the group and whether it seems like a reasonable set of potential approaches. This is the list that moves forward to the next strategic thinking step. Ensure a rapporteur captures all comments.

Outputs:

- Lists of prioritised innovative ideas and opportunities that target the leverage points and meet the identified vision and goals
- Annotated list of discussion comments from SAP Development Team

Workshop Example 8: Reviewing options and alternatives

Length of workshop:
Approximately 4 to 8 hours of the second SAP strategic thinking meeting.

Structure:
Initially in plenary to describe the process but followed by small breakout groups. After the plenary session, SAP Development Team members divide into groups of between 3 and 8 (possibly based around priority transboundary problems or goals). Mixed discipline groups work well – ensure that the group members working on this process cover all the areas of expertise needed. In addition to natural scientists, social, legal, political and economic experts will be required. Preferably, the Project Manager will define the groups prior to the workshop. At the end of the group work, each working group should report back in plenary.

Purpose:
Selection of ideas, opportunities or solutions that best meet the needs and realities of the region

The task:
In Breakout groups:

1. Decide on a facilitator/chair and a rapporteur and ensure all members know each other.
2. Facilitator introduces the review matrix that the group will be asked to complete (see above).
3. The breakout groups review (and if necessary amend) the ideas, opportunities or solutions and then complete the table row by row, except for the 'Relative Priority' column which is completed by the breakout group once all the proposed solutions have been examined.
4. The facilitator of each group should ensure that his or her group takes its decisions by consensus; the objective is not to exclude any genuinely viable ideas, just to elaborate them further.
5. Groups should be encouraged to move forward if they become stuck on a particular point, and to return to it if time permits.
6. Where lack of information makes it impossible to complete one of the columns, information can be supplied after the meeting but there must be a clear agreement on who takes responsibility for this. At this stage, the tables should be seen as a 'work in progress'.

Report back and discussion:
In plenary, ask for a 5 to 10 minute report from each group to present the key findings. Allow time for a critical discussion within the group and ensure a rapporteur captures all comments.

Outputs:

- Completed tables of prioritised options and alternatives that meet the needs and realities of the region
- Annotated list of discussion comments from SAP Development Team

Annex 2: Example of a TDA Content List

TDA Content List

4. Priority Transboundary Problems

4.1 Introduction

4.2 Transboundary problem 1

- 4.2.1 Description of the problem and its transboundary importance
- 4.2.2 Major environmental impacts and social-economic consequences
- 4.2.3 Linkages with other transboundary problems
- 4.2.4 Immediate, underlying and root causes (with diagrams)
- 4.2.5 Knowledge gaps
- 4.2.6 Conclusions and recommendations

4.3 Transboundary problem 2

- 4.2.1 Description of the problem and its transboundary importance
- 4.2.2 Major environmental impacts and social-economic consequences
- 4.2.3 Linkages with other transboundary problems
- 4.2.4 Immediate, underlying and root causes (with diagrams)
- 4.2.5 Knowledge gaps
- 4.2.6 Conclusions and recommendations

4.3 Transboundary problem 2

- 4.3.1 Description of the problem and its transboundary importance
- 4.3.2 Major environmental impacts and social-economic consequences
- 4.3.3 Linkages with other transboundary problems
- 4.3.4 Immediate, underlying and root causes (with diagrams)
- 4.3.5 Knowledge gaps
- 4.3.6 Conclusions and recommendations

4.4 Transboundary problem 3 etc

- 4.4.1 Description of the problem and its transboundary importance
- 4.4.2 Major environmental impacts and social-economic consequences
- 4.4.3 Linkages with other transboundary problems
- 4.4.4 Immediate, underlying and root causes (with diagrams)
- 4.4.5 Knowledge gaps
- 4.4.6 Conclusions and recommendations

5. Stakeholder analysis

6. Governance analysis

7. Summary, conclusions, recommendations

Annexes

Annex 3: An example of a typical SAP content list

TDA Content List

Forward
Table of contents, figures and tables
Acknowledgements
Participating institutions
Acronyms and Abbreviations

Executive Summary

1. Introduction

1.1 Global and Regional Significance of the system

1.2 The need for a coordinated and integrated approach

2. STEPS TOWARDS THE PREPARATION OF THE SAP

2.1 The TDA/SAP Methodology

2.2 TDA Findings

2.3 The SAP Approach

3. THE STRATEGIC ACTION PLAN

3.1 Long term vision

3.2 Goals

3.3 Objectives

3.4 Actions and Interventions

4. SAP IMPLEMENTATION ARRANGEMENTS

5. MONITORING AND EVALUATION

6. FINANCIAL NEEDS, POTENTIAL SOURCES AND MECHANISM

ANNEXS –Including detailed supporting tables for the SAP

GEF LME:LEARN

GEF LME:LEARN is a program to improve global ecosystem-based governance of Large Marine Ecosystems and their coasts by generating knowledge, building capacity, harnessing public and private partners and supporting south-to-south learning and north-to-south learning. A key element of this improved governance is main-streaming cooperation between LME, MPA, and ICM projects in overlapping areas, both for GEF projects and for non-GEF projects. This Full-scale project plans to achieve a multiplier effect using demonstrations of learning tools and toolboxes, to aid practitioners and other key stakeholders, in conducting and learning from GEF projects.

PROJECT COMPONENTS

1. Global and regional network of partners to enhance ecosystem-based management and to provide support for the GEF LME/ICM/MPA projects to address their needs and incorporate climate variability and change considerations.
2. Synthesis and incorporation of knowledge into policymaking; capture of best LME governance practices; and development of new methods and tools to enhance the management effectiveness of LMEs and to incorporate ICM, MPAs and climate variability and change, including the five LME Approach modules.
3. Capacity and partnership building through twinning and learning exchanges, workshops, and training among LMEs and similar initiatives.
4. Communication, dissemination and outreach of GEF LME/ICM/MPA project achievements and lessons learned.

GEF IW:LEARN

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United Nations Educational, Scientific and Cultural Organization (IOC/UNESCO)

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https://iwlearn.net/manuals/methodologies

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IW LEARN

UNDP
Empowered lives.
Resilient nations.

UNESCO
United Nations
Educational, Scientific and
Cultural Organization

Intergovernmental
Oceanographic
Commission

UN environment
United Nations
Environment Programme