# TRANSBOUNDARY BENEFIT SHARING FRAMEWORK Training Manual

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## SOCIO-ECONOMIC DEVELOPMENT AND BENEFIT SHARING PROJECT

**NILE BASIN INITIATIVE**

**CONTENTS**

## ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| BSF | Benefit Sharing Framework |
| CFA | Cooperative Framework Agreement |
| CRA | Comparative Regional Assessment |
| DSS | Decision Support System |
| ENTRO | Eastern Nile Technical Regional Office (Addis Ababa) |
| GEF | Global Environment Facility |
| ISP | Institutional Strengthening Project |
| IWRM | Integrated Water Resources Management |
| IWRM | Integrated Water Resource Management |
| NBI | Nile Basin Initiative |
| NELSAP | Nile Equatorial Lakes Subsidiary Action Programme |
| NILE SEC | Nile Basin Initiative Secretariat |
| PSP | Professional Service Provider |
| SAC | Sectoral Advisory Committees |
| TAC | Technical Advisory Committee |
| TDA | Transboundary Diagnostic Assessment |
| TOR | Terms of Reference |
| TWO | Transboundary Water Opportunity Analysis |
| VBS | Volumetric Based Scenarios |
| WUTS | Water Utility and Trade Scenarios |

# 1 INTRODUCTION

The purpose of this training manual is to promote understanding of a Benefit Sharing Framework for use by Nile Basin States.

The purpose of a Nile Basin Benefit Sharing Framework is:- to assist the Nile Basin Countries and SAP coordination units *to provide a common understanding upon which riparian states can agree and develop transboundary benefit sharing, identify significant benefit sharing opportunities and determine the magnitude of possible benefits and costs.*

The Framework requires a common understanding of benefit sharing to be identified, provides a flexible methodology to determine benefit sharing scenarios and also suggests how this approach may support future basin activities.

The Framework is not intended to be a tool for the detailed design, financing or approval of programmes, but it is a means to enable the riparians states to jointly cooperate to identify, discuss and recommend opportunities of mutual benefit.

As such it is concerned with opportunities which are properly transboundary in nature – that is they affect more than one country. Benefits are also seen in a very broad context including for example, cooperation and integration such as adopting common procedures and standards. Benefits therefore have to be valued in both qualitative and quantitative ways.

A critical contribution which the framework aims to make is improved cooperation between the Nile Basin Riparians – since this is the basis from which benefit sharing is possible.

The benefit sharing framework proposes a methodology to determine transboundary benefit sharing opportunities which is based upon the Transboundary Water Opportunity [TWO] Analysis after Phillips et al 2008. This training course will present a case study of a TWO analysis conducted for the Jordan River Basin.

The training course is designed to provide an overview of key concepts, exposure to a substantive case study and an opportunity for a rapid application the approach in practice. As a result it is hoped that the participants will be able to explore and discuss the framework in greater detail during the course of the workshop and contribute to its development and promotion. Because the methodology is flexible participants are encouraged to propose how it could be modified to better fit Nile Basin requirements

## 2 OVERVIEW

> *"The emergence and maintenance of transboundary water management regimes rests on a complex web of inter-related factors that define incentives for cooperation. Fostering cooperative regimes is, essentially, a matter of altering perceptions such that the benefits of cooperation are seen to outweigh those of unilateral action. This is at the heart of the concept of benefit sharing. The difficulty lies not in the conceptualisation, but in the realisation." (Quaddumi 2008)*

To date the Nile Basin Initiative has realised many significant cooperative achievements with the Riparian Sates of the River Nile. These already include a number of benefit sharing activities as well as progress on a Cooperative Framework Agreement [CFA]. It is expected that over time the CFA will come to fully represent the legal basis for the reasonable and equitable utilisation of the water of the Nile Basin.

These activities have been characterised by progressive cooperation between the Riparian States and it is this basis of cooperation which suggests that a greater degree of benefit sharing can become a reality as the legal and institutional framework for cooperation continues to develop and leads to greater regional integration.

The idea of a Benefit Sharing Framework is to enable a common vision and approach to emerge where benefit sharing can develop progressively and effectively in the long term. The broader future forms of Benefit Sharing envisaged are practical expressions of the legal principle of reasonable and equitable utilisation of the water resources. Enabling cooperation to displace competition for water is intended to create stable, peaceful and productive use of the resources in new and innovative ways.

Grasping what benefit sharing across an entire river basin could mean calls for a combined intellectual and practical approach. At its heart is the intention to identify and propose alternative approaches to water resource sharing which are sufficiently attractive in terms of additional and new benefits that the perceptions of Stakeholders support cooperative rather than competitive unilateral approaches to water resource allocation and use. A benefit sharing framework should enable the Riparian States to see where innovative opportunities for cooperative use of water resources outweigh the benefits gained from States using water resources independently of their co-riparians.

The Benefit Sharing methodology being proposed for use by the Nile Basin States follows a three step logical approach. It first establishes a common understanding, it then broadly scopes potential activities and finally undertakes a general analysis of the scale of benefits which might be achieved as a result of the new approaches. The Framework is not an administrative tool for the planning or approval of programmes of work – it is a mechanism to identify, consider and suggest alternative water resource use and management scenarios which are properly trans-boundary in nature.

For example agreeing upon what we mean by a “transboundary benefit” and whether the framework should be applied to basin as a whole or basin sub units is part of the first stage of establishing a common understanding.

It is presently envisaged that the three stages proposed in the Benefit Sharing Framework will be applied in sequence and be completed over a two to three year period. This training course will provide an introduction to what those stages entail. Work could then start to complete the first stage of arriving at a common understanding of what is to be achieved and how the

methodology will be applied. That will lead to stage 2 of scoping benefit sharing scenarios and determining their qualitative significance. The final stage concerns determining the general quantitative magnitude of the benefits and formulating baskets of options. The information requirements at this last stage will be greatly enhanced through close association with the Decision Support System. Throughout – the Framework seeks to enable a high degree of participation and cooperation of the Riparian States.

The Framework is not simply a practical mechanism to identify benefit sharing projects. It also has an intellectual dimension calling for an open minded approach. In seeking to identify new approaches to water sharing any future possibilities should be discussed outside of the constraints which a present day "*status quo*" might appear to impose. This approach is not political- but practical and pragmatic - and a mechanism to strengthen existing cooperation. Its outputs are the identification of alternative approaches to water sharing which result in increase benefits shared between the Riparians as a result of greater levels of cooperation. Consequently it aims to realise programmes which are the result of cooperation, rather than define programmes which will then require cooperation if they are to succeed.

It is important to bear in mind that there is very limited experience worldwide of developing **planned** transboundary benefit sharing for an entire river basin. There is no fully tested methodology available. Where transboundary benefit sharing currently exists it is often the result of long term influences and activities more than a deliberately planned approach. Consequently this is new ground, and applying the Framework will call for an innovative and experimental approach.

## 3 WHAT IS BENEFIT SHARING?

What we mean by benefit sharing depends on the context in which we expect to see the benefits emerge.

Collaboration between two projects within a single country can certainly result in new and additional benefits – for example the projects might decide to share knowledge, expertise and equipment- and as a result reduce their costs and increase their outputs.

Similarly projects based in two different countries could also cooperate in new ways to achieve greater benefits. For example combining approaches to watershed management can not only reduce investment costs – but can also result in more effective management of the shared environment and resources.

The nature and importance of water resources also suggests opportunities for cooperation and benefit sharing **across sectors**. For example hydro power generation in one country can benefit industry in another.

These are all examples of Benefit Sharing. But when benefit sharing is considered at the level of an entire basin – additional layers of sharing and become possible across sectors. For example where agriculture is intensified as a result of more efficient and intensive farming in areas of productive soils and favourable climate this can result in greater overall regional food production and security. As a result water which was used in less efficient forms of food production could be released for use in new productive ways such as the development of industry.

Benefit Sharing in the context of an entire basin considers how using and managing water more effectively across all sectors **in combination** can yield new additional benefits. So it would look at how a joint approach to power generation or watershed management could provide a new perspective on water use for food production. The approach aims to find out what new opportunities can emerge as a result of considering the combined effects of water resource management across sectors and countries. This approach is based on the argument that if we "optimise" water use in one sector it can lead to and enable the optimisation of water use in

other sectors and so increase the net benefit to the basin as a whole. This concept is well understood at the National level and has been the basis for water resource master planning for many years. But applying this optimisation and conjunctive use thinking across a whole river basin is an entirely new challenge.

A theoretical example of a "full blown" benefit sharing approach might be as follows:

Country A and Country B share a river whose flow is 100 $Km^3$ per year. Country A is the upstream state and has limited but efficient industry and average agriculture. Country B has no industry but good agriculture. The Countries presently have a water sharing agreement which provides A with 80 $Km^3$ per year and B with 20 $Km^3$ per year. The combined economic return of both countries use of the water is presently 115$M.

| **Sectoral Use** | **Country A** | | **Country B** | |
|---|---|---|---|---|
| | Volume $Km^3$ | Economic Return $M | Volume $Km^3$ | Economic Return $M |
| Agriculture | 60 | 60 | 12 | 30 |
| Industry | 5 | 25 | 0 | 0 |
| Domestic consumption | 15 | 0 | 8 | 0 |
| Total | 80 | 85 | 20 | 30 |
| **Combined Total** | **Volume = 100 $Km^3$ Economic Return = 115 $M** | | | |

Country B believes the present share of water is inequitable because it has limited water for domestic consumption. So they successfully re negotiate the agreement based on the argument of per capita share of the water. As a result Country B now gets to use 25 $Km^3$ /year and Country A 75 $Km^3$/ year but the combined economic return from the use of the water falls to 105 $M / year because less water is available for productive uses.

| **Sectoral Use** | **Country A** | | **Country B** | |
|---|---|---|---|---|
| | Volume $Km^3$ | Economic Return $M | Volume $Km^3$ | Economic Return $M |
| Agriculture | 60 | 60 | 12 | 30 |
| Industry | 3 | 15 | 0 | 0 |
| Domestic consumption | 12 | | 13 | 0 |
| Total | 75 | 75 | 25 | 30 |
| **Combined Total** | **Volume = 100 $Km^3$ Economic Return = 105 $M** | | | |

This new arrangement means the countries are economically weaker than under the previous arrangement and it is seen as a "negative sum" or win – loose output. The two countries decide they must strengthen their economies. Country A invests $5 million to improve its water use efficiency and this results in an additional 5 $Km^3$/ year flowing down to Country B. Country B uses this additional flow for agriculture and agrees to pay Country A $5 million in return.

| **Sectoral Use** | **Country A** | | **Country B** | |
|---|---|---|---|---|
| | Volume $Km^3$ | Economic Return $M | Volume $Km^3$ | Economic Return $M |
| Agriculture | 60 | 60 | 17 | 35 |
| Industry | 3 | 15 | 0 | 0 |
| Domestic consumption | 12 | 0 | 13 | 0 |
| Total | 75 | 75 | 25 + 5 from A | 35 – 5 to A |
| **Combined Total** | **Volume = 100 $Km^3$ Economic Return = 105 $M** | | | |

This arrangement represents improved efficiency and cooperation but its net result doesn't yield any greater combined economic benefit. Both countries are economically weaker than when under the original agreement. The countries discuss their next move. Country A realises that its economic return from using water on agriculture is much lower than that in Country B. They agree that instead of B paying 5$M per year to A, the money will be used to improve agriculture in A with training provided by B. As a result Country A's economic return increases by $5 million per year and an additional 5 $Km^3$/ year is released for use in B.

| **Sectoral Use** | **Country A** | | **Country B** | |
|---|---|---|---|---|
| | Volume $Km^3$ | Economic Return $M | Volume $Km^3$ | Economic Return $M |
| Agriculture | 60 | 65 | 17 | 35 |
| Industry | 3 | 15 | 0 | 0 |
| Domestic consumption | 12 | 0 | 13 | 0 |
| Total | 75 | 80 | 25 +10 from A | 35 – 5 invested in A |
| **Combined Total** | **Volume = 100 $Km^3$ Economic Return = 110 $M** | | | |

This approach increases the economic return to 110$M but this is still not as beneficial as the original situation. But there is interest to move towards an optimised win-win situation. Consequently the countries renegotiate their water allocation agreement so that A receives 50 $Km^3$/ year and B also 50 $Km^3$/ year, whilst they both continue to improve agricultural efficiency. Country A also allocates 2 $Km^3$/ year from its quota to industry.

| **Sectoral Use** | **Country A** | | **Country B** | |
|---|---|---|---|---|
| | Volume $Km^3$ | Economic Return $M | Volume $Km^3$ | Economic Return $M |
| Agriculture | 33 | 55 | 37 | 60 |
| Industry | 5 | 25 | 0 | 0 |
| Domestic consumption | 12 | 0 | 13 | 0 |
| Total | 50 | 80 | 50 | 60 |
| **Combined Total** | **Volume = 100 $Km^3$ Economic Return = 140 $M** | | | |

This arrangement gives a combined economic return of 140 $M which is an improvement on the original arrangement. This is seen as a win – win or positive sum outcome. The countries are encouraged to continue to develop their approach and turn their attention to industrial development in which Country A has particular skills. Country B begins to industrialise as result of assistance from A. They agree on a new water allocation arrangement in which country A gets 60 $Km^3$/ year.

| **Sectoral Use** | **Country A** | | **Country B** | |
|---|---|---|---|---|
| | Volume $Km^3$ | Economic Return $M | Volume $Km^3$ | Economic Return $M |
| Agriculture | 40 | 60 | 20 | 50 |
| Industry | 8 | 40 | 7 | 35 |
| Domestic consumption | 12 | 0 | 13 | 0 |
| Total | 60 | 100 | 40 | 85 |
| **Combined Total** | **Volume = 100 $Km^3$ Economic Return = 185 $M** | | | |

This arrangement is seen as an improved win –win or positive sum outcome. Initially Country used 80 $Km^3$/ year and made an economic return of 85$M / year, it now uses 60 $Km^3$/ year to make a return of 100$M / year. Country B initially used 20 $Km^3$/ year to make 30 $M / year and now uses 40 $Km^3$/ year to make 85 $M/ year.

Encouraged by the results of their cooperation the countries then set about further investments to release more water resources from water re-use and desalination which they can then introduce into their benefit sharing approach.

Although this example is entirely hypothetical its point is to show how cooperation can influence perceptions of water sharing arrangements and release additional benefits from the cooperative use of finite water resources. It can be seen that in order for it to work there has to be cooperation – as well as new opportunities to jointly optimise the use of water resources.

The Benefit Sharing Framework identifies such new opportunities to water resource use and management whilst maintaining a strong cooperative environment. Clearly the development of these broader forms of benefit sharing is a long term process, which must build upon existing cooperation, projects and activities. The Benefit Sharing Framework is therefore a mechanism to identify new benefit sharing scenarios in the context of increasing cooperation. In turn those forms of cooperation would reduce the possibility of conflict and provide an alternative perspective for cooperative and beneficial water sharing.

# 4 BENEFIT SHARING THEORY

At present there is a rapidly growing body of theoretical literature on benefit sharing which mainly describes and classifies what is meant by benefit sharing. The literature introduces many new terms and approaches but often falls short of providing a methodology for developing an approach itself. One notable exception is the Transboundary Water Opportunity or TWO Analysis developed by Phillips et al for the Swedish Ministry of Foreign Affairs. (Phillips et al 2008) The TWO Analysis builds upon previous approaches including the Comparative Regional Assessment (Sadoff and Grey 2005) and the Transboundary Diagnostic Assessment developed under the GEF. A review of this current literature suggests that a number of "principles" of benefit sharing are being recognised, these are:

| | Table 1: Emerging Principles of Transboundary Benefit Sharing in River Basins |
|---|---|
| A | *Where the river basin is not yet being used optimally, improving use and management can release new benefits for the riparians. This condition can also apply in a "closed" basin where all of the available waters are already allocated to the riparians, because their use of water could still be optimized. (Phillips - Sida)* |
| B | *Transboundary cooperation can release benefits which are greater than those benefits realized through unilateral country actions (Phillips - Sida)* |
| C | *Transboundary benefit sharing means that the effects and impacts of an activity are felt in more than one country.* |
| D | *Water Resources Management is directly linked to stability, integration and economic growth. (Phillips - Sida) (Sadoff & Grey 2002)* |
| E | *Analysing and identifying transboundary water benefit sharing potential requires both a process to build cooperation as well as a mechanism to examine benefits.* |
| F | *The nature of benefits which might be shared is an open debate and includes inter alia environmental, economic, and political benefits. The process of cooperation to determine benefits is in itself also a benefit. Not all benefits can be assigned a financial value.* |
| G | *Successful transboundary benefit sharing depends upon identifying Positive Sum Outcomes (or win – win scenarios) in which all countries recognize a benefit, rather than a Zero Sum Outcome (win – lose or lose-lose scenarios) in which the benefit for one country can represent a loss to another.* |
| H | *Successful transboundary benefit sharing depends upon the consideration of the hydrological cycle as a whole and not only "blue" water present in a river system.* |
| I | *Cooperation lies at the heart of realizing Positive Sum Outcomes (win –win) whereas competition over benefits results in (win- lose) Zero Sum Outcomes* |
| J | *A cooperative approach to benefit sharing scenarios is likely to be successful when based on negotiating "a basket of benefits" rather than negotiating a single benefit. The "basket of benefits" approach puts more opportunities for trade off's and developments on the negotiating table. (Phillips-Sida)* |
| K | *Benefit sharing should not create future conditions for conflict or competition* |
| L | *Benefit sharing should be environmentally, politically and economically sustainable.* |
| M | *Benefit sharing should not aggravate equity and result in those who have more getting more – or those who have less getting less.* |

The literature is consistent in the view that for benefit sharing opportunities to be realised there must first be cooperation between the parties. Consequently it makes good sense to engage the riparians in agreeing upon the methodology before they apply it- and this should be a first stage in a benefit sharing framework.

The significant new terms introduced in the benefit sharing literature are **"Positive Sum Outcomes"** or PSO's and **the "basket of benefits"** approach.

**Positive Sum Outcomes** [PSO] result when all of the parties believe they have increased the benefits they gain from sharing water. So rather than "robbing Peter to pay Paul" by transferring existing benefits from one party to another, (which is a zero sum output or win lose situation) a PSO is a result of finding new ways to use water in which there are greater levels of benefit to be shared. It the art of making 5 + 5 equal more than 10. PSO's are important to effective benefit sharing because they change the perceptions of the parties towards water allocation. As the benefits from sharing the resource become increasingly available, so a competitive approach to water allocation softens and can be replaced by more pragmatic and cooperative

forms of sharing. PSO's become especially important as the availability of water resources diminishes. PSOs then become an approach enabling what water is available to be used to the maximum benefit of all – rather than the approach of "a race to the bottom of the barrel".

The **Basket of Benefits** approach is introduced by the TWO analysis and provides a more equitable and systematic means to negotiate the use of water resources than a project by project approach. A wide range of potential activities concerning different countries and sectors are identified and considered as a whole when negotiating. This means that additional and spin off benefits are considered as these can have a significant effect on the success of negotiations. A simple example is where one country wishes to increase its allocation of water for industry, whilst another riparian wants to use the same water to develop agriculture. Considered separately these could emerge as all or nothing – win- lose outcomes, where a benefit is simply transferred from one party to another. But when considered together, industry and food production could lead to a win-win outcome because additional benefits can be shared. Clearly the more scenarios which are being negotiated the greater the possibility to find a positive sum outcome. Negotiating on a project by project basis can easily result in a stalemate – whereas the basket of benefits approach means opportunities can be modified and changed until an acceptable outcome is agreed by all.

A very critical element of Benefit Sharing Theory is introduced by the TWO Analysis and requires that benefits are considered in relation to many forms of available water and not only the "blue" water in a river. Increasing agricultural efficiency in one country will not only increase the availability of green water for the farmer, it can also result in an improved flow regime of blue water for downstream riparians. **The blue / green water balance** is therefore critical in realising benefit sharing opportunities and requires the riparians to develop a good appreciation and understanding of the importance of green water. Similarly improving water use efficiency has to be considered alongside the use of blue water and it follows that groundwater, and new water sources should also form part of the basis for identifying viable benefit sharing scenarios. The TWO analysis therefore doesn't just consider management of the "blue" water in a river as the means to arrive at benefit sharing.

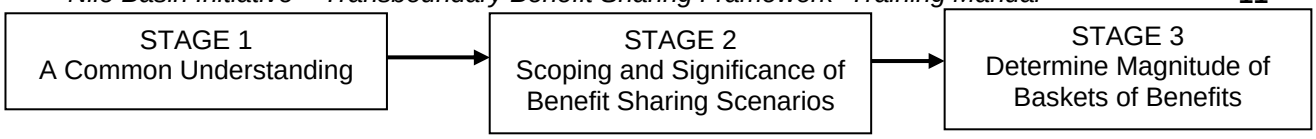
An emerging topic of theoretical research may be of particular significance in the Nile Basin. Some researchers have considered a purely water resource management perspective where it makes sense to ignore country boundaries and plan for the **optimised use of the basin as whole**. That master plan would then be modified with respect to national boundaries and issues to arrive at workable plans. The major factor attracting the riparians to agree to the plan is that it would achieve the maximum possible benefit for the entire basin. In reality of course it can prove very difficult to get a large number of riparians to agree and act upon a "total basin plan".

Consequently a second line of thinking is emerging which argues that benefit sharing is more likely to work in large river basins if the river basin is divided into clearly identifiable **basin sub units**. In effect this is already happening on the Nile through the programme focus on the Eastern Nile and the Equatorial Lakes. Whether additional divisions would accelerate actual progress in the Nile Basin may be an important question to address. For the present it is assumed that the Benefit Sharing Framework will be applied on the Eastern Nile as well as on the Equatorial Lakes region – rather than on the Basin as a whole.

An important factor in adopting this basin sub unit approach is not to ignore the potential for benefit sharing between the sub units.

## 5 BENEFIT SHARING METHODOLOGY

The Nile Basin Benefit Sharing Framework proposes a methodology of three stages of activity which would be undertaken overtime and can be re visited and modified as and when conditions require. The three stages are:




## 5.1 Stage 1 Establishing a Common Understanding

The purpose of this stage is to enable the riparians to reach agreement on what they expect from the framework and how they intend to apply it. In essence it could take the form of a planning workshop. The key issues to be resolved would include:

| | **Table 2: Issues Concerning a Common Understanding** | |
|---|---|---|
| | **Issue** | **Questions** |
| | Geographical coverage of the Framework | Is the framework to be applied to the whole river basin or to separate sub units? |
| | | How is benefit sharing between sub units to be addressed? |
| | Hydrological coverage of the framework | Are the hydrological boundaries agreed? |
| | | Which waters will be included in the analysis? Blue water, Green water, basin transfers, groundwater, water re use, water use efficiency, virtual water? |
| | What is meant by transboundary sharing? | Are shareable benefits those shared within a single country, between two or more countries, or also with non riparians. What criteria will be used to identify a benefit as being shared? |
| | What categories of benefits are to be included in the analysis | Economic Benefits including hydro power, Agriculture, fisheries, tourism, mining, industry. |
| | | Environmental Benefits including watershed management, wetland conservation, environmental flows, flood control, habitat protection. |
| | | Political Benefits including meeting MDG targets, domestic and rural drinking water supply, stability and assurance of flows, integration , cooperation. |
| | | Social Capital Benefits including increased human capacity, knowledge, training and skill sharing, Common systems and approaches. |
| | Clarification of terminology | Agreement upon the meaning of any technical terminology being used (French and English) |
| | Planning Stage 2 | Agreement on the methodology |
| | | Agreement on responsibilities, logistics and timing. |
| | | Agreement on a plan of work |
| | | Agreement on reporting of Stage two outputs |
| | Planning Stage 3 | General agreement on the methodology and use of final results. |

The conclusions of the workshop should be contained in a single report which would be both a planning and technical reference for the riparians.

## 5.2 Stage 2 Determining the Significance of Benefit Sharing

The purpose of Stage 2 is to show the significance of a broad range of benefit sharing scenarios in a visual format such that positive sum outcomes can be identified and potential “baskets of benefits” proposed. Stage 2 represents complex possibilities in a simple visual format so that they can be compared and synergies identified. Stage 2 is qualitative rather than quantitative. It uses matrices to present information and follows the approach of the TWO analysis.

*The Matrix Approach*

An overall matrix is first established which sets the available water sources against the benefit categories to be analysed.

| **Transboundary Water Opportunity Analysis** Matrix A | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | **Volumetric Based Scenarios - VBS** | | | | | |
| **Water Utility and Trade Scenarios - WUTS** | **Benefit Category** | Sub category | Efficiency of Use | Water Re use | Inter basin transfers | Blue water | Green water | etc |
| | Economic | Hydropower | | | | | | |
| | | etc | | | | | | |
| | Environmental | Wetland conservation | | | | | | |
| | | etc | | | | | | |
| | Political | Rural Supply | | | | | | |
| | | etc | | | | | | |
| | Social Capital | Human resources | | | | | | |
| | | etc | | | | | | |

Each benefit category is then considered with respect to the riparian countries and results in a number of sub matrices. An example for agriculture as a subcategory of economic benefit is given below.

| **Transboundary Water Opportunity Analysis** Matrix B | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | **Volumetric Based Scenarios VBS** | | | | | |
| Benefit Category | Benefit Sub-category | | Efficiency of use | Water Re use | Inter basin transfers | Blue water | Green water | etc |
| **ECONOMIC** | **Agriculture** | Burundi | | | | | | |
| | | DRC | | | | | | |
| | | Egypt | | | | | | |
| | | Ethiopia | | | | | | |
| | | Kenya | | | | | | |
| | | Rwanda | | | | | | |
| | | Sudan | | | | | | |
| | | Tanzania | | | | | | |
| | | Uganda | | | | | | |

Each of the sub matrices is then filled in with brief narrative statements summarising how the various available water sources relate to benefit sharing. Published reports can be used as reference materials to develop the narrative statement and can include national sectoral study papers, Comparative Regional Assessments and UN data bases and country assessments. A hypothetical example is given below:

| **Transboundary Water Opportunity Analysis** Matrix C | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Volumetric Based Scenarios VBS** | | | | | | |
| Benefit Category & Sub Category | Benefit Sub-category | Efficiency of use | Water Re use | Inter basin transfers | Blue water | Green water | etc |
| **ECONOMIC Agriculture** | A-Land | Efficiency can be improved n all 3 states and would result in major water savings. High Priority | Limited potential at present | No potential | Limited utilisation, agriculture is mainly rain fed and subject to frequent droughts. High priority to secure more sustainable water sources. | Dependence on rain-fed agriculture. High priority to increase availability of green water. | |
| | B-Land | | Significant potential on major irrigation schemes – high priority | No potential | Moderate use high productivity but low efficiency. | High priority to increase green water availability | |
| | C-Land | | | Possible out of basin transfer – low priority | Very high use and dependency. High priority to develop alternatives | No alternatives to increase green water availability. Low priority | |

See also the example of a completed narrative matrix given in Section 8 of this manual.

Aspects of high significance can be highlighted using a simple "traffic light" colour coding system where useful.

| Highly significant opportunity | Intermediate opportunity | Poor opportunity |
|---|---|---|

| **Transboundary Water Benefit Sharing Analysis** Matrix D | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Volumetric Based Scenarios VBS** | | | | | | |
| Benefit Category & Sub Category | Benefit Sub-category | Efficiency of use | Water Re use | Inter basin transfers | Blue water | Green water | etc |
| **ECONOMIC Agriculture** | A-Land | Efficiency can be improved n all 3 states and would result in major water savings. High Priority | Limited potential at present | No potential | Limited utilisation, agriculture is mainly rain fed and subject to frequent droughts. High priority to secure more sustainable water sources. | Dependence on rain-fed agriculture. High priority to increase availability of green water. | |
| | B-Land | | Significant potential on major irrigation schemes – high priority | No potential | Moderate use high productivity but low efficiency. | High priority to increase green water availability | |
| | C-Land | | | Possible out of basin transfer – low priority | Very high use and dependency. High priority to develop alternatives | No alternatives to increase green water availability. Low priority | |

See also the example of a completed matrix for the Jordan River Basin in Section 8 of this manual.

*Analysing Matrices*

The completed matrices are then considered all together to enable discussion and identify benefit sharing scenarios. By looking at the significance of scenarios relative to each country and sector, possible cooperation options can be examined and the potential for new Positive Sum Outcomes discussed. Benefit categories and sub categories can be analysed in parallel with all other sub categories to explore broader possibilities for cooperation and identify positive sum outcomes. Data from existing projects, investigations and research can be considered.

The objective of the discussion is to identify a broad selection of benefit sharing scenarios and to begin to consider how new scenarios interact and suggest where in combination they might represent a PSO. For example meeting hydropower needs is only possible using blue water, but in concert with improved watershed management practices an increased range of benefits become available to all riparians which can include food production and industry. It may be possible for blue water industrial water needs of one riparian to be met through reducing their own use of blue water for agriculture whilst supporting the improved agriculture and enhanced green water availability in another. Potential activities can be added or removed from a basket to explore what benefits can become available and consider how balancing the basket influences the views of the riparians towards cooperation.

It is the task of stage 2 to produce a descriptive overview of these baskets of benefits.

Because the Stage 2 analysis is essentially conceptual and qualitative it has to contend with a great deal of inherent uncertainty. It is likely that a degree of iteration is needed to return to scenarios and re- examine them and to consider different components in the baskets. Even so the results of Stage 2 have to be summarized in the form of benefit sharing portfolios which present the components, logic and potential positive sum outcome which might be realized. The purpose of those portfolios is also to seek agreement to proceed with quantitative analysis under stage 3. This agreement component is essential for building understanding and cooperation. It does not represent approval for implementation – it represents approval for further investigation.

*Reporting on Stage 2*

Reporting on Stage 2 serves two purposes. Firstly it consolidates a view of the scope and components of benefit sharing scenarios. Secondly it provides the documentary basis upon which the riparians can agree to proceed to a further level of analysis in stage 3. Much of the content of this stage 2 reporting should contribute directly to the final reporting of the BSF and the benefit sharing portfolios. The stage 2 report should aim to have a high impact with few words, and use visual representations – such as matrices- to convey the concept of benefit sharing.

As tools such as the DSS become operational the sensitivity of analysis possible will be greatly enhanced. For example if it is possible to model the effects and benefits of different crops and agricultural techniques a broader range of scenarios and potential benefits can be explored.

Stage 2 is summarised diagrammatically below:

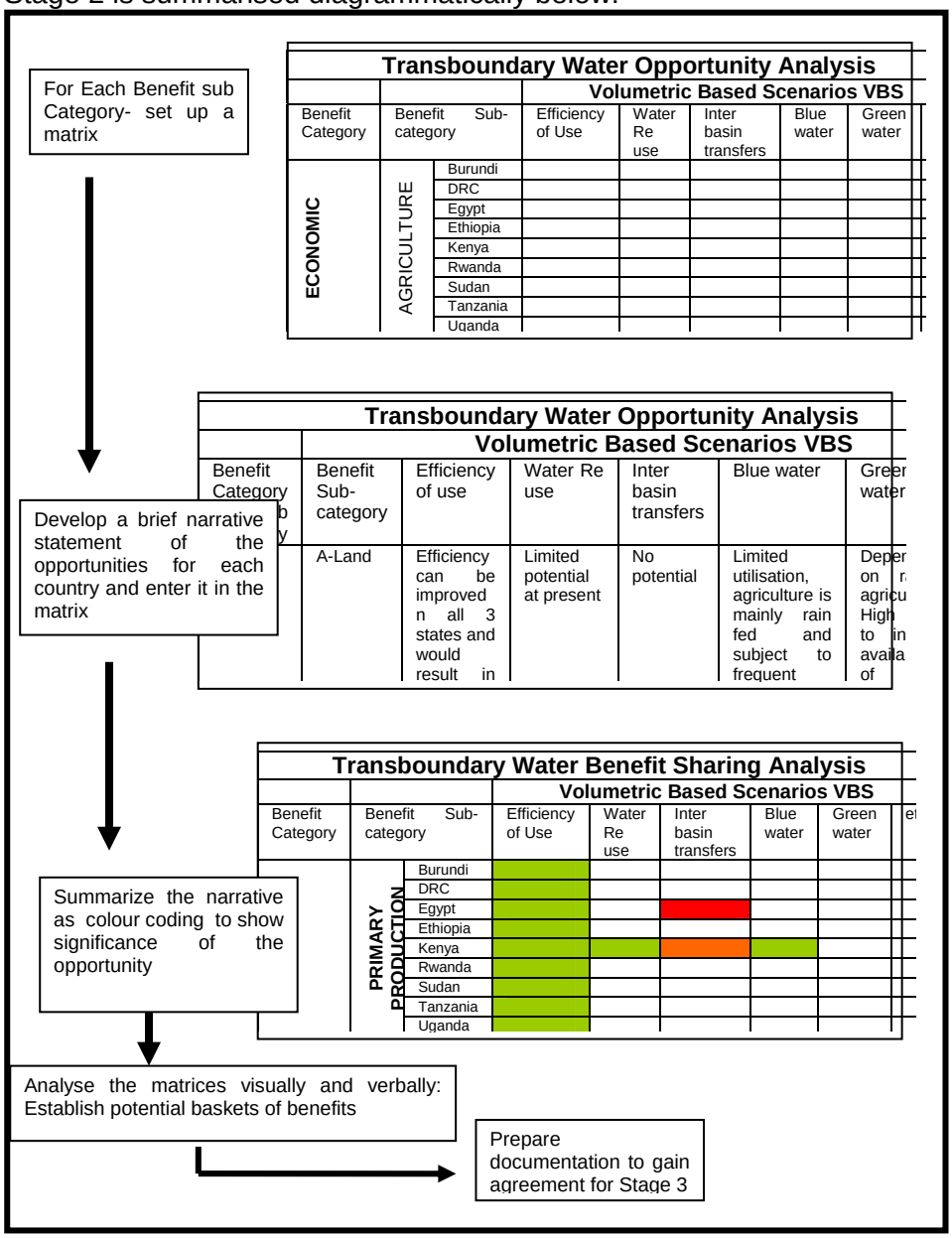



Fig.1 Summary of BSF Stage 2

## 5.3 Stage 3: Determining the Magnitude of Baskets of Benefits

The purpose of Stage 3 is to show the quantitative magnitude of "baskets of benefit scenarios" under a range of modelled situations. This refines the understanding of scenarios such that their potential benefit and implications to water management can be seen at a general qualitative level. Stage 3 does not engage in detailed quantitative analysis, it can be based upon pre-

feasibilty studies and Comparative Regional Assessment data. It should however aim to provide an explicit determination in numerical terms of those benefits which can be quantified and to also present a qualitative determination of benefits which cannot be quantified. In this respect Stage 3 ought to collaborate closely with existing and emerging tools such as the DSS.

The logic behind considering baskets of benefits is two fold. Firstly it is the way to identify a positive sum outcome such that the benefits of using waters cooperatively are greater than using them separately. Secondly agreement to proceed is more likely to be achieved when negotiating several opportunities rather than single opportunities. Consequently the role of the BSF in setting up baskets of benefits critically prepares the ground for a successful outcome.

In broad scoping terms baskets are established in stage 2 – stage 3 provides an opportunity to modify those baskets in the light of a general analysis of the magnitude of the benefits. This enables the contents of the baskets to be adapted such that a balance might be achieved between the potential for successful cooperation and the optimization of benefits.

For example quantitative analysis might reveal a skewed distribution of benefits arising from shared use of water for an agricultural development, but as a result of considering additional developments along side agriculture a more equal balance of benefits could be proposed. The process of modifying the baskets should therefore be innovative and creative.

*Determination of the Magnitude of Benefits*

The BSF aims to incorporate existing techniques as well as tools being developed and adapted by the NBI for quantification of benefits. The BSF itself does not intend to develop or adopt separate tools or mechanisms for quantification, but seeks to utilize techniques which emerge as common best practice across the basin. The Decision Support System [DSS] is therefore recognized as the key resource in this regard.

The DSS is presently in its initial design phase and it is estimated that it may take 30 months before it becomes operational. Close cooperation is therefore essential if the BSF is to be able to fulfil its purpose through the use of that resource. As it is likely that the BSF will be operational in 30 months an interim period is anticipated during which the BSF will have to use the “best currently available” techniques to determine the magnitude of benefits. But it is fully expected that common tools are adopted as soon as this is possible.

There is no doubt that realizing useful practical tools and procedures to determine and compare the magnitude of benefits is a very significant challenge and represents the largest hurdle to operationalising the BSF. Consequently recommendations concerning approaches to operationalising the BSF are presented in the benefit sharing framework itself and should be discuss in this training course.

The important relationship between the Benefit Sharing Framework, the legal principle of reasonable and equitable utilisation and the role of design of the DSS is noted. It will be important to examine how to arrive at a high and workable level of consistency.

*Analysis of Results*

An analytical protocol has to be developed for the stage 3, which guides the analysis through the choice of tools and criteria, the degree of analysis required and also identifies the point to stop exploring quantities and to begin making comparisons. That protocol has to provide guidance for the analysis not only of idealized present scenarios but through simulations of future change such as demography, climate and competing resource demands. The development of the protocol will be possible in close collaboration with the DSS and other emerging tools.

The protocol must identify the means to synthesize both qualitative and quantitative determinations of benefit values and this may well approximate to the factors to determine reasonable and equitable utilization under international watercourse law. The protocol must

establish the mechanism to compare scenarios against each other such that best options can be selected prior to recommendation by the parties.

In practice however it may be necessary to undertake stage 3 before all of the necessary tools are developed and in place.

*Reporting on Stage 3*

The key reported output of the BSF is to take the form of Benefit Sharing Portfolios. These documents combine the main information arising from stage 2 and stage 3 analyses which led to the identification of balanced baskets of options. The purpose of the Benefit Sharing Portfolios is to present:

- A concise overview of the main components and benefits arising from a proposed scenario
- The rationale for recommending the scenario
- An outline of the components, their valuation and synergies
- A checklist of design criteria and components suggested during BSF analysis

In essence then the Benefit Sharing Portfolio encapsulates the rationale, main components and reasoning for considering a particular basket of benefits. It aims to consolidate and focus interest in a set of activities and facilitate further cooperation between affected states at a more practical level.

The Benefit Sharing Portfolios are to be put forward for recommendation. Recommendation results in the portfolio being handed to the relevant parties for practical consideration. The countries concerned might then be expected to begin formal investigation of the scenario involving feasibility, engineering, economic and environmental studies and move the scenario towards its practical realization and formal approval. The role for the BSF however ends at the point of recommendation.

A diagrammatic summary of Stage 3 is given below

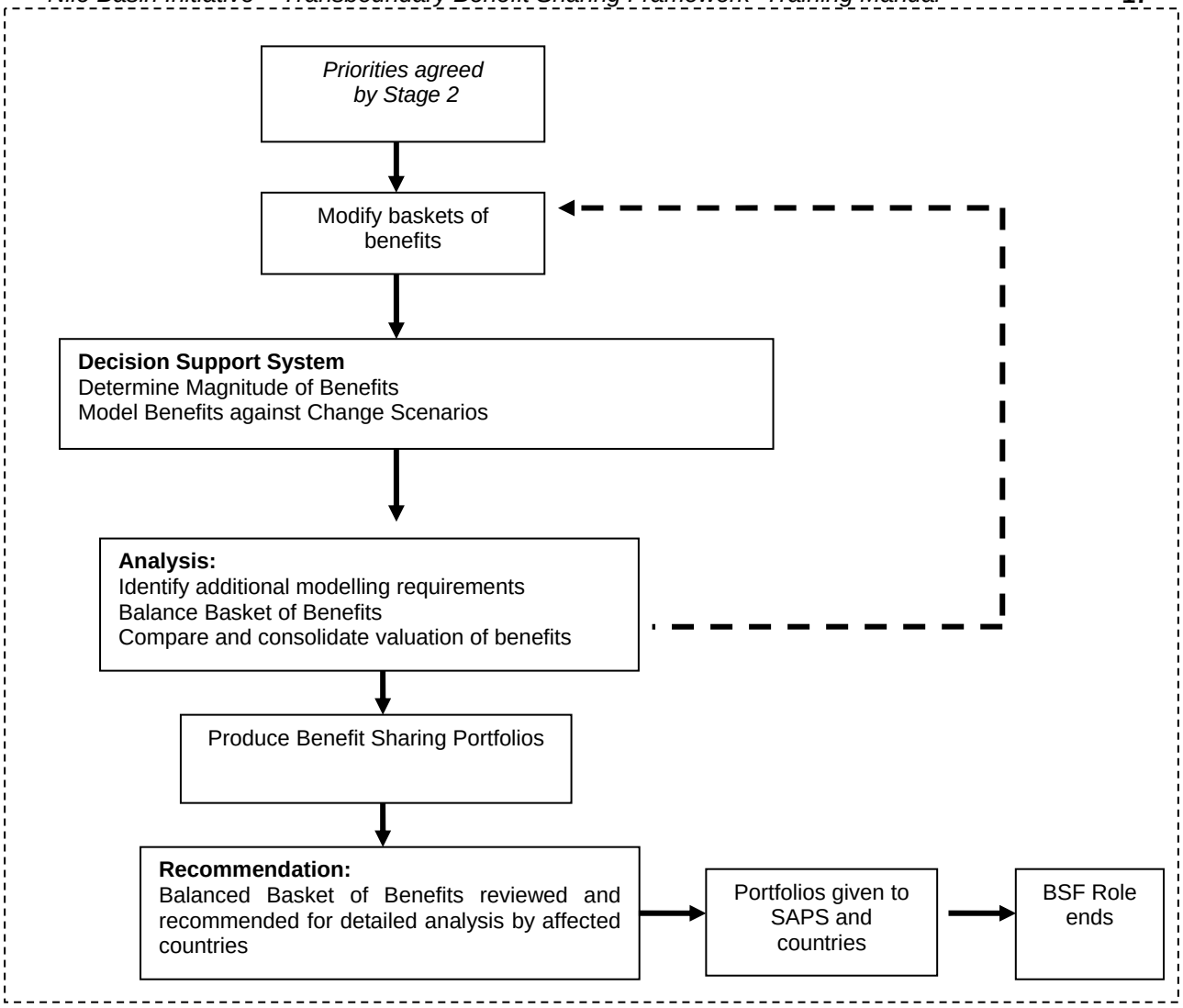



Fig. 2. Summary of BSF Stage 3.

## 6 IMPLEMENTATION OF THE BENEFIT SHARING FRAMEWORK

Views of the participants at the training course are invited regarding the implementation of the benefit sharing framework into the work of the NBI and its successors. A working proposal is contained in the Benefit Sharing Framework document.

It is re-iterated that the BSF does not see the need to duplicate systems or institutional frameworks – but is a technique which should harmonise with existing diagnostic tools being developed and be available for use by the present and future institutional framework without calling for additional institutional provisions.

The Benefit Sharing Framework document considers possible legal and institutional implications; it also compares the proposed design criteria for the DSS against the requirements of the BSF. In general implementation of the BSF does not appear to create any conflicts or require any significant modifications to future plans.

**Timeline Overview: Development and Implementation of the BSF**

| **Timeline Overview : Development and Implementation of the BSF** | | | | | | |
|---|---|---|---|---|---|---|
| **Nov 08** | **Dec 08** | **Jan 09** | **Feb 09** | **Mar 09** | **To Mar 2010** | **To Jul 2011** |
| BSF Draft 1 complete | BSF Training module finalised | BSF Training Addis | | TAC meeting? Adopts BSF implementation strategy | BSF stage 1 and 2 completed | DSS operational |
| BSF Training modules developed | | BSF finalised | | DSS development : continues | BSF interim strategy for quantification adopted. BSF Stage 3 underway | DSS and BSF harmonised |
| | | Present consultancy completed | | BSF implementation | | Legal basis for Institutional Framework Agreed. Final "home" for BSF adopted |

Indicative points for discussion are:-

- Is the BSF to be applied to the basin as a whole or basin sub units?
- Is it feasible to complete Stages 1 and 2 over 24 months?
- How can stage 3 be harmonised with the emergence of the DSS?
- Is it reasonable to expect NBI staff to use the BSF given their future commitments?

## 7 REFERENCE MATERIALS

The following materials have been used to develop the BSF and this training course. They will be made available as electronic copies at the workshop.

**Phillips, D.J. et al 2006** Transboundary Water Co-operation as a tool for Conflict Prevention and Broader benefit Sharing. Global Development Studies No 4. Swedish Ministry for Foreign Affairs.
Available at : http://www.egdi.gov.se/pdf/44699_om_web.pdf

**Phillips, D.J. et al 2008**. The Transcend –TB3 Project: A Methodology for the Trans-boundary Waters Opportunity Analysis (the TWO Analysis) 2008. For Swedish Ministry for Foreign Affairs. Not yet available on the internet.

**Sadoff *et al***. Africa's International Rivers: An Economic Perspective.
Abstract available at:
http://www.iwlearn.net/abt_iwlearn/events/ouagadougou/readingfiles/worldbank-africas-international-rivers-part1.pdf

**Sadoff, C.W. and D. Grey. 2002**. "Beyond the river: the benefits of cooperation on international rivers." *Water Policy* 4, No.5: 389-403.
Available at http://siteresources.worldbank.org/EXTABOUTUS/Resources/BeyondtheRiver.pdf

**Sadoff, C.W. and D. Grey. 2005**. Cooperation on International Rivers. *A Continuum for Securing and Sharing Benefits. Water International*, Volume 30, No. 4
Available at http://siteresources.worldbank.org/INTWRD/Resources/0509_Continuum_WI.pdf

**Quaddumi *2008*** *Practical Approaches to transboundary water benefit sharing. ODI working Paper 292. 2008*
*Available at http://www.odi.org.uk/resources/odi-publications/working-papers/292-transboundary-water-benefit-sharing.pdf*

## 8 CASE STUDY: THE JORDAN BASIN TWO ANALYSIS

Due to its large graphic content the case study is appended as a separate document. However for reference, extracts are given below which illustrate aspect of the methodology presented in section 5 of this manual. It is important however to understand the extracts in the context of the complete case study.

**Table 3.** An initial TWO Analysis relating to the Jordan River basin, addressing the factors relating to primary production and to hydropower generation.

| ***Factor*** | ***Riparian*** | ***Efficiency of Use*** | ***Flow Management*** | ***Desalination*** | ***Wastewater Re-use*** | ***Inter-basin Transfers*** |
|---|---|---|---|---|---|---|
| **Primary Production** | Lebanon | The efficiency of water use in the agricultural sector can be improved in all of the riparians, the one (partial) exception being Israel. | Flow management can be improved in the three upper riparians by considering Green Water and Blue Water in concert. This will enhance Blue Water flows to the two downstream riparians, improving equity in relation to Blue Water allocations. | The desalination of brackish or marine flows is not appropriate as an option to enhance Blue Water volumes for agricultural use, due to high cost and the inappropriate quality of the water produced. | No requirement, due to high Blue Water availability. | Any scheme is likely to require the cooperative inclusion of all five riparians. Israel is already considering this option, but Jordan and Palestine have the most urgent needs. Turkey is the most likely source of flows, probably from the Seyhan/ Ceyhan systems. |
| | Syria | | | | Should be expanded throughout the country. | |
| | Israel | | | | Already very high, and continuing to increase. | |
| | Jordan | | | | Moderate presently; could be expanded. | |
| | Palestine | | | | Should be introduced after treatment levels are upgraded. | |
| **Hydropower Potential** | Lebanon | The Karaoun Dam on the Litani River and the Bisri Dam on the Awali River are of importance. The Kardalé Dam on the middle reach of the Litani River has not been constructed as yet. Minor potential exists outside the Jordan River basin. | | | | |
| | Syria | The Al-Weydah Dam on the Yarmouk River has been completed recently. Over 140 dams exist in total, mainly on the Tigris-Euphrates system. Additional sites external to the Jordan River basin offer significant further potential. | | | | |
| | Israel | While about 180 small dams exist in Israel, there are no hydroelectric generating facilities of major significance. Little further potential exists, due to the nature of the river systems present. | | | | |
| | Jordan | The King Talal Dam on the Zarqa River is the largest structure at present, apart from the Al-Weydah Dam (see above, under Syria). Little further potential exists for major schemes, except for the Red Sea-Dead Sea Conduit. | | | | |
| | Palestine | No hydropower exists at present. Very little potential exists, apart from a possible share in power from the Red Sea-Dead Sea Conduit, although it is intended presently that electricity generated from that scheme would be allocated to Jordan. | | | | |

**Table 4.** An initial TWO Analysis relating to the Jordan River basin, addressing the factors relating to urban growth and industrial development, and ecosystem services.

| ***Factor*** | ***Riparian/ Activity*** | ***Efficiency of Use*** | ***Flow Management*** | ***Desalination*** | ***Wastewater Re-use*** | ***Inter-basin Transfers*** |
|---|---|---|---|---|---|---|
| **Urban Growth and Industrial Development** | Lebanon | Little scope exists for within-basin development of this type, but there is certainly scope externally to the basin. However, Lebanon's *per capita* fresh water availability implies that few interventions involving additional water are needed. | | | | Any scheme is likely to require cooperative inclusion of all five riparians. Israel is already considering this option, but Jordan and Palestine have the most urgent needs. Turkey is the most likely source of flows, probably from the Seyhan/Ceyhan systems. |
| | Syria | There is very considerable scope for inter-sectoral allocation of Blue Water away from agriculture, to realize the higher economic returns from the industrial and services sectors. However, this will require a significant shift in Government policy. | | | | |
| | Israel | Israel is a developed economy by comparison to the other riparians. The industrial and services sector both generate high economic returns from Blue Water. The principal problem remains the high allocation of Blue Water to the agricultural sector. | | | | |
| | Jordan | Jordan is undergoing a transition from an agriculturally-dominated economy to a base of industry and services. The specific types of industries and services to be introduced require additional consideration, to minimize water demand and maximize revenue. | | | | |
| | Palestine | Water use in the industrial sector in Palestine has been constrained by the occupation by Israel. The economy remains agriculturally-based but domestic water demand increases will force an inter-sectoral shift in Blue Water use to the industrial and services sectors. | | | | |
| **Ecosystem Services** | Fisheries | There is little scope for increased fishery production in the inland waters within the basin, and limited scope externally (for any of the riparians). The offshore fisheries (which are affected by river inflows) are important in certain cases (e.g. Gaza), but the management of these resources is poor. | | | | |
| | Tourism | Tourism has been severely adversely affected by the frequent conflicts within the region as a whole. Israel and Jordan have faired the best for tourism revenue in recent years, although both have been adversely affected by conflict-related events. Very significant scope exists basin-wide for major income from tourism, if a lasting regional peace is achieved. | | | | |

**Figure 5.** A summary of the output of the initial TWO Analysis for the Jordan River basin. A 'traffic light system' is employed to denote major opportunities for future economic development (green, high; yellow, intermediate; red, poor). Note that where vertical columns relating to the derivation of water are combined, this implies that the source of the water is of limited relevance.

| ***Factor*** | ***Riparian/ Activity*** | ***Efficiency of Water Use*** | ***Flow Management*** | ***Desalination*** | ***Wastewater Re-use*** | ***Inter-basin Transfers*** |
|---|---|---|---|---|---|---|
| | | | | | | |
| **Primary production** | Lebanon | | | | | Later stage |
| | Syria | High Priority | | | High Priority | |
| | Israel | | | | | |
| | Jordan | High Priority | | | | |
| | Palestine | High Priority | | | High Priority | |
| | | | | | | |
| **Hydropower potential** | Lebanon | Moderate, external to the basin. | | | | |
| | Syria | The Al-Weydah Dam in the basin and other sites external to the basin. | | | | |
| | Israel | | | | | |
| | Jordan | Red Sea-Dead Sea Conduit. | | | | |
| | Palestine | | | | | |
| | | | | | | |
| **Urban Growth and Industrial Development** | Lebanon | Mostly external to the basin. Medium Priority. | | | | Later stage |
| | Syria | Mostly external to the basin. High Priority. | | | | |
| | Israel | Ongoing. Agricultural sector to be de-emphasized, as a High Priority. | | | | |
| | Jordan | Ongoing. High Priority. | | | | |
| | Palestine | Critically High Priority. | | | | |
| | | | | | | |
| **Ecosystem Services** | *Fisheries* | | | | | |
| | *Tourism* | Potential major driver for the riparian economies; dependent on a sustainable peace. | | | | |