

# Mainstreaming Initiatives and Priorities of the Indus Ecoregion into the Sindh Vision 2030 7<sup>th</sup> February 2008



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## Executive Summary

Despite continued development efforts and a substantial volume of foreign aid, Sindh is facing extreme poverty, increased competition for water resources, deterioration of natural resources and inconsistent quality of civic services. With a relatively high population growth rate of 2.8%, Sindh's population is expected to more than double by 2025 to 64.2 million (*Draft Sindh Vision 2030*). In this scenario, the Government of Sindh has developed the Sindh Vision 2030, a long-term development framework that aims to capture the aspirations of the citizens of Sindh and identify avenues for sustained sectoral growth. In line with international and national development frameworks, poverty alleviation and environmental sustainability are essential ingredients of the Sindh Vision 2030. Recognizing the integrated nature of poverty problems, the Government of Sindh has emphasized the need for inter-sectoral analysis to identify linkages between poverty and other sectors-health, education, and environment as essential precursors to combating poverty in Sindh.

WWF-Pakistan's Indus Ecoregion Programme (IEP) provides a significant opportunity for complimenting Government of Sindh's focus on poverty reduction by addressing poverty-environment linkages through sustainable natural resource management in the Indus Ecoregion. In this chapter, the Indus Ecoregion Programme's concept of sustainable-resource use based poverty reduction has been presented. More importantly, through a comparative review of Sindh Vision 2030 and Indus Ecoregion documents, those thematic areas where the IEP can support the Sindh Vision 2030 and gaps that must be addressed in the Sindh Vision 2030 have been identified.

Guided by a long-term vision (2005-55) for the Indus Ecoregion, the Indus Ecoregion Conservation Plan (IECP) identifies targets (10-20 years) and milestones (3-5 years) for the Indus Ecoregion complimented by draft institutional action plans. The finalization of these institutional action plans in 2008 provides an opportunity for integration of relevant livelihood improvement-natural resource management interventions into Sindh Vision 2030, the Sindh Poverty Reduction Strategy Paper and the Government of Sindh's sectoral plans. Moreover, the development of poverty-environment indicators, the establishment of site-specific poverty-environment linkages and poverty-environment manuals during the first phase of the IEP will provide guidance for developing customised poverty reduction interventions in Sindh. Lessons from poverty-environment assessments during the first phase (2006-12) of the Indus Ecoregion Programme can be replicated and applied at other sites in Sindh.

The six thematic areas that will benefit from mainstreaming priorities of the Indus Ecoregion are: *Poverty-Environment Linkages/Livelihood Improvement, Forestry Research and Management, Environmental Education and Awareness, Better Management Practices for Agriculture, Alternate Energy, and Water Management*. Three areas that require a more concerted focus in the Sindh Vision 2030 are *Wildlife, Fisheries and Protected Areas*. Implementation of the Indus Ecoregion Programme provides a platform for guiding interventions under the six common themes and will strongly contribute to developing the required focus in the three areas currently lacking in the existing draft of the Sindh Vision 2030. In light of these findings, WWF-Pakistan strongly recommends mainstreaming of all the Indus Ecoregion targets and milestones (Table 1 in main document) into the Sindh Vision 2030 that will further strengthen the Government of Sindh's holistic focus on poverty alleviation and environmental sustainability.

## **1. Background and Context**

### **1.1 Rationale**

The natural capital of any region is an important ingredient of its development strategy. Similarly in Sindh, diverse natural resource components- forest, fisheries, wildlife, livestock, water and others not only constitute Sindh's natural assets but also contribute significantly to communities' livelihood. Continued deterioration of these natural assets is compromising the development process and threatens achievement of the targets for poverty reduction in the province. Reduction in freshwater flows, sea intrusion, habitat destruction, deforestation, water pollution and water logging and salinity are stark indicators of an escalating environmental catastrophe. This degradation of land and water resources coupled with population growth present enormous challenges to sustainable development in Sindh. The total population of Sindh is projected to reach 43.1 million by 2010 based on an intercensal (1981-1998) growth rate of 2.8%. A Federal Bureau of Statistics (2001) study concludes that income inequality has also been on the rise, especially in the latter half of the 1990s. Improving management of Sindh's natural assets will not only contribute to sustaining livelihood, but will also support other sectors (agriculture, livestock and fisheries) that contribute significantly to Sindh's and Pakistan's overall economic output.

Sustainable poverty alleviation in Sindh calls for deconstruction of the various links between poverty alleviation and environmental degradation. The poverty-environment nexus is complicated by the diverse geographical, natural resources and resource use practices across Sindh. This necessitates an understanding of poverty-environment links at local levels-community, village or specific sites. Understanding the various relationships between degradation of poor people's living environments and their well-being will provide the basis for future development policies and plans. Adequately incorporating these aspects into the Sindh Vision 2030 and operationalizing these at the field level remains a challenge.

The Indus Ecoregion Programme, a joint initiative of WWF-Pakistan and the Government of Sindh provides a unique platform for addressing poverty-environment linkages through sustainable natural resource management in Sindh. An ambitious long-term (2005-2055) initiative for biodiversity conservation and livelihood improvement, the Indus Ecoregion Conservation Programme stems from a 50-year vision supported by an integrated Indus Ecoregion Conservation Plan. The Sindh Vision 2030 aims to reduce poverty and bring prosperity to every citizen in the province. The Indus Ecoregion Programme can compliment these efforts of the Sindh Government by addressing poverty-environment linkages through natural resource management at selected sites in Sindh.

### **1.2 Policy Framework for Livelihood Improvement and Environmental Sustainability in Sindh**

Holistic development strategies that place environmental improvement and poverty reduction at the forefront of development are necessary elements for achieving sustainable development. United Nations Millennium Development Goal 1 (Eradicating Extreme Poverty and Hunger) and Goal 7 (Environmental Sustainability) provide the international framework for these two pillars of development. At the

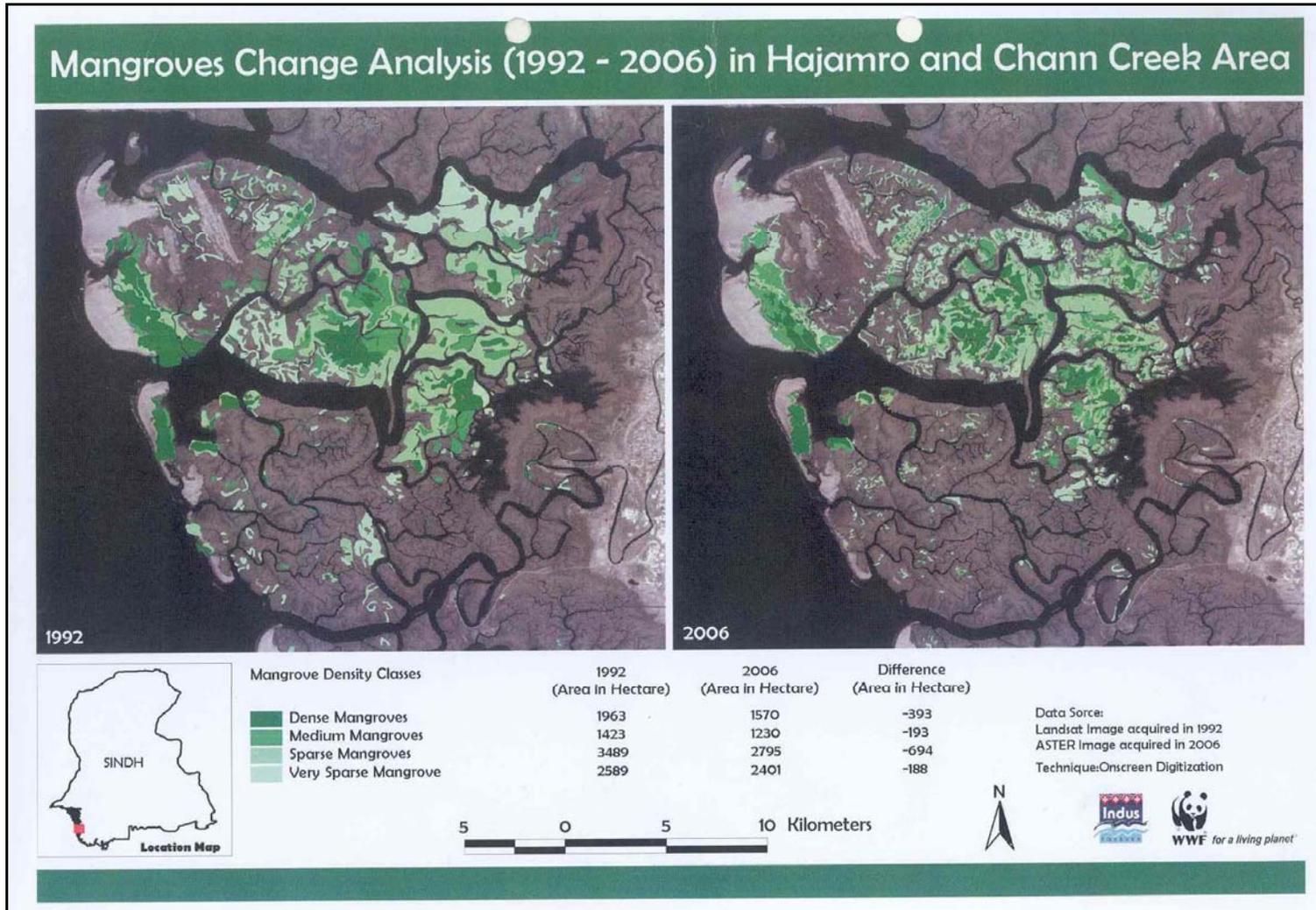
epicentre of development in Pakistan is a national Vision 2030 that amongst other critical issues highlights sustainable development, poverty alleviation and environmental sustainability. Pakistan's Medium Term Development Framework and Poverty Reduction Strategy Paper aim to translate these key themes into short term targets that will lead to realization of Pakistan's Vision 2030 through a process of periodic reviews and revisions. Moreover, recognition of the complex and localized nature of poverty and environmental issues has led to the development of provincial long-term vision documents and poverty reduction strategy papers. This process provides a sound platform for developing situation-specific goals and targets that are in line with socio-economic and ecological realities at local levels.

### 1.3 The Poverty-Environment Nexus in Sindh

Considerable theoretical and empirical evidence has led to the popular view that "environmental conditions have major effects on the livelihoods, health and vulnerability" of the poor. From their research on the poverty-environment nexus, Songsore and MchGranahan point to the close correlation between environmental risks and socio-economic deprivation (Zaidi and Iftikhar, 2003). Moreover, Asian Development Bank's Report (2002) on *Poverty in Pakistan- Issues, Causes and Institutional Responses* also indicates that the poor themselves identify ecological fragility, resource rights, vulnerability to natural resources, access to water and sanitation as factors that contribute to their poverty. This perspective of the poor themselves, therefore, calls for incorporation of environmental management into the Sindh Vision 2030 and subsequently into the Sindh PRSP and relevant sectoral plans.

A brief review of Sindh's environmental and livelihood issues further strengthens this justification. The flow of the Indus River accompanied with millions of tons of silt deposition has played a critical role in the evolution of Sindh's rich ecological diversity. Riverine forests along the river banks, mangrove forests along the coastline, and inland and coastal wetland habitats that harbor numerous fish species and attract both resident and migratory bird species are all part of Sindh's rich natural heritage. It is this natural capital that has supported the livelihoods of people in Sindh and that must be managed for sustainable poverty alleviation. As a downstream state, many of Sindh's environmental problems originate from upstream diversions of the River Indus. Progressive reduction in flow of the Indus has contributed to sea intrusion. Coupled with poor agricultural water management, sea intrusion has led to persistent problems of waterlogging and salinity, especially in lower Sindh. This progressive land degradation has deprived rural folk of their valuable assets. Such circumstances limit the livelihood opportunities of local communities, leaving them more vulnerable to external shocks and stresses such as natural disasters. Upstream diversions of the River Indus have also affected the annual silt deposition in the coastal areas resulting in drastic reductions of the mangrove cover. A comparison of GIS images of mangrove cover in Figure 1 is a case in point. More recently, unchecked industrial activities and disposal of untreated agricultural and municipal effluents is polluting both inland and coastal water bodies. In May 2004, over twenty people died from contaminated water from Manchar Lake and yet again, this year there is concern about drinking water contamination originating from Manchar Lake (DAWN, 21<sup>st</sup> January, 2007).

Figure 1: Comparison of Mangrove Cover in Hajamro and Chann Creeks, 1992 and 2006



## 2. Indus Ecoregion Programme: Promoting Sustainable Resource-Use based Poverty Reduction

### 2.1 Ecoregion Conservation: Concept and Principles

In 1997, the World Wide Fund for Nature (WWF) and other organisations such as the United Nations Environment Programme and National Geographic Society embarked upon a global biodiversity conservation initiative assessing the biological diversity and ecological significance of more than two hundred ecoregions. Commonly known as the G-200, this global effort was guided by the need to urgently identify biodiversity hotspots covering the entire canvas of biodiversity on the planet. Six specific themes- freshwater, forests, species, toxics, marine, and climate change further helped prioritize the most ecologically significant ecoregions.

#### ***Definition of Ecoregion***

Ecoregion refers to a large unit of land or water containing a geographically distinct assemblage of species, natural communities, and environmental conditions. The boundaries of an ecoregion encompass an area within which important ecological and evolutionary processes most strongly interact

These efforts for ecoregion conservation are guided by the following principles:

- ❖ Formulation of a long-term Biodiversity Vision for the region (50 years)
- ❖ Focus on the fullest possible range of biodiversity in an ecoregion
- ❖ Developing solutions in partnership with stakeholders at all levels (micro, meso, macro levels)
- ❖ Implementation through an Integrated approach (linking natural resources and livelihoods)

### 2.2 Development of the Indus Ecoregion Programme: A Multi-Stakeholder Process

Ranked amongst the top 40 most biologically significant ecoregions in the world, the Indus Ecoregion is home to a range of ecosystems harboring desert areas in the eastern periphery, riverine forests along the river Indus, inland and coastal wetlands scattered across the ecoregion and a rich deltaic ecosystem covering large areas of mangrove habitat in the south (Figure 2). Approximately two-thirds of the area of Sindh province, the Indus Ecoregion partially or fully covers 18 districts of Sindh. Through poverty-environment linkage analyses WWF-P aims to enhance the understanding and implementation of sustainable resource use based poverty reduction. This premise is central to the concept and design of the Indus Ecoregion Programme.

The aim of establishing the Indus Ecoregion Programme was to facilitate articulation of a long-term 50-year vision for the Indus Ecoregion. The purpose of the vision is to provide inspiration to all partners to take coordinated actions towards sustainable natural resource management and poverty alleviation. The long-term vision, medium-term targets and near-term milestones and outputs formulated as part of the Indus Ecoregion Programme is based on the wide knowledge base of stakeholders engaged at the local,

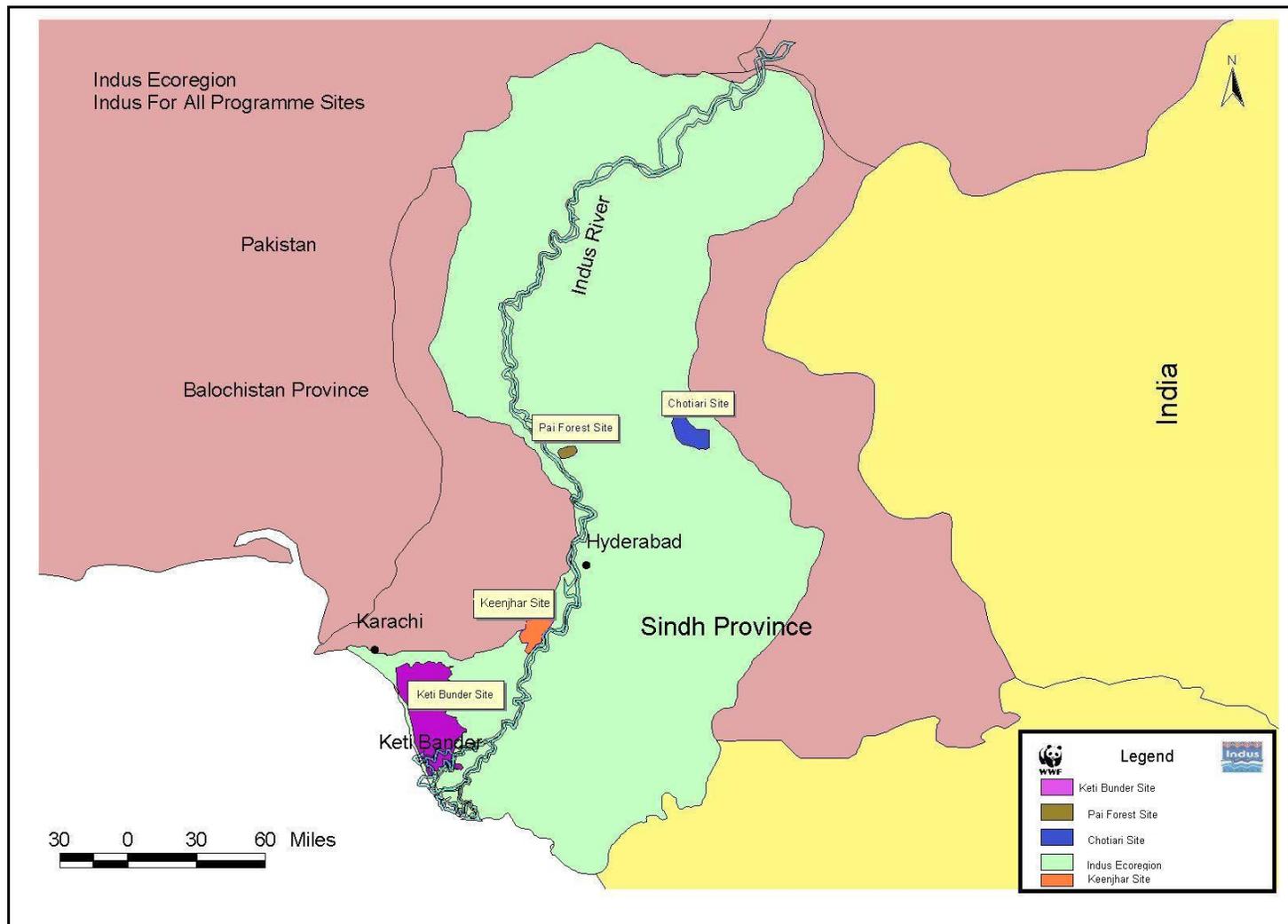
provincial, national and international levels. The rigorous national and international consultative process that led to the establishment of the Indus Ecoregion Programme is briefly highlighted here.

- ❖ *In December 2002*, over sixty participants at a Stakeholders Consultative workshop assessed the current status of environmental resources of the Indus Ecoregion. A platform for coordination and collaboration amongst stakeholders working in the ecoregion was established.
- ❖ *In July 2004*, fifty-six participants representing twenty-five conservation partners participated in a Biodiversity Visioning and Ecoregion Conservation Planning workshop for the Indus Ecoregion that enabled formulation of a 50-year vision, development of a draft Indus Ecoregion Conservation Plan complimented by five Institutional Action Plans, and identification of fifteen priority areas requiring concerted efforts for biodiversity conservation and poverty alleviation.
- ❖ *In October-November 2004*, the Indus Ecoregion Conservation Plan underwent two international reviews at Monterey, California with the Nature Conservancy and Bangkok, Thailand with WWF's Asia-Pacific Programme.
- ❖ *In September 2005*, a Partnership Workshop was organized to appraise partners of the Indus Ecoregion planning process and to identify partners' roles against the expected results of the first phase of the programme
- ❖ *In July 2006*, these efforts of all stakeholders steered by WWF-Pakistan resulted in the approval of the first six-year phase of the Indus Ecoregion Programme

### 2.3 Programme Implementation: The 3M Approach

Recognizing that biodiversity loss and environmental degradation are often driven by social, economic and institutional factors, WWF has adopted a holistic approach to programme implementation that links field and policy level interventions. Developed by WWF's Macroeconomic Programme Office, the 3M approach links changes at the local level (micro) with changes at the sub-national (meso) and national levels (macro) in an effort to synchronise field-scale lessons and community aspirations with policy-level decisions. The 3M approach helps minimize the political, economic and institutional disconnects that present hurdles to sustainable poverty alleviation. WWF-Pakistan has customised this approach according to Sindh's context for implementation of the Indus Ecoregion Programme. At the micro scale, the programme intends to address stakeholders at village and union council level; at the meso scale, stakeholders at district and provincial level and at the macro scale, the stakeholders at national and international levels.

**Figure 2: Map of the Indus Ecoregion Highlighting Priority Areas for the First Phase**



## 2.4 Indus Ecoregion Conservation Plan: Opportunities for Integration into the Sindh Vision 2030, Sindh PRSP and Sectoral Plans

The Indus Ecoregion Conservation Plan (IECP) is the blueprint for concerted action towards long-term biodiversity conservation and livelihood improvement in the Indus Ecoregion. Expertise from a wide variety of stakeholders belonging to relevant line departments, civil society organizations, community-based organizations and private sector institutions enabled the development of a working draft of the Indus Ecoregion Conservation Plan in 2004. The key features of this plan are a 50 year (2055) vision, 10-20 year (2015-2025) targets and 3-5 year (2008-10) milestones that provide guidance to all stakeholders for conservation and livelihood improvement in the Indus Ecoregion (Table 1). Ecoregion-wide targets and milestones are supported by 5 draft institutional action plans that outline the interventions each department/organization will pursue to achieve ecoregion targets and milestones. Presently, departments/institutions are revising their action plans and those that do not have an action plan are developing these.

Reflecting a broad range of environmental management and poverty alleviation issues of Sindh, the working draft of the IECP provides concrete targets and milestones to achieve the long-term ecoregion vision. A representative forum, the Indus Ecoregion Steering Committee notified by the Government of Sindh in March 2006 under the Chairmanship of Additional Chief Secretary (Dev), P&D Department, Government of Sindh provides a regular mechanism for implementation and review of sectoral targets and milestones included in the IECP. Targets and milestones for the Indus Ecoregion will contribute to realizing the strategies for achieving environmental sustainability and poverty alleviation outlined in the Sindh Vision 2030. Moreover, the finalization of institutional action plans for the Indus Ecoregion provides a platform for the integration of poverty-environment issues into Sindh's Poverty Reduction Strategy Paper and relevant sectoral plans that will contribute to operationalizing the Sindh Vision 2030. It is therefore recommended that the targets and milestones identified by various stakeholders in the IECP may be adopted in the Sindh Vision 2030 as the targets for poverty alleviation and environmental sustainability in Sindh province. The schematic alignment of the Indus Ecoregion and Sindh Vision initiatives indicated in Figure 1 highlights opportunities for mainstreaming Indus Ecoregion targets and milestones.

### **Indus Ecoregion Vision (2005-2055)**

Humans coexisting with nature, in complete harmony, a network of interlinked wetlands where **Dolphins/Otters** thrive in their river habitats and **raptors/waterfowl** inhabit lakes and lagoons. **Aquatic flora** and associated **biodiversity** flourish on the banks and mouth of the River Indus and the newly

## 2.4.1 Indus for All Programme: First Phase of the Indus Ecoregion Programme

### 2.4.1.1 Overview and Objectives

The first 6-year phase (Indus for All Programme) of the Indus Ecoregion Programme was approved in July 2006. The Indus for All Programme is focused on introducing natural resource management and poverty reduction interventions at four of the fifteen priority areas identified during the development phase of the Indus Ecoregion Programme. The four sites selected under the Indus for All Programme include a mangrove ecosystem (Keti Bunder in Thatta), a freshwater ecosystem (Keenjhar Lake in Thatta), a desert wetland ecosystem (Chotiari Reservoir in Sanghar) and an irrigated forest ecosystem (Pai Forest in Nawabshah). The four programme objectives are designed to establish concrete baselines for ecosystems, livelihoods and poverty-environment linkages, integrate preliminary findings from baseline studies into provincial and national policies and frameworks, carry out a range of education and awareness building initiatives for stakeholders and establish institutional structures and processes at micro, meso and macro levels that will enable the implementation of the programme targets and ensure ownership amongst stakeholders and partners.

### 2.4.1.2 Poverty-Environment Linkages

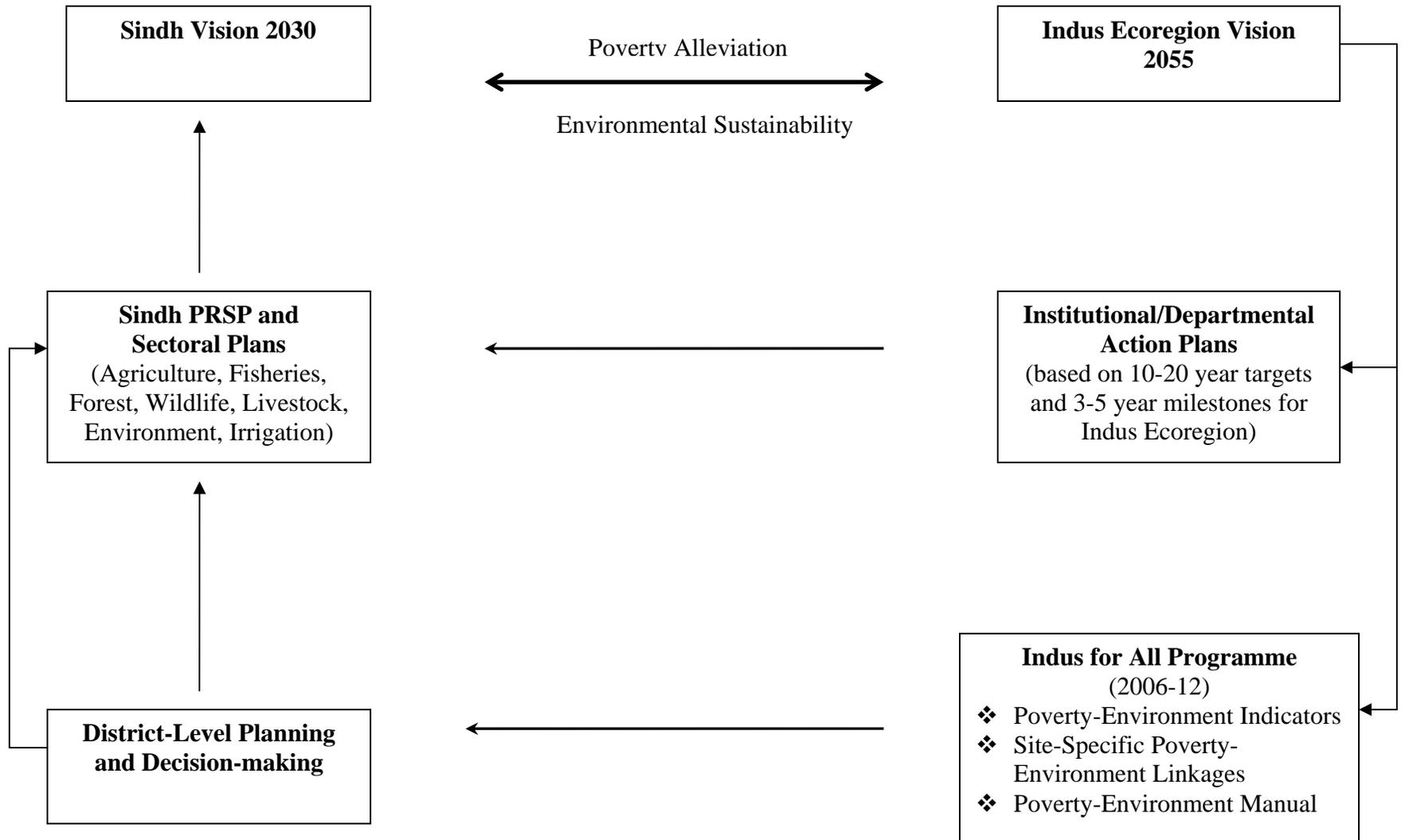
The preliminary socio-economic assessment carried out under the Indus for All Programme has indicated a strong link between natural resources and community's livelihood. The majority of people at the priority areas of programme are directly or indirectly dependent on one or more natural resources. The degradation of natural resources is exacerbating the poverty of these communities. In a ranking of the 100 districts of Pakistan—with Karachi being counted as 1—according to 11 social and 16 economic development indicators, of the three districts under review, Nawabshah was relatively better off with Sanghar in the middle and Thatta at the bottom of the scale.<sup>1</sup> The Indus for All Programme has targeted two sites from district Thatta and one each from Nawabshah and Sanghar districts for priority interventions.

The majority of people in the four priority sites depend on fresh water, fisheries, livestock, and rangeland, agriculture and forest products. The decline in water quantity and quality at Indus delta, Keenjhar Lake, and Pai Forest has negatively affected people's livelihood. Similarly the shortage of water to Pai forest has led to reduction in forest cover and consequently affecting people's income. According to preliminary socio-economic survey of Indus for All Programme 75% people of Pai forest depend upon agriculture and remaining on livestock. The population of Chotiari reservoir also heavily depend on fishing and livestock grazing. Fishing is the major livelihood base of most communities at Keenjhar and Keti Bunder. These preliminary findings indicate that majority of the poor are dependent on natural resources and the rising trend in poverty in these areas is mainly explained by depletion and degradation of these resources. Environmental management can contribute towards poverty alleviation and successful measures can be replicated at other sites in the Indus Ecoregion in subsequent years.

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<sup>1</sup> Social Policy and Development Center. 2001. *Social Development in Pakistan: Growth, Inequality and Poverty*. Oxford University Press. Karachi.

**Figure 3: Opportunities for Mainstreaming Indus Ecoregion Initiatives and Priorities into the Government of Sindh's Development Framework**



### **3. Indus Ecoregion Programme and Sindh Vision 2030: Opportunities and Gaps**

Poverty alleviation is one of the key objectives of the Government of Sindh as reflected in the Sindh Vision 2030. Indus Ecoregion Programme's approach of poverty reduction through sustainable resource use can significantly contribute to the Government of Sindh's goals for poverty alleviation. Leading both these efforts is the P&D Department of the Government of Sindh that serves as a focal point for these initiatives and that provides a significant opportunity for partnership and lesson learning in areas of mutual interest.

Through a preliminary comparative review of the Indus Ecoregion Programme and the Sindh Vision 2030, a number of core areas of concern to both initiatives have been identified. Whereas the Sindh Vision 2030 is more concerned with highlighting specific issues of concern, the Indus Ecoregion Programme employs a target-oriented approach citing specific targets and milestones. These targets and milestones provide a more focused framework that can be mainstreamed into the Sindh Vision 2030 and strengthen implementation of the vision document. Moreover, certain issues of concern to the Indus Ecoregion Programme are either not identified at all or not covered appropriately in the Sindh Vision 2030. These gaps have also been identified and it is strongly recommended that these are incorporated in the final version of the Sindh Vision 2030. A comparative review of the Indus Ecoregion Programme and Sindh Vision 2030 is reflected in Table 1. Issues highlighted in the Sindh Vision 2030 have been screened against targets and milestones from the draft Indus Ecoregion Conservation Plan.

#### **3.1 Opportunities for Mainstreaming Indus Ecoregion Programme into the Sindh Vision 2030**

Based on the comparative analysis (Table 1), six thematic areas common to both initiatives have been filtered:

- *Poverty-Environment Linkages/Livelihood Improvement*
- *Forestry Research and Management*
- *Environmental Education and Awareness*
- *Better Management Practices for Agriculture*
- *Alternate Energy*
- *Water Management*

By identifying specific areas and interventions, the Indus Ecoregion Programme provides more focus for guiding implementation of the Sindh Vision 2030 under these six common themes identified above. Emphasis has been laid on educating the younger generation on environmental issues in the Sindh Vision 2030, which is taken a step further in the Indus Ecoregion Conservation Plan where the need for an awareness campaign for conservation of the Indus Dolphin has been highlighted. Similarly, in the Sindh Vision 2030, the need for developing riverine forests and replanting mangroves has been raised. However, in the Indus Ecoregion Conservation Plan, the actual magnitude of forests to be rehabilitated within a stipulated time-frame has been specified. These few examples reflect how the target-oriented focus of the Indus Ecoregion Conservation Plan can contribute to prioritizing efforts for implementation of the Sindh Vision 2030.

Under the six core themes identified above, the Indus Ecoregion Programme can support the implementation of the Sindh Vision 2030. Implementation of the Indus for All Programme initiated in April 2007 provides a platform for initiating activities under all six themes that directly addresses issues raised in the Sindh Vision 2030. Interventions of the Indus Ecoregion under these six themes should therefore become a permanent part of the Sindh Vision 2030 and subsequently mainstreamed into the Sindh PRSP and relevant sectoral plans in the near future.

### 3.2 Highlighting Gaps in the Sindh Vision 2030

The screening of Sindh Vision 2030 against Indus Ecoregion targets and milestones also highlight important gaps in the Sindh Vision 2030 that must be addressed before finalization of the vision document. Several targets in the IECP are concerned with restoring wildlife populations and development of species management plans, there is no specific section in the Sindh Vision 2030 dealing with issues of wildlife management in Sindh. This becomes particularly important, when one considers the large amount of revenue that wildlife conservation schemes such as 'trophy hunting' contributes to the Government of Sindh. Similarly, fisheries play a significant role in Sindh's economy and is a critical sector both in terms of environmental management and poverty alleviation. However, there is only fragmented coverage of fisheries in the Sindh Vision 2030. A comprehensive section on fisheries of Sindh is required that highlights the threats to the fisheries sector, links to poverty alleviation and options for improving the fisheries sector through analyses of poverty-environment links. Lastly, avenues for management and development of more protected areas in Sindh are missing in the vision document. Protected Areas are important centers of Sindh's natural capital that require more effective management if these are to play their due role in enabling long-term environmental sustainability of the region.

Therefore, WWF-P strongly recommends that the following three areas may also be added to the Sindh Vision 2030. These areas have already been addressed in the Indus Ecoregion Conservation Plan (IECP) and their targets are being refined under the departmental/institutional action plans that compliment the IECP.

- *Wildlife*
- *Fisheries*
- *Protected Areas*

**Table 1: Comparison of Indus Ecoregion Conservation Plan and Sindh Vision 2030**

INDUS ECOREGION CONSERVATION PLAN		Sindh Vision 2030
TARGETS (2015-2025)	MILESTONES (2008-10)	
1. <b>Indus River Dolphin habitat restored</b> and rehabilitated from upstream Taunsa to downstream Kotri by 2025.	1.1 In collaboration with print and electronic media, an <b>awareness campaign</b> highlighting conservation of the Indus Dolphin is developed by 2008 1.2 Adoption of agricultural practices that <b>minimizes the discharge of toxic chemicals</b> , insecticides and pesticides in 44,200 ha of Indus River Dolphin Reserve by 2010 1.3 <b>Number of dolphins stranding reduced to half</b> by 2010	“In order to deal with environmental issues, efforts will be made to <b>educate the younger generation</b> ”  <b>Interactive modes of education</b> to be used to promote environmental education and conservation
2. 20,000 ha of riverine forests are rehabilitated to <b>restore swamp/hog deer populations</b> by 2025.	2.1 <b>Ban on the entry of livestock</b> in the protected areas strictly enforced by 2008 2.2 No of <b>illegal hunting cases reduced to 50%</b> by 2008 2.3 Keep a proper ratio of animals in relation to the natural food available by 2007.	“A holistic and comprehensive approach for <b>developing Sindh riverine forests...</b> ” “... <b>replanting mangrove forests</b> in deltaic and coastline areas. (p.137)  Development of integrated management plans and <b>forest monitoring mechanisms using satellite imagery</b>  As an immediate intervention, a <b>thorough audit of the existing forest cover</b> must be carried out to provide a realistic picture of forest health in Sindh
3. Population of <b>extinct and endangered species restored</b> to the carrying capacity of their natural habitats by 2025.	3.1 <b>Species management plan of all endangered species</b> such as otters, swamp deer, hog deer, waterfowl, palla, marine turtles and raptors by 2008 3.2 Suitable habitat identified for release of two pairs of Gaviel by 2010 3.3 <b>Environmental flow downstream Kotri secured</b> to restore palla habitat by 2010	Studies on water requirements below Kotri Barrage must be considered to ensure availability of <b>minimum water requirements below Kotri</b> .
4. 2,000 ha of <b>marine turtle nesting beach protected</b> to minimize mortality rate by 2015.	4.1 <b>Minimizing external threats to marine turtles</b> to half by 2008	

INDUS ECOREGION CONSERVATION PLAN		Sindh Vision 2030
TARGETS (2015-2025)	MILESTONES (2008-10)	
5. A representative network of <b>coastal habitat types</b> totalling 150,000 ha is <b>effectively managed</b> by 2025.	<p>5.1 <b>Sustainable management</b> of 7,000 ha of densely vegetated <b>mangrove forests</b> by 2010</p> <p>5.2 Rehabilitation of 10,000 ha of sparsely vegetated mangrove forests by 2010</p> <p>5.3 <b>Reforestation</b> of 1,000 ha of denuded mangrove landscape by 2010</p> <p>5.4 <b>Reducing pollution levels to 25% by abating the industrial and municipal threats</b> by 2010 to improve the coastal habitats</p> <p>5.5 <b>Rehabilitate coastal wetlands</b> by constructing an improved structure of Left Bank Outfall Drainage to ensure zero leakage by 2010</p>	<p>“A holistic and comprehensive approach for <b>developing Sindh riverine forests...</b>” “... <b>replanting mangrove forests</b> in deltaic and coastline areas. (p.137)</p> <p>Key <b>environmental impacts from industrial sub-sectors</b> and brief strategy points to address the negative externalities of these industries that covers water and air pollution, noise pollution, solid waste, chemicals waste, energy use and occupation health &amp; safety.</p>
6. A representative network of <b>inland habitat types</b> totalling 500,000 ha is <b>effectively managed</b> by 2025	<p>6.1 <b>Arresting decline in water birds population</b> by increasing feeding grounds in selected wetlands by 2010</p> <p>6.2 Elimination of exotic weeds in 25% of the aquatic habitats by 2010</p> <p>6.3 Sustainable management of 46,567 ha of dense <b>riverine forests</b> by 2010</p> <p>6.4 Rehabilitation of 10% or 3,323 ha of sparse riverine tree forest by 2010</p> <p>6.5 <b>Reforestation</b> of 5% or 3,523 ha of denuded riverine forest area by 2010</p> <p>6.6 Implementation of management plans in five important wetlands by 2010</p> <p>6.7 <b>Rehabilitate inland wetlands</b> by constructing an improved structure of Right Bank Outfall Drainage ensuring zero leakage by 2010</p>	<p>“A holistic and comprehensive approach for <b>developing Sindh riverine forests...</b>” “... <b>replanting mangrove forests</b> in deltaic and coastline areas. (p.137)</p>

INDUS ECOREGION CONSERVATION PLAN		Sindh Vision 2030
TARGETS (2015-2025)	MILESTONES (2008-10)	
<p>7. <b>Protected areas network to be increased</b> by 25% and management plans of half of the protected areas implemented by 2025.</p>	<p>7.1 Existing protected areas network effectively managed by 2010                      7.2 Protected areas network to be increased by 10% by 2010                      7.3 Management plans of five Ramsar sites developed by 2010                      7.4 Designation of protected areas by 2010 of the following areas:                      1. Coastal (Green turtle habitat, Narri-Jubboh Lagoon)                      2. Inland (Palla breeding ground)                      7.5 <b>Review, improve and strengthen existing legislation pertaining to conservation and rehabilitation</b> of habitats in the light of international laws, treaties and WTO interventions by 2010</p>	
<p>8. <b>Environmental flow downstream Kotri secured</b> to rehabilitate Indus delta ecosystem by 2015.</p>	<p>8.1 <b>Minimum water requirements</b> to maintain ecological balances within the Indus Ecoregion <b>scientifically assessed</b> through transparent and consultative process by 2008.                      8.2 Revise water allocations as per the recommendations of aforementioned study by 2008.                      8.3 <b>Irrigation efficiency enhanced</b> by 10% through improved agricultural and irrigation practices / techniques by 2008.                      8.4 Institutional reforms as envisioned in the National Drainage Program implemented by 2008.                      8.5 No water diversion projects executed prior to approval of a comprehensive EIA conducted through a transparent and consultative process by 2008.</p>	<p>Studies on water requirements below Kotri Barrage must be considered to ensure availability of <b>minimum water requirements below Kotri</b>.</p> <p><b>“Modern agricultural practices</b> such as drip agriculture should be used <b>to conserve water and meet agricultural demands.</b>” (p. 153)</p> <p><b>Efficient use of water resources through better management practices</b> and establishment of Farmer Field schools to improve the agriculture sector</p>

INDUS ECOREGION CONSERVATION PLAN		Sindh Vision 2030
TARGETS (2015-2025)	MILESTONES (2008-10)	
<p>9. <b>The water quality within the Indus Ecoregion is improved</b> to a suitable level to support/sustain biodiversity, agriculture, and humans by 2015.</p>	<p>9.1 Surface water classification standards developed and implemented by 2008.                      9.2 <b>Agricultural, municipal, and industrial effluents are properly treated</b> before being released into freshwater bodies and coastal waters by 2010.                      9.3 <b>All environmental laws and NEQS strictly enforced</b> by 2010.                      9.4 Water management plan under NDP implemented by 2008.                      9.5 <b>Integrated Coastal Zone Management Plan</b> developed and implemented by 2008.</p>	<p>Improved quality and <b>access to safe drinking water and sanitation</b> facilities- main element of future water and sanitation strategy</p> <p><b>Better water management</b> can make a key contribution to poverty reduction in Sindh</p> <p>Emphasis on <b>cleaner production practices and cleaner technology solutions</b> for combating industrial effluent</p>
<p>10. <b>Sustainable resource use practices adopted</b> by farmers and fishermen to rehabilitate 3 mha of degraded cultivable land and 1 mha of degraded wetlands by 2025.</p>	<p>10.1 <b>Livelihood of 100,000 farmers improved</b> by rehabilitation of 1 mha of cultivable land affected by water logging and salinity by 2010.                      10.2 <b>Livelihood of 70,000 fishermen improved</b> by treatment of 1 mha of wetlands affected by poor drainage system by 2010                      10.3 Community based drainage beneficiary groups in Nara canal area enabled to minimize discharge of untreated effluents into the drainage system                      10.4 Natural pest control system revived through implementation of <b>integrated pest management by farmer organizations</b> by 2010                      10.5 <b>Alternate energy and freshwater resources provided</b> to deltaic communities dependent on mangroves in Keti Bunder wildlife sanctuary by 2008.                      10.6 Introduce forest nurseries, shrimp nurseries, red rice cultivation, fish processing, salt resistant crops and camel-by-products as alternate livelihood options by 2008.</p>	<p>For poverty alleviation, "...effort is required to elucidate the <b>link between conservation and livelihood</b>. Establishment of a <b>Sindh Poverty Baseline</b> is essential to develop more context-specific poverty reduction projects/programmes and <b>customising the Sindh PRSP</b> to the Sindh context</p> <p>Reduction in freshwater flows leading to ecosystem degradation has a "<b>negative effect on livelihoods, namely; a steady decline in crop and fish production.</b> with an increase in salinity..."</p> <p>Promotion of <b>Integrated Pest Management (IPM)</b> techniques</p> <p>Efforts for <b>alternative energy technologies</b> needs to be intensified for social equity, environmental protection, etc.</p>

#### 4. Recommendations

In light of the findings presented in this chapter, the following recommendations may be considered. Adoption of these recommendations will further strengthen the Sindh Vision 2030's focus on poverty alleviation and environmental sustainability and establish a regular mechanism for aligning Indus Ecoregion initiatives with the Government of Sindh's development framework.

- ❖ Incorporate targets and milestones from the Indus Ecoregion Conservation Plan (Table 1) into the Sindh Vision 2030
- ❖ Expand the focus of the Sindh Vision 2030 to cover three key areas not covered comprehensively in the existing draft: *Wildlife*, *Fisheries*, and *Protected Areas* (section 3.2)
- ❖ In the future, use the Indus Ecoregion Steering Committee as a focal point for incorporating findings from implementation of livelihood improvement-natural resource management initiatives under the Indus Ecoregion Programme into the Government of Sindh's development frameworks-Sindh PRSP and relevant sectoral plans

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### **Our Mission**

WWF - Pakistan aims to conserve nature and ecological processes by:

- Preserving genetic, species and ecosystem diversity
- Ensuring that the use of renewable natural resources is sustainable, both now and in the longer term
- Promoting actions to reduce pollution and the wasteful exploitation and consumption of resources and energy

### **Vision of the Indus Ecoregion Programme**

“Mankind coexists with nature in complete harmony and biodiversity flourishes in its respective habitat”

### **Indus For All Programme, WWF - Pakistan**

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