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Recommendations  
for  
**Water  
Policy  
Reforms**

A Report By  
**WWF - Pakistan**

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# Acronyms

ASR	Aquifer Storage and Recovery
AWB	Area Water Board
EPA	Environmental Protection Agency
FFC	Federal Flood Commission
FO	Farmers Organisation
ID	Irrigation Department
IFAP	Indus for All Programme (WWF - Pakistan's Endeavour)
IPOE	International Panel of Experts
IRSA	Indus River System Authority
IWMI	International Water Management Institute
IWRM	Integrated Water Resources Management
KR	Key Requirements
MinFA	Ministry of Food and Agriculture
MoWP	Ministry of Water and Power
NWP	National Water Policy
PIDA	Provincial Irrigation and Drainage Authority
PIM	Participatory Irrigation Management
WCAP	Water Sector Capacity Building and Advisory Services Project
WWF - P	World Wide Fund for Nature - Pakistan



# Table of contents

Acronyms .....	5
Table of contents .....	6
Executive summary .....	7
Introduction .....	8
Status of water policy .....	9
Key issues and international best practices .....	11
Comments on storage and piloting .....	18
Stakeholder consultations .....	18
Karachi .....	19
Lahore .....	20
Islamabad .....	20
Way forward .....	21
Annexure 1 - Water accord .....	22
Annexure 2 - Participants (Islamabad) .....	24
Annexure 3 - Participants (Lahore) .....	25
Annexure 4 - Participants (Karachi) .....	26



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## Executive summary

The report is an effort to furnish recommendations on Water Policy Reforms pertaining to the contextual International Best Practices that may be replicated for Pakistan. This exercise engaged a consultancy consisting of two missions, review of key information, including a range of meetings and consultations with relevant stakeholders and decision makers, and a series of regional and national workshops to ascertain positions and concerns regarding the proposed way forward.

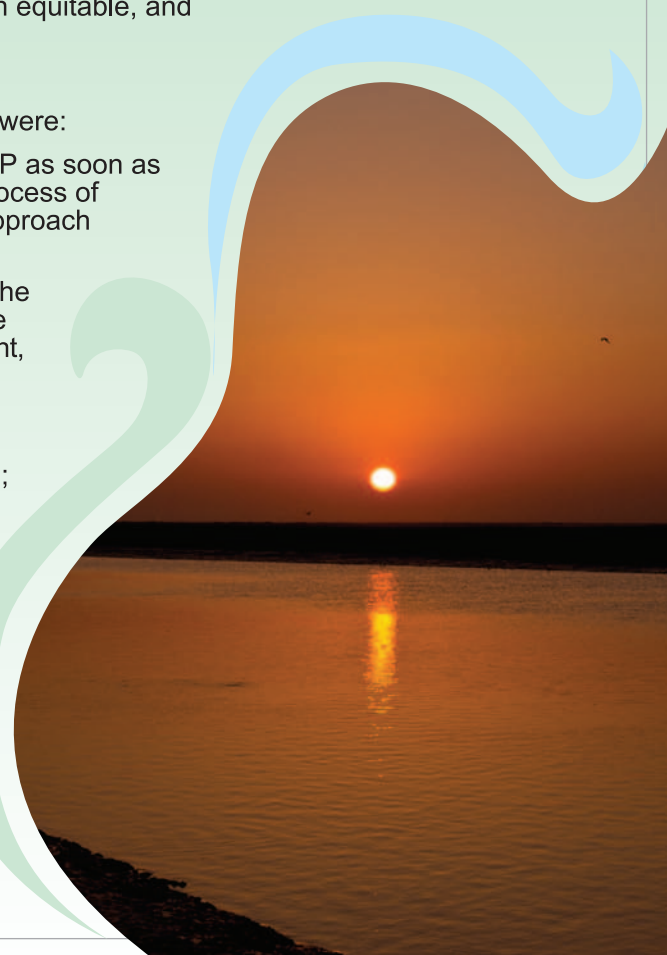
WWF - Pakistan has undertaken a range of freshwater conservation activities in Pakistan for many years. Across these areas of work, there is a desire to scale-up WWF - P's engagement in project activities to an increased engagement of key national and provincial policies that drive water sustainability in the Indus. To this end the status quo on the National Water Policy, policies relating to allocation of water, water infrastructure management policy and environmental flows policy were sought out and analyzed.

Using international best practice recommendations and consultations with stakeholders the following 5 key requirements were discussed, validated and strengthened:

1. A transparent and coherent institutional framework and policy, adapted to the demands of the 21<sup>st</sup> century.
2. Adoption of an Integrated Water Resources Management (IWRM) approach within the framework of the Water Accord 1991, on the basis of use of both surface water and groundwater. This includes institutional mechanisms (IRSA, Participatory Irrigation Management [PIM], etc.) and systems (capping, licensing, etc.);
3. Revised water (re)allocation at the provincial level, harmonising water availability to cropping patterns;
4. Recognition and allocation of environmental flows coupled with equitable, and environmentally/socially/ economically sustainable storage;
5. Piloting of IWRM, e-flows and ecosystem monitoring.

The main responses of stakeholders to these five key requirements were:

1. There was a relatively equal split in favour of adopting the NWP as soon as possible, and another group was in favour of re-starting the process of consultations to develop a new NWP based on a bottom-up approach to include provinces;
2. As with the NWP, there were strong feelings on both sides of the divide. Whereas many felt that the Water Accord should not be touched, since it took a lot of time and effort to reach an agreement, others were in favour of revisiting the Water Accord along the axis of the IWRM;
3. The 3<sup>rd</sup> key requirement was endorsed by most parties during stakeholder consultations. Institutional constraints were identified;
4. This key requirement was also endorsed, with a specific focus on in-basin storage and re-use of treated waste water;
5. Piloting was also supported, although doubts were raised on the possibility of securing water for e-flows, even for a pilot project. It was also proposed to implement a pilot project in one of the eastern rivers, rather than focusing solely on the main stem of the river.





## Introduction

For the past several years, WWF - P has undertaken a range of freshwater conservation activities in Pakistan. These include:

- An EC funded “Thirsty Crops Project”, in collaboration with local partners, whose objective was to improve water-related agricultural practices among sugarcane and cotton farmers;
- The “Indus For All” programme, a Natural Resource Management and restoration project;
- The “Indus Water Security Programme”, a new programme based on water security and environmental flows for the Indus;
- The Ministry of Environment’s “Pakistan Wetlands Programme”, which aims to promote the sustainable conservation of freshwater and marine wetlands and their associated globally important biodiversity throughout Pakistan.

Across these areas of work, there is a desire to scale-up WWF - P’s engagement from project activities to an increased engagement of key national and provincial policies that drive water sustainability in the Indus. Specifically, within the EC-funded “Thirsty Crops” project, the cotton and sugarcane related policies have been reviewed through a consultative process and recommendations have been made for change. However, there is now an objective to review the broader water management framework within which this agricultural activity is undertaken, with a view to identifying appropriate policy reforms and supporting international best-practice.

In this context, WWF - P has conducted stakeholder consultations to contribute the development and refinement of water policy reform objectives. The scope of consideration includes a range of water policy areas, including:

1. The national and provincial water resources management policy and institutional framework;
2. Policies relating to allocation of water, in particular in the agricultural sector;
3. Water infrastructure development and management policy;
4. Environmental / minimum flows policy.

It is recognised that these represent a broad policy area to consider within the limited framework of these consultations. It is intended, however, that the programme of work will build on existing analysis and understanding previously developed by WWF - P and partners.

In this report a series of key requirements for water policy reform in Pakistan are presented; these are informed and supported by an assessment of the existing policy framework in Pakistan, policy developments and practices of countries in the region (India, China, Bangladesh), and feedback from stakeholders during consultations held in Karachi, Lahore and Islamabad.





## Summary of problems

In Pakistan the largest amount of water is used for agriculture. Agriculture accounts for 95% of water withdrawals from the Indus River, but only contributes approximately 24% to the GDP. Irrigation systems are very inefficient, and it is estimated that only 35% of water abstracted from them reaches the crop. Nonetheless, 68% of the total population is directly or indirectly dependent upon agriculture for its livelihood. According to estimates, the water shortage in the agricultural sector will be 29% by 2010 and 33% by 2025, which puts an agricultural country like Pakistan on the brink of physical water scarcity. The allocation of such large amounts of water to agriculture, compounded by the inefficient irrigation systems and the less than optimal cropping patterns, means that less water is available for others, such as ecosystems and people. The Indus River system, under the influence of these factors, is already facing severe water issues in its delta area. Due to the absence of adequate flows, sea water is intruding upon the land and destroying the livelihoods of the delta population. As a result, millions of people and livestock as well as the seventh biggest mangrove forest of the world, islands with great potential for tourism, and fish products worth billions of rupees, are at stake.

## Status of water policy

Below is a concise summary of the current status of water policy and ecosystem values in Pakistan; these are organised as per the water policy areas identified above.

### 1. In terms of the national and provincial water resources management policy and institutional framework:

The National Water Policy of Pakistan, (NWP) which was drafted in 2002-2003, has not been approved to date. Within the context of the WCAP (Water Sector Capacity Building and Advisory Services Project) project of the World Bank the Ministry of Water and Power (MoWP) is recruiting a series of national experts to conduct a review and thorough update of the water policy by taking into consideration relevant developments of the past years.

The institutional framework for water management in Pakistan is mainly geared towards implementation of the Water Accord of 1991. Water is a provincial issue, and efforts are focused upon maximising provincial water shares for agriculture to optimise social equity, food security and development.<sup>1</sup>

The Indus River System Authority (IRSA) is responsible for the application of the Water Apportionment Accord of 1991. As such they apply the agreed shares to the total water volume available in each season. IRSA is a pivotal institution for water resources management in Pakistan. At present IRSA is specifically structured for its task, and does not have the capacity for a larger involvement in water resources management. It would, however, be a key institution for an integrated water resources management approach.

### 2. In terms of policies relating to the allocation of water:

In 1998, institutional reforms were introduced in the irrigation sector in Pakistan. The Provincial Irrigation and Drainage Authorities (PIDAs) were established parallel to the Irrigation Departments in each province. Farmers Organisations (FOs) and Area Water Boards (AWBs) were also established at water course and command level. According to many, these water management organisations still lack legitimacy. Further, the organisations do not have any provisions for water requirement articulation at the field level.

<sup>1</sup> See the Water Accord attached to this document (Annexure 1).





Provincial Irrigation Departments, the Ministry of Food and Agriculture (MinFA), WWF - P, IWMI and others have done much work on water use efficiency in agriculture, and a great deal has been achieved to demonstrate that considerable water savings can be made at the field level. Nonetheless, these water savings have not been incentivised, and mechanisms to measure, validate and reintegrate these water savings into allocation policies need to be developed.

As in most of the cases where water savings are achieved at the field level, excess water is either used to bring new fields under cultivation, or to change cropping patterns to grow high value cash crops that require more water; such as cotton or sugarcane. One of the key elements to make use of water savings further back up the water chain is by incentivising these savings, and allocating less water to those that are part of the incentive programme. This excess water could then subsequently be allocated to e-flows. This is, in effect, a kind of subsidisation of water savings. For such a programme to work, undisputed water measurements have to be taken and validated, and water availability has to be reliable. This would therefore have to be done in close cooperation with the irrigation departments, PIDAs and the agricultural departments.

### 3. In terms of water infrastructure management policy:

The federal government has commissioned 32 small dams to be built (eight in each province) to alleviate short-term storage gaps. The Kalabagh Dam plans have been shelved. Further, the Diamer-Basha Dam is still in its development phase, albeit low-key, as financing of this dam has not been fully secured to date.

To date, the issue of storage has not been resolved satisfactorily. Most stakeholders recognise that more storage on the Indus basin is required, not only to provide water for e-flows, but also to buffer temporal and spatial variations of precipitation, sedimentation of current storage structures and the impacts of climate change. Nonetheless it is noted here that strictly speaking, e-flows could be provided without additional storage. Another aspect of storage in this context is the type of storage. More details are provided in the section on storage and piloting.

The telemetry system developed and installed by Siemens is still not fully operational. There are apparently considerable inconsistencies between the data provided by the system and the data provided through conventional means.

### 4. In terms of environmental flows policy:

The three studies on e-flows completed in 2005 are still on the shelf. The Federal Flood Commission (FFC) has not publicly released the documents of these studies. However, the Recommendations and Conclusions of the International Panel of Experts are available online<sup>2</sup>.

Whereas within government circles the conclusions of these documents are generally accepted, there is little progress in implementing them. The main reasons for this are alleged to be:

- Due to methodological concerns and apprehensions about the approach in terms of transparency, these studies do not have credibility in all circles in Pakistan;

<sup>2</sup><http://www.ppib.gov.pk/IPOEFINALREPORT.pdf>





- The political and social upheaval that has taken place since the completion of these studies has shifted the political agenda, and implementation of the recommendations of these studies is not considered a high political priority.

With reference to the three studies on e-flows undertaken by the FFC, the MoWP supports these findings, but asserts that more storage is required to be able to release e-flows on a perennial basis.

The irrigation system of Pakistan is a contiguous irrigation system and is supply based. These characteristics effect possible e-flows. E-flows released upstream (e.g. Chasma) would probably not always reach d/s Kotri, as they would be used up by farmers on the way if released during the irrigation season. Compounding this is the fact that water supply for agriculture is not enough under the best of circumstances, so there will often be demand for extra water. Whereas an appropriate institutional and legal framework for e-flows could address this, implementation of these measures could be difficult due to the size of the system and the institutional weaknesses prevalent at a local level within the system.

## Key issues and international best practices

The main objectives of WWF - P in the context of this paper are:

- Improved irrigation and cropping patterns are implemented;
- Flagship species are maintained;<sup>3</sup>
- There is an improved allocation of water between the various sub-sectors and users (agriculture, industry, domestic);
- Surface water quality is improved in the irrigation network;
- Environmental/minimum flows are recognised by the government and civil society as crucial to sustaining aquatic ecosystems and subsequently livelihoods that depend on these, and are therefore maintained.

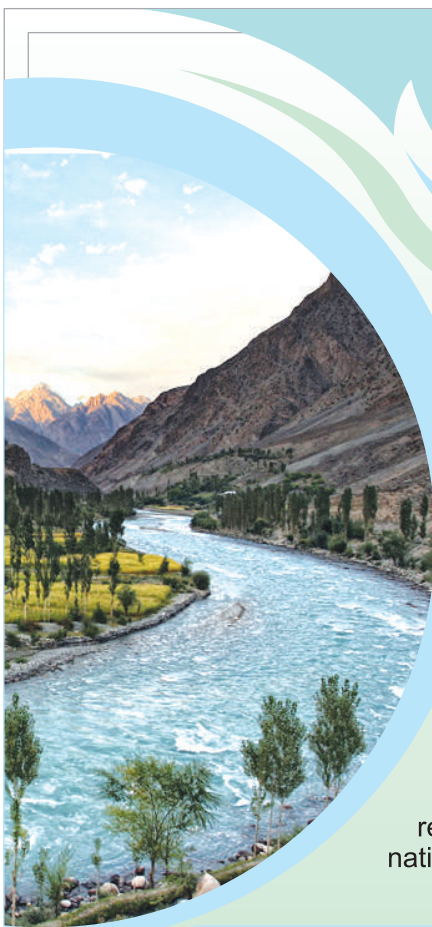
These objectives are central to the following key requirements (KRs) for water management in the Indus Basin identified by WWF - P, which are:

1. A transparent and coherent institutional framework and policy, adapted to the demands of the 21st century. (KR1)
2. The adoption of an Integrated Water Resources Management (IWRM) approach within the framework of the Water Accord 1991, on the basis of the use of both surface water and groundwater. This includes institutional mechanisms (IRSA etc.) and systems (capping, licensing, etc.) (KR2);
3. Revised water (re)allocation at the provincial level, harmonizing water availability to cropping patterns (KR3);
4. Recognition and allocation of environmental flows coupled with increased equitable, and environmentally/socially/ economically sustainable storage (KR4);
5. Piloting of IWRM, which must include e-flows and ecosystem monitoring (KR5).

<sup>3</sup>Flagship species such as Endemic Indus dolphin (*Platanista minor*) and Indian otter (*Lutrogale perspicillata*)







In this section these five key requirements are supported by international best practises taken mainly from the region, and informed further through stakeholder workshops in Karachi, Lahore and Islamabad. These international best practices are taken from similar social and agro-ecological conditions to ensure that a comparison is relevant.

*1. A transparent and coherent institutional framework and policy, adapted to the demands of the 21<sup>st</sup> century*

For any of the direly-needed developments and interventions on the Indus basin to be implemented in order to address the prevalent environmental and social problems, a transparent and coherent national water policy must be promulgated as soon as possible. In parallel the current institutional framework has to be re-assessed in light of the second requirement; adoption of an IWRM approach to water management in the basin.

It is internationally accepted that flow reallocation cannot occur in isolation from wider reforms in water governance. In India, environmental flows have been incorporated into national policies, and these policies provide a framework for development and debate.

### Box 1: Water Sector Reforms in South Asia

A number of significant water sector and policy reform programmes have been initiated in India over the last decade, including major reform programmes in Maharashtra and Uttar Pradesh. These were focussed around the creation of new Water Sector Regulatory Authorities, with wide-ranging powers to allocate water resources and establish tariffs. These sector reform programmes have often been financed by the World Bank, with hundreds of millions of dollars made available. Central to the intention of the new authorities is the establishment of authorities with sufficient political independence who are able to introduce rational reforms regarding the manner in which water is managed and allocated.

### Box 2: Water reform in China

In response to profound water challenges, China has instigated a major programme of modernisation and reform in the water sector in the last decade. This included the revision of the national Water Law in 2002, signalling a commitment to investment in agricultural and irrigation policy and management. Through the 11<sup>th</sup> Five Year Plan (2006-2010), China introduced programmes to become a 'water saving society', and plans have been developed to improve the allocation of water between sectors, and improved allocation at the local level. Changes have included a shift in emphasis in water management from supply-side construction of new storage to demand-based management, and the establishment of early stages of water rights trading. Major investment is on going in the rehabilitation of water irrigation infrastructure.

Under the 12<sup>th</sup> Five Year Plan (2011-2015), China will establish further water allocation plans for large river basins. These plans will include recognition of environmental flow needs as a prior right, to be accounted for before water is allocated between provinces.

For more details on Chinese water reforms, see: International Journal of Water Resources Development, Volume 25, Number 2, June 2009, Special Issue: The Development of a Water Rights System in China.

In Bangladesh (see box 6), a national water policy has also been promulgated and includes environmental flows.

2. *Adoption of an Integrated Water Resources Management (IWRM) approach within the framework of the Water Accord 1991, on the basis of surface water and groundwater*

IWRM is defined as a process that promotes the coordinated development and management of water, land and related water resources, in order to maximize the resulting economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems. All aspects of water use should be considered when formulating policy, implementing plans or evaluating interventions. This concept is based on the following four main principles:

- i. Fresh water is a finite and vulnerable resource, essential to sustain life, development and environment; it should be considered in a holistic way, simultaneously taking into account quantity and quality, surface water and groundwater;
- ii. Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels;
- iii. Women play a central part in the provision, management and safeguarding of water;
- iv. Water has an economic value in all its competing uses and should be recognised as an economic good.

IWRM has been touted around the world for many years as a panacea to all water management problems. This it is not. However, it is a key fundamental approach to water management which provides an enabling environment for optimisation of water usage, and can therefore contribute strongly to development, growth and prosperity.

Within the context of Pakistan it is crucial to note here that an IWRM approach was chosen in China (see the case study of the Jiao River basin, Box 3), and that conjunctive use and management of surface water and groundwater was initiated.

Recognition of the inter-dependence between surface water and groundwater is a key premise which requires attention in Pakistan. Permitting and capping groundwater abstractions is crucial to managing a water resource, and subsequently to determining and applying water savings through improved irrigation efficiencies or other interventions. These water savings can then be used to support implementation efforts for e-flows.

### **BOX 3: The Jiao River basin case**

In China, efforts have been made to develop an entitlements based system of water allocations. This was done in three phases:

- a. The first phase reviewed the status of water rights and entitlements in China to develop a framework for an entitlement system that has since been endorsed by the Chinese Ministry through regulations and guidelines.
- b. The second phase developed more detailed guidelines for implementation of a full spectrum of water resource management activities. This framework encompassed allocation and planning activities from the basin to catchment levels and a permitting system linked to caps on water extraction for large irrigation districts comprised of thousands of water users.
- c. The final element of the project involved two pilot projects to apply the framework to practical water management situations, including (a) allocation and trading within a large irrigation district and (b) environmental flows assessment and planning.



Subsequently the adoption of e-flows was piloted. The Jiao River basin – a small river basin on the southeast coast of China was chosen for the pilot environmental flows project. This project occurred within the context of growing interest throughout China in environmental flows, particularly in terms of the flow required to assist in sediment transport. Environmental flows are among a series of drivers prompting Chinese water managers to review the master plans for China's seven major river basins. The project attempted to demonstrate the role of catchment planning to identify and incorporate environmental flow requirements into allocation planning and rules using water resource modelling and scenario analysis. Historically, allocation planning was demand-driven and licensing occurred on an incremental basis without a cap on water extraction. (With permission of Robert Speed from: The Nuts & Bolts of Flow Reallocation; Proceedings of a Workshop held at the International Conference on Implementing Environmental Water Allocations Port Elizabeth, South Africa, February 22, 2009).

### 3. *Revised water (re)allocation at provincial level, harmonizing water availability to cropping patterns*

At the end of the day it is not feasible for a country like Pakistan to continue short-term unsustainable agricultural practices and to export “virtual” water. In light of the changing water resource parameters in the Indus basin, a more “enlightened” approach to water allocation between the various users is required.

“Ultimately, where water has been fully allocated to existing uses – whether through de jure legal means or through de facto customary practice – reallocating water to the environment implies a need to change existing patterns of water use and management. Responding to the need may involve, for example, reducing diversions of water for irrigation or changing dam operations and then rededicating the water to meet the needs of those dependent upon the environment. Reallocation mechanisms take several forms and vary between regulatory and voluntary approaches. The difference between these two approaches is one of degree. Voluntary approaches emphasize compensation and cooperation with water users affected by reallocation decisions. Regulatory approaches emphasize compulsory relicensing and may not always involve compensation.”<sup>4</sup>

<sup>4</sup>Adapted from: The Nuts & Bolts of Flow Reallocation; Proceedings of a Workshop held at the International Conference on Implementing Environmental Water Allocations Port Elizabeth, South Africa, February 22, 2009



For an example as to how other countries in the region are struggling with water allocation issues, see the Krishna basin case as narrated in the box below.

#### BOX 4: The Krishna basin

“The current Krishna Water Disputes Tribunal put in place by the Government of India and in charge of apportioning the Krishna water among the three riparian states of Andhra Pradesh, Karnataka, and Maharashtra is expected to reach a decision between 2008 and 2010 and it could be an appropriate platform to devise such environmental allocation. However, at present, the tribunal mainly involves decision makers and bureaucrats from the three states and needs to be made more responsive to local communities’ demands through involving local users in the negotiatory process of water apportionment for both social and environmental benefits.” (From: Krishna Basin Development, Interventions to Limit Downstream Environmental Degradation, Venot et. al.).

#### 4. *Recognition and allocation of environmental flows (e-flows) coupled with increased equitable, and environmentally/socially/ economically sustainable storage*

From the given examples we can not only deduce that a national water policy is required and that an IWRM approach is fundamental to set the scene for change and adaptation, but also that the recognition of the environment as a legitimate water user has taken place in most neighbouring countries in the region.

In Pakistan the recognition of a need for environmental flows has taken place only tacitly<sup>5</sup> The Water Accord states, “The need for certain minimum escapage to sea, below Kotri, to check sea intrusion was recognised.” The reference is only to sea water intrusion and not a need for maintaining an ecosystem balance, through the implementation of the three studies commissioned by the Federal Flood Commission. There is no formal policy in which the environment is recognised as a water user alongside agriculture, domestic usage, industry and many others.

need for increased storage on the Indus basin. The Indus only has approximately 30 days of storage, and is therefore not able to weather larger fluctuations in precipitation, leading to either floods or droughts. In other words, the lack of storage means that the system is not able to buffer flow extremes. Since storage is a concern to water management authorities in Pakistan, the issue has become inextricably linked to allocation of e-flows, whether merited or not. To be able to gain political consensus on effectuating e-flows, more progress with development of storage will be required.

<sup>5</sup>The Water Accord states, “The need for certain minimum escapage to sea, below Kotri, to check sea intrusion was recognised.” The reference is only to sea water intrusion and not a need for maintaining an ecosystem balance.





### BOX 5: Environmental flows in policy in India

The National Water Policy - April 2002 in paragraph 6.3 and 14.3 has provided for environment flows as under:

“6.3 In the planning, implementation and operation of projects, the preservation of the quality of environment and ecological balance should be a primary consideration. The adverse impact on the environment, if any, should be minimized and should be offset by adequate compensatory measures. The project should nevertheless be sustainable.”

“14.3 Minimum flow should be ensured in the perennial streams for maintaining ecology and social considerations.”

The National Environmental Policy 2006 has provided for maintenance of ecological values in their suggested action plan for river systems:

“Promote integrated approaches to management of river basins by the concerned river authorities, considering upstream and downstream inflows and withdrawal by season, interface between land and water, pollution loads and natural regeneration capacities, to ensure maintenance of adequate flows, in particular for maintenance of in-stream ecological values, and adherence to water quality standards throughout their course in all seasons.”

“Consider and mitigate the impacts on river and estuarine flora and fauna, and the resulting change in the resource base for livelihoods, of multipurpose river valley projects, power plants and industries.”

Therefore, it can be inferred that there is wide acceptance to set minimum flows/ environmental flows by striking a right balance between abstractions for economic development and for providing ecosystem goods and services in India at the policy level.  
(From: Synthesis and FLOW Road Map for India, 2007, Prof. Subhash Chander)



### BOX 6: Environmental flows in national policies in Bangladesh

The concept of environmental flow is new in Bangladesh. In the water resource management planning and practices, the term “e-flow” has not been used. However, the core concept of e-flow has been reflected in the National Water Policy and subsequent plans and emphasis was put on “in-stream flow”. For example, the NWP recommends that rules for water allocation will be developed for in-stream needs (ecological, water quality, salinity control, fisheries and navigation) during low-flow periods; for off-stream withdrawal (irrigation, municipal and industrial, power), and for groundwater recharge and abstraction. Allocation for non-consumptive use (e.g. navigation) would imply ensuring minimum levels in water bodies used for that purpose.

The NWP also recognizes fisheries and wildlife as integral aspects of economic development and placed emphasis on the availability of water for fisheries being important for sustenance as well as commercial ventures. It recommends the following measures:

- a. Fisheries and wildlife will receive due emphasis in water resource planning in areas where their social impact is high;
- b. Measures will be taken to minimise disruption to the natural aquatic and water channels;
- c. Drainage schemes, to the extent possible, will avoid state-owned swamps and marshes that have primary value for waterfowl or other wildlife;
- d. Water bodies like baors, haors, beels, roadside burrow pits, etc. will, as far as possible, be reserved for fish production and development. Perennial links of the water with the rivers will also be properly maintained;
- e. Water development plans will not interrupt fish movement and will make adequate provisions in control structures for allowing fish migration and breeding.

The above set recommendations made under the NWP, resonate the concept of e-flow. Putting these policy recommendations into practice is the next challenge. This will require changing the mindset of the planners to shift from pro-agriculture development to a more holistic basin-wide approach. From the beneficiary's perspective, there is a need to demonstrate the trade-off between giving up water user rights for agricultural use and enhanced ecosystem services for commons while ensuring minimum environmental flow. At this moment, very little knowledge or awareness is available for demonstration. (Prepared by Dr. Ainun Nishat and Raquibul Amin from IUCN Bangladesh)

#### 5. *Piloting of IWRM, which must include e-flows and ecosystem monitoring*

To gain credibility and acceptance it is necessary to show/pilot small scale e-flows and ecosystem monitoring. This may provide some incentive to reassess the overall water governance structures, and it should also provide support for the assertions about the importance of e-flows. This would however also require measuring of flow. Accurate and credible measurement of flows is crucial to legitimise e-flows and to mitigate possible conflict.

The case study from the Jiao River Basin (box 2) illustrates this fact.

## Comments on storage and piloting

Even though this report has referred to the political necessity of additional storage for environmental flows, it is important to note that in our perception, this storage does not automatically refer to large dams. One of the recommendations of this report is to undertake a serious study to attain basic data on scenarios for decentralized storage such as (upper-catchment) small(er) dams, on-farm storage, micro-hydels, groundwater recharge systems (ASR) and demand-management in terms of water stored and required, electricity generated and required, people displaced, costs of construction and O&M, and lifetime and ecosystem impacts. It is on this basis that additional storage could be attained without the negative social and environmental impacts of additional large dams.

Assertions were made by the MoWP that on average, over a five year period, more water was released below Kotri for the Indus Delta than recommended by the International Panel of Experts (IPOE ) for e-flows. These flows are however not perennial and guaranteed. If these flows could be stored at Kotri, in theory there would be sufficient water for perennial e-flows below Kotri without having to broach the issue of which provincial share would have to be affected, where storage would have to be, how farmers can be kept from using the extra water, etc. Storage could (partially) be done through Aquifer Storage and Recovery (ASR). This would however have to be studied in terms of the (hydro) geology of the area around Kotri, amounts that would have to be stored, costs of extraction, etc. It would, however, be a systematic solution to the whole issue.

In terms of piloting e-flows and ecosystem monitoring, it would probably prove to be difficult to implement a pilot project on the main stem of the river. As was suggested during the consultations as well as in Study III, piloting of e-flows could be undertaken in one of the eastern rivers of the basin; more specifically, the Ravi River may be advisable. This would gain both political support and provide useful insights into the impacts of additional flows on ecosystems and livelihoods.

Incentivising water savings in agriculture is a crucial demand management tool to ascertaining sufficient flow for e-flows. To a certain degree WWF has already made considerable progress on this in its thirsty crops project. However, mechanisms to measure, validate and reintegrate these water savings into allocation policies need to be developed. This is complex, as it requires a pre-assumption of probable water savings, thereby reducing water allocations to those farms. Yet, unless water savings are properly incentivised, the risk of receiving reduced irrigation water (in an already insecure environment) will overall be too high for farmers to cooperate voluntarily.

## Stakeholder consultations

To finalise the key requirements for water policy reform in Pakistan, and to ensure that priorities and comments of key stakeholders are taken on board to inform future policy work, WWF - P organised a series of workshops. There were two regional workshops, and one held on a national level. The two regional workshops were held in Karachi and Lahore, and the national workshop was held in Islamabad. Below the key comments/recommendations that came out of these workshops are presented.





## Karachi

With reference to Key Requirement 1 (KR 1) on the National Water Policy (NWP), there were two major positions represented in the workshop:

1. Endorsement of the key recommendation to promulgate the NWP as soon as possible;
2. Proposals to re-start the process of policy making through a bottom-up approach, culminating in provincial water policies. These provincial water policies would be the basis for a new NWP.

Whereas the idea to develop provincial water policies definitely has merit, this could be done within the framework of the NWP. Furthermore, the NWP, once adopted, would be up for review and adaptation within a few years, as is common with these kinds of policy cycles. Such a review would allow new provincial policies to be accommodated in the NWP. In line with recommendations of the workshop, it is seen as a role of donors and NGOs to lobby for promulgation of the NWP.

In Karachi, as in the other cities, it was recommended to include the impacts of climate change in the NWP.

With reference to KR 2 on the recommendation to adopt IWRM within the water accord, there were also strong and diverging responses:

1. The first response was not to touch the Water Accord of 1991, as it took a large number of years to achieve a consensus on this accord;
2. The other side presented was that the Water Accord, being almost 20 years old and not having incorporated climate change issues, environmental flows, decreases in storage capacity and groundwater, should be revisited.

The overall consensus within the WWF - P team and the consultant was that management of surface and groundwater in an integrated fashion should become part of the Water Accord sooner rather than later. The exclusion of groundwater potentiality, problems of salinisation, groundwater mining and seawater intrusion should be taken into account when allocating water between the provinces. It is recognised that this issue is sensitive, but a review of the Accord is deemed necessary at some stage.

In terms of institutions, it was agreed that a river basin management apex organisation would be required. It was suggested that a strengthening of IRSA would be a good starting point. Taking into account the fact that water is a provincial issue, close regulation and cooperation with the provincial EPAs, IDs and Agricultural Departments would be required.

cropping patterns and water availability, it was suggested in the workshop that more research on virtual water and water use efficiency would be required to assess the actual status of import and export of water and transboundary water quality issues.

e-flows, a Multi-Stakeholder Platform approach on recognition of e-flows and storage was proposed, including additional research on in-basin storage, rather than large water infrastructure.

For KR 5 there was widespread support for piloting. WWF - P's programme IFAP suggested that there might be a possibility to implement a pilot IWRM (specifically integrated management of surface and groundwater, environmental flows and ecosystem monitoring) within one of the project pilot areas. It was also suggested that this pilot could take place in other locations than below Kotri (e.g. Ravi River).



## Lahore

In Lahore the positions on KR 1 were similar to those in Karachi. It was suggested that a strong focus on engaging parliamentarians, media and senior bureaucrats would allow WWF - P to develop sufficient momentum to get the NWP sent to the cabinet for promulgation.

With reference to KR 2, the response was even stronger, in the sense that the two positions present in Karachi were also present here, but the strengths and emotions with which both sides were presented were more intense. It was also suggested that a review of existing legislation and practices on groundwater legislation and regulations take place, and that the Groundwater Administration Rights Ordinance of NWFP (North West Frontier Province) be used as a guideline to integrate surface and groundwater usage.

For KR 3, the main recommendations were:

- Subsidise fallow fields;
- Increase water productivity;
- Crop re-zoning
- Development of genotypes (drought resistant varieties);
- Coordination between irrigation and agriculture - improved (master) planning.

For KR 4 there was general consensus, and more attention to the potential of recycling waste water was asked.

Finally, for KR 5, there was some disagreement as to whether piloting was useful.

## Islamabad

In Islamabad there was a broad representation of civil society organisations, as well as government agencies at high levels. As a result the debate was lively and interesting. There was much disagreement from the side of the Planning Commission on the process of developing the NWP. They indicated that it was a “cut-and-paste” job not worth reading. Others disagreed with this statement and supported the document as it is. From this workshop the main conclusion on KR 1 is that a broad and serious support base has to be mobilised for the current NWP to be accepted.

Also on KR 2, much was debated. There were again supporters and dissenting voices regarding revisiting the Water Accord. It was also stressed that a regulatory framework would be required with a strong focus on the provincial level.

coordinate agricultural practices with water availability, accurate and reliable forecasting and water quantity data was required.

KR 5 the following issues were raised:

- A consideration of the eastern rivers;
- A consideration of household and municipal use of water;
- A consideration of the re-use of treated wastewater for e-flows.



## Way forward

The following steps are seen as the way forward on these complex and challenging issues:

1. To develop a step-by-step approach for a strategically managed multi-stakeholder platform, whose main objectives would be to (i) build consensus for the IPOE recommendations, (ii) invite key governmental stakeholders to become part of an advocacy campaign to promote e-flows, and (iii) review institutional and policy issues related to water allocation. Detailed terms of reference for the platform and the leader of the platform should be developed first, as this process can only be done once.
2. To undertake a serious study to attain basic data on scenarios for decentralized storage such as (upper-catchment) small(er) dams, on-farm storage, micro-hydel, groundwater recharge systems (ASR) and demand-management in terms of water stored and required, electricity generated and required, people displaced, costs of construction and O&M, lifetime and ecosystem impacts. It is on this basis that additional storage could be attained without the negative social and environmental impacts of additional large dams.
3. Through the modalities of the Indus for All Programme (WWF - P), a pilot area for IWRM and e-flows should be identified and a detailed approach should be developed.
4. Mechanisms to measure validate and reintegrate water savings into allocation policies need to be developed.
5. National Water Policy should be approved and notified at the earliest.

## ANNEXURE 1 - WATER APPORTIONMENT ACCORD

Apportionment of the Waters of Indus River System between the  
Provinces of Pakistan

Karachi, dated 16.3.91

As a follow-up to the meeting of the Chief Ministers in Lahore on March 3, 1991, a meeting of the representatives of the four provinces was held at Lahore on March 4, 1991. Another meeting was held in Karachi on March 16, 1991.

The participants agreed on the following points:

1. There was an agreement that the issue relating to apportionment of the waters of the Indus river system should be settled as quickly as possible.
2. In the light of the accepted water distributional principals the following appointment was agreed upon:

(Fig. in MAF)

PROVINCE	KHARIF	RABI	TOTAL
PUNJAB	37.07	18.87	55.94
SINDH*	33.94	14.82	48.76
NWFP (a)	3.48	2.30	5.78
(b)CIVIL CANALS**	1.80	1.20	3.00
BALUCHISTAN	2.85	1.02	3.87

\* Including already sanctioned urban and industrial uses for metropolitan Karachi.

\*\* Engaged civil canals above the rim stations.

3. N.W.F.P/Balochistan projects under execution have been provided their authorised quota of water as per existing uses.
4. Balance river supplies (including flood supplies and future storages) shall be distributed as below:

PUNJAB	SINDH	BALUCHISTAN	NWFP	TOTAL
37	37	12	14	100%

5. Industrial and urban water supplies for Metropolitan City, for which there were sanctioned allocations will be accorded priority.



6. The need for storages, wherever feasible on the Indus and other rivers was admitted and recognised by the participants for planned future agricultural development.
7. The need for certain minimum escapeage to the sea, below Kotri, to check sea intrusion was recognised, Sindh held the view, that the optimum level was 10 MAF, which was discussed at length, while other studies indicated lower/higher figures. It was, therefore, decided that further studies would be undertaken to establish the minimal escapeage needs downstream of Kotri.
8. There would be no restrictions on the provinces to undertake new projects within their agreed shares.
9. No restrictions are placed on small schemes not exceeding 5000 acres above elevation of 1,200 ft.
10. No restrictions are placed on developing irrigation uses in the Kurram / Gomal / Kohat basins, as long as these do not adversely affect the existing uses on these rivers.
11. There are no restrictions on Balochistan to develop the water resources of the Indus right bank tributaries, which flow through its areas.
12. The requirements of LBOD will be met out of the flood supplies in accordance with the agreed sharing formula.
13. For the implementation of this accord, the need to establish an Indus River System Authority was recognised and accepted. It would have its headquarters in Lahore and would have representation from all four provinces.
14.
  - a) The system-wise allocation will be worked out separately, on ten-daily basis and will be attached to this agreement as part and parcel of it.
  - b) The record of actual average system uses for the period 1977-82 will form the guideline for developing a future regulation pattern. These ten daily uses will be adjusted pro rata to correspond to the indicated seasonal allocations of the different canal systems and will form the basis for sharing shortages and surpluses on all- Pakistan basis.
  - c) The existing reservoirs will be operated with priority for the irrigation uses of the provinces.
  - d) The provinces will have the freedom within their allocations to modify system wise and period-wise uses.
  - e) All efforts will be made to avoid wastages. Any surplus may be used by another province, but this will not establish any rights to such uses.

## ANNEXURE 2 - PARTICIPANTS (ISLAMABAD)

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## Our Mission

WWF aims to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature by:

- conserving the world's biological diversity
- ensuring that use of renewable natural resources is sustainable
- promoting the reduction of pollution and wasteful consumption

## Join Us

Everyday the burden on our environment grows heavier. Increasing pollution, decreasing natural resources and habitat destruction affect the quality of life for all living beings.

Become a part of the solution by becoming a Corporate or individual member of WWF-Pakistan. Members are regularly updated on conservation issues and have access to WWF resources and activities.

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