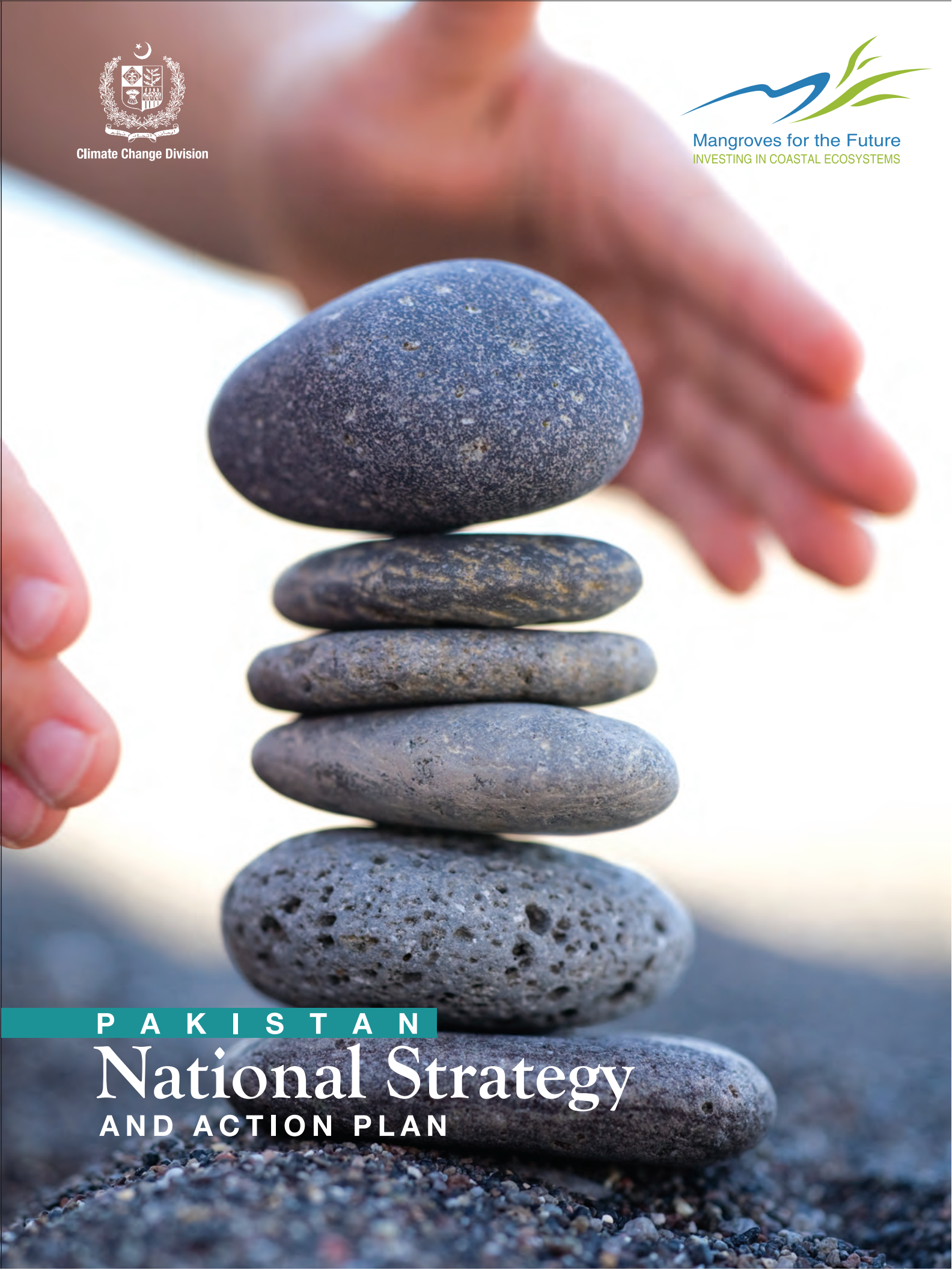

Climate Change Division

Mangroves for the Future
INVESTING IN COASTAL ECOSYSTEMS

PAKISTAN

National Strategy
AND ACTION PLAN

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Table of Contents

Abbreviations and Acronyms

BDA	Balochistan Development Authority
COP	Conference of Parties
CSO	Civil Society Organisation
EEZ	Exclusive Economic Zone
FAO	Food and Agriculture Organisation of United Nations
GDA	Gwadar Development Authority
GDM	Green Development Mechanism
GHG	Greenhouse Gas
HFA	Hyogo Framework of Action
HITE	Hub Industrial Trading Estate
ICM	Integrated Coastal Management
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
LAPA	Local Adaptation Plans of Action
LITE	Lasbella Industrial Trading Estate
KCCI	Karachi Chamber of Commerce and Industry
MAF	Million Acre Feet
MFF	Mangroves for the Future
MSA	Marine Security Agency
NCB	National Coordinating Body of MFF Programme
NDMA	National Disaster Management Authority
NSAP	National Strategy and Action Plan
PDMA	Provincial Disaster Management Authority
PoW	Programmes of Work
PPAF	Pakistan Poverty Alleviation Fund
RSC	Regional Steering Committee
SITE	Sindh Industrial Trading Estate
TCCR	Trust for Conservation of Coastal Resources
UNEP	United Nations Environment Programme
UNDP	United Nations Development Programme
WWF	Worldwide Fund for Nature

Foreword

Coastal and marine ecosystems are among the world's most productive, economically valuable and biodiversity rich regions. Pakistan's coastal areas lie on the fringes of the tropical zone, spread over 990 kilometres that feature marvelous geophysical and ecological landscapes. The Indus Delta mangroves are one of the world's largest arid mangrove wetlands that lie on the route of an important part of the 'Indus Flyway' or 'Green Route' of migratory birds between Europe and Asia. The Sandspit Beach near Karachi is one of the globally recognised important turtle nesting sites. The mud volcanoes along the coast at Hingol National Park are magnificent geological features along the Balochistan coastline. The continental shelf along the coast supports a diversity of fishes, cetaceans, corals and vegetation, as well as featuring bustling ports and harbours that support the economy of the country.

The coastal areas of Pakistan face a multitude of environmental challenges resulting from man-made and natural factors. The natural habitats and mangrove wetlands are subject to degradation and decline mainly from over-exploitation, pollution and unsustainable practices. Climate change impacts in the form of extreme events, sea-level rise and coastal erosion are emerging areas of concern facing the coastal areas. Since 2010 the impacts of climate change appear to have become a regular feature, as evidenced by the changing rainfall magnitude, timing and pattern. The Global Climate Risk Index 2013 prepared by German Watch has included Pakistan among the top ten countries facing the risk of long-term impacts of climate change.

Many of these challenges could be effectively dealt with through strategic planning, effective coordination and improved communication between the relevant stakeholders working along the coast, and by networking at the regional level to promote learning and adoption of best management practices. At the same time, there is a need to create supportive institutional and policy frameworks and enhance awareness and capacities of coastal institutions, private sector and local communities in sustainable management of the coastal resources.

Coastal natural resources are an integral part of disaster risk management strategies. Therefore, recognising that many coastal communities are critically dependent on well-functioning ecosystems and their services, there is a need to build the resilience of coastal ecosystems and communities by adopting a strategic approach that helps in better understanding of socio-ecological systems and defines targeted actions to address critical issues and challenges facing them.

It is encouraging that the Mangroves for the Future Programme (MFF) is promoting a strategic resilience approach by strengthening local capacities

and supporting actions that promote sustainable management of coastal ecosystems in the ten countries of the Asian Region.

The Climate Change Division feels privileged to chair the National Coordinating Body of Pakistan (NCB) on behalf of the Government of Pakistan, which provides overall guidance and technical oversight to MFF in Pakistan. The diversified representative composition of the NCB plays an effective role towards achieving a holistic approach in coastal zone management in Pakistan. Steps by the NCB to make its role more dynamic to meet the emerging challenges shall definitely go a long way towards enabling it to fulfil its objectives.

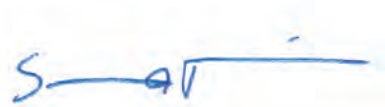
This National Strategy and Action Plan (NSAP) of Pakistan provides a good framework to promote integrated coastal management and is, in fact, a critical document that links local actions with global thinking. This document provides guidance to both proposal developers and those who evaluate the proposals for funding by MFF. In fact, it is the key national document on coastal areas. This document suggests strategies and actions that support the implementation of the National Climate Change Policy 2012, approved by the Government of Pakistan, and direct the way forward towards meeting Pakistan's obligations under various international environmental conventions.

I am hopeful that the members of NCB Pakistan and other coastal stakeholders will use this document extensively in their efforts to translate strategies suggested in the NSAP into actions on the ground and also while formulating their own sectoral policies and plans.

I also hope that the proponents of MFF grants will make effective use of this document and will formulate their project proposals in line with actions suggested in this NSAP.

Finally, I commend the efforts of IUCN Pakistan, members of National Coordinating Body of MFF Programme, Deputy Inspector General of Forests-II of the Climate Change Division and the MFF Pakistan National Coordinator for providing their valuable input and support in the preparation of this document.

Dated:1st of April 2014



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Executive Summary

Mangroves for the Future (MFF) is a programme that aims at promoting sustainable coastal development through participatory and inclusive decision making for facilitating strategic investments in coastal ecosystems. For a country like Pakistan, inclusion in MFF opens up a number of exciting opportunities for both positively participating in 'region wide' initiatives and in prioritising actions to effectively mobilise critical national stakeholders and resources for visioning, implementing and sustaining a viable national coastal management regime. There is now a growing recognition in Pakistan that sustainable coastal management can only be realised through the adoption of an *'Integrated Coastal Management (ICM)'* process. Within this context, MFF serves as an extremely viable 'institutional and programmatic' opportunity for 'incubating' well-coordinated efforts and for facilitating progress towards establishing a 'National ICM regime' for Pakistan. This is because its 'approach' and 'implementation mechanism' address key 'gaps' and 'constraints' hindering the desirable progress. The *Programmes of Work (PoWs)* contextualising the MFF can suitably assist in establishing 'priority areas of action' and in setting 'appropriate landmarks' in the 'ICM Roadmap'. A hitherto 'unexplored potential' of the National Coordination Body (NCB) has specifically been assessed in the present National Strategy and Action Plan (NSAP) for 'steering' the 'process' not just in terms of managing 'grant projects' implementation but also for acting as a 'forum' for facilitating dialogue, discussion and consensus-building among the key stakeholders on critical challenges in policy and institutional reform related to coastal resources management. In addition, the NSAP may also contribute to national progress towards the *Aichi Biodiversity Targets*, agreed upon at the *Convention of Parties* (*COP) 11* in *Hyderabad, India (2011),* to protect and utilise biodiversity resources in Pakistan. In a similar vein, the NSAP provides a suitable strategic framework for aligning action to the *Hyogo Framework for Action* to counter disaster risks and build resilience, as well as strategies and measures for climate change adaptation (such as *Local Adaptation Plans of Action*).

An assessment of the status of Pakistan's coastal ecosystem and the challenges associated with its sustainability has clearly indicated that the key issues are lack of holistic visioning, inadequate coordination and disintegrated planning. The lack of a consolidated and updated *'Data Bank'* of the physical, climatic, hydrologic and ecological features of the Pakistan coast is a critical gap in the ICM process. The approach of treating the coastal zone in isolation from the terrestrial activities having an impact on the coast has not been able to address the degradation of coastal ecosystems and livelihoods. A change in approach and strategy from *'Coastal Zone Management'* to *'Integrated Coastal Management'* is required. The NSAP aims to outline a 'strategic framework' and a 'construct' for a role of MFF in contributing to the 'process' by mobilising institutional and financial resources within some universally

accepted defining markers of an ICM 'roadmap'. A 'cross-referential' and 'relational construct' has been established between an 'ICM Action Plan' and the 'MFF PoWs' that has then been placed within the confines of the 'NCB Mandate'.

The starting point for an ICM plan is the structuring of a 'framework' that can facilitate multi-sectoral and inter-agency coordination by engaging the relevant stakeholders. The MFF NCB is well placed to give a headstart in fulfilling this fundamental ICM requirement as it provides both a 'forum' and the 'associated mandate' to assist in addressing this critical gap. It has therefore been recommended that the MFF NCB charts for itself a 'proactive' role where alongside 'steering' MFF specific initiatives (small and medium grants projects), it uses the NCB platform to build consensus and formulate policies and strategies for 'integrated coastal management'. The NCB can specifically utilise the PoW listed in the thematic areas – 'apply knowledge', 'empower civil society' and 'enhance governance' to build a 'consensus' and align these to meeting international obligations such as, those under the *Aichi Biodiversity Targets* and to facilitate suitable 'follow-up actions' for formulating the structural framework and implementation process of a 'National ICM regime'. This can be done both through working within the NCB membership and also by seeking an 'outreach' for collaborating with relevant stakeholders outside the ambit of the NCB. Some actions could be of a 'direct nature' such as brainstorming for conceptualising legislative and institutional 'blueprints' while other actions could be of a 'supportive' and 'indirect' nature such as facilitating a process of 'knowledge management' so that the ICM can rely on appropriate scientific knowledge and information for instituting actions and also through promoting measures for 'capacity building' of all relevant stakeholders.

It has been recommended that the process of MFF facilitation in establishing an 'ICM regime' be 'phased' and spread out in 'stages' of involvement for greater clarity and impact. Three phases - the consensus building and charting of the ICM regime, its implementation and ultimately monitoring, evaluation and continuous feedback are being identified, whereas the areas of 'MFF NCB/ICM' interface have also been detailed. The MFF programme and the forum of the NCB has also been recommended to specifically explore possible 'synergies' and foster 'strategic partnerships' that can serve as 'force-multipliers' in suitably extending outreach both in terms of 'scale' and the corresponding 'impacts'. In this regard, a few critical 'partnership' possibilities with the academia, private sector and media are discussed.

When considering a topic as vast and multi-faceted as 'ICM', there are a number of important 'cross cutting' sectors and thematic areas that play an important role in offering both challenges

Box 1: The Programme-Mangroves for Future

- A partnership-based initiative promoting investment in coastal ecosystems that support sustainable development.
- Provides a collaborative platform for the many countries, sectors and agencies tackling the challenges to coastal ecosystem conservation and livelihood sustainability, and assists them to work towards a common goal promoting an integrated, ocean-wide approach to coastal area management.
- Seeks to achieve demonstrable results through regional cooperation, national programme support, private sector engagement and community action.
- Facilitates concerted actions and projects to generate and share knowledge more effectively, empower institutions and communities, and enhance the governance of coastal ecosystems.

The Objective - Facilitating the Establishment of a National ICM Regime

- Multi-sectoral and interagency coordination.
- Engagement of multi-stakeholders and partners.
- Promotion of environmental investment.
- Developing local capacity in integrated planning and management.
- Applying sea-use zoning and area-based management.
- Linking upstream and downstream concerns.
- Building public and private partnerships.

and opportunities that require to be factored in the planning and strategy development process. Two such strategic 'contexts' are discussed for consideration and action by the MFF/NCB, namely climate change and gender. In addition, it has been suggested that MFF NCB's work dovetails and integrates with the 'National Climate Change Adaptation Plan' following the notification of the 'National Climate Change Policy' and the establishment of the 'Federal Climate Change Division'. The link between climate change and coastal adaptation has already been highlighted in the National Climate Change Policy.

The *MFF Mid Term Review* process has helped in identifying some critical gaps and recommending important strategic adjustments at policy and implementation levels. Some specific recommendations of the *MFF Mid Term Review,* that find particular reference to the role of NCB towards mobilising the implementation of the Pakistan NSAP objectives, have been identified and discussed. In the end, two (2) detailed 'Matrices' have been developed. *Matrix 1* lists strategic actions linked to the fifteen (15) MFF POWs, focal institutions for their implementation and the anticipated outcomes. *Matrix 2* provides a 'strategic interface' between the Aichi Biodiversity Targets and the MFF Pakistan NSAP.

1 INTRODUCTION

Mangroves for the Future (MFF) is a unique, multi-faceted and timely initiative that aims at promoting sustainable coastal development through participatory and inclusive decision making for facilitating 'strategic investments' in coastal ecosystems. 'Investments' in human resources and for supporting sustainable conservation and development measures are felt to be critically important for securing dependent livelihoods and safeguarding the integrity of sensitive coastal habitats. The structuring and launch of the programme was primarily 'triggered' by the devastating impacts of the 2004 tsunami and the preliminary focus was on the worst affected countries – India, Indonesia, Maldives, Seychelles, Sri Lanka and Thailand. However, the conceptual design was such that it allowed for incubating a wide range of actions within a larger 'integrated – reef to ridge' approach - and for accommodating countries and initiatives in addition to those initially prioritised. Already, MFF has expanded to include Pakistan and Vietnam within the larger scope of not just developing national capacities to effectively manage coastal ecosystems but to promote an 'integrated' approach to coastal area management.

This visionary approach is reflected in the fact that while the MFF programme adopted 'mangroves' as its 'flagship ecosystem' - in recognition of the important role that mangrove forests played in reducing the impact of the 2004 'Indian Ocean tsunami' - it also embraced other vital coastal ecosystems such as coral reefs, estuaries, lagoons, wetlands and beaches within the mandated scope of work. For a country like Pakistan, inclusion in MFF opens up a number of exciting opportunities for positively contributing to and participating in 'region wide' initiatives. The scope of mobilisation can, at the same time, include prioritising actions to effectively mobilise critical national stakeholders and resources for visioning, implementing and sustaining a viable national coastal management regime. In the larger perspective, there is now a growing recognition that such a vision can only be realised through the adoption of an *'Integrated Coastal Management (ICM)'* process in Pakistan. While Pakistan may have lagged behind other regional countries in moving in the direction of an ICM plan, it is now becoming increasingly evident that an ICM approach offers the best strategy for protecting the coastal ecology in parallel with tapping the vast potential our coastal zone and resources possess for contributing to the financial growth of the country. This realisation now demands that all future 'actions' directed towards achieving sustainable coastal development have to be contextualised within the overarching framework of an ICM Plan.

1.1 The Pakistan Context - Relevance of MFF and an ICM Vision for Pakistan

If the critical fault lines that run through the 'coastal management' scenario in Pakistan are to be mapped and are found to be seriously endangering the future sustainability of coastal resources, then at a broader level, they can be categorised as follows:

- Inadequacies in research and documentation that accurately profile the 'state of the coastal ecosystems'.
- Wide distribution of 'jurisdictions' and 'management roles' of coastal land among agencies and institutions spread across all tiers of governance (federal, provincial and local) with no effective 'institutional and legislative space' for coordination and decision making.
- Absence of ICM approaches, resulting in a disconnect between 'coastal' and 'in land', 'up-stream' and 'down-stream' stakeholders; non-integrated and ill-coordinated efforts for coastal sustainability; and, an incapacity to attract new stakeholders (example the private sector) for creating viable 'partnerships' for promoting appropriate 'investments'.
- Lack of a vision for ICM in Pakistan and where it should lead (e.g. sustainable development, sustenance of livelihoods, climate resilience, etc.).
- Weaknesses in legislations for 'protection' of coastal resources and failure in enforcement of existing legislative instruments resulting in uncontrolled exploitation of land and resources.
- Coastal resources being a low priority for policy makers and planners.
- Inadequate measures for 'capacity building' and 'empowerment' of coastal communities to act as 'stewards' for protection of coastal resources.

The defining characteristics of an ICM plan exhibit the appropriate approaches and mechanisms to effectively address these critical 'fault lines'. Within this context, MFF can serve as an extremely viable 'institutional and programmatic' space for 'incubating' well-coordinated efforts for facilitating progress towards establishing a 'National ICM regime' for Pakistan. It is quite evident that the 'approach' and 'implementation mechanism' of MFF address key 'gaps' and 'constraints' hindering desirable progress which can best be achieved within the context of an ICM plan.

MFF follows an 'approach' that is defined by a plan of action supported by *15 Programmes of Work (PoWs),* grouped under the three 'pillars' - 'apply knowledge', 'empower civil society' and 'enhance governance'. Cross cutting themes such as 'climate change', 'disaster risk reduction' and 'gender equality', among other issues, are then inter-woven within the PoW approach for achieving strengthened community resilience and promoting participatory and informed decision making.

The PoWs well articulate the many commonly faced challenges within the member countries. While individual member states may be placed at varying 'stages' towards achieving the full potential of an ICM approach, the areas of focus indicated by the PoWs remain relevant for all. For Pakistan, the 'journey' is yet to commence – a reality that offers both opportunities and challenges. There is the 'opportunity' of learning from the experiences of regional countries that have already advanced on the path of an ICM plan and avoid possible pitfalls. On the other hand, the fundamental 'challenge' is of making up for valuable time that has already been lost and is reflected in the continuously degrading state of our coastal resources. This is where MFF's PoW-defined 'course of action' finds critical relevance, providing a workable 'agenda and mandate' and an all-embracing 'framework' for action. Pakistan can and needs to use all the three 'pillars' of the PoW as the essential 'guiding markers' in its efforts to make progress in the desired direction.

The 'implementation' of MFF's action plan and overall progress towards its goals is monitored by the *'Regional Steering Committee (RSC)'* – co-chaired by the *International Union for Conservation of Nature (IUCN),* and the *United Nations Development Programme (UNDP)* with representatives from MFF's member country governments and institutional partners. The in-country activities are coordinated by the *'National Coordinating Body (NCB)'* constituted in each of the member countries (Annex-I).

The 'implementation mechanism' of the MFF provides a unique opportunity for Pakistan to assemble all the relevant stakeholders, from the government, private sector, and civil society, on one 'forum' – the *NCB* - to discuss, debate and strategise 'action' through 'consensus' and 'coordinated' efforts. Absence of such a 'centralised' and 'coordinated' forum for discussion and decision making has been a significant roadblock in the way of catalysing collective action of key stakeholders. A sustained 'dialogue' in the NCB can lead to facilitating progress towards developing the required policies, institutional spaces, plans and implementation mechanisms that can enable appropriate actions.

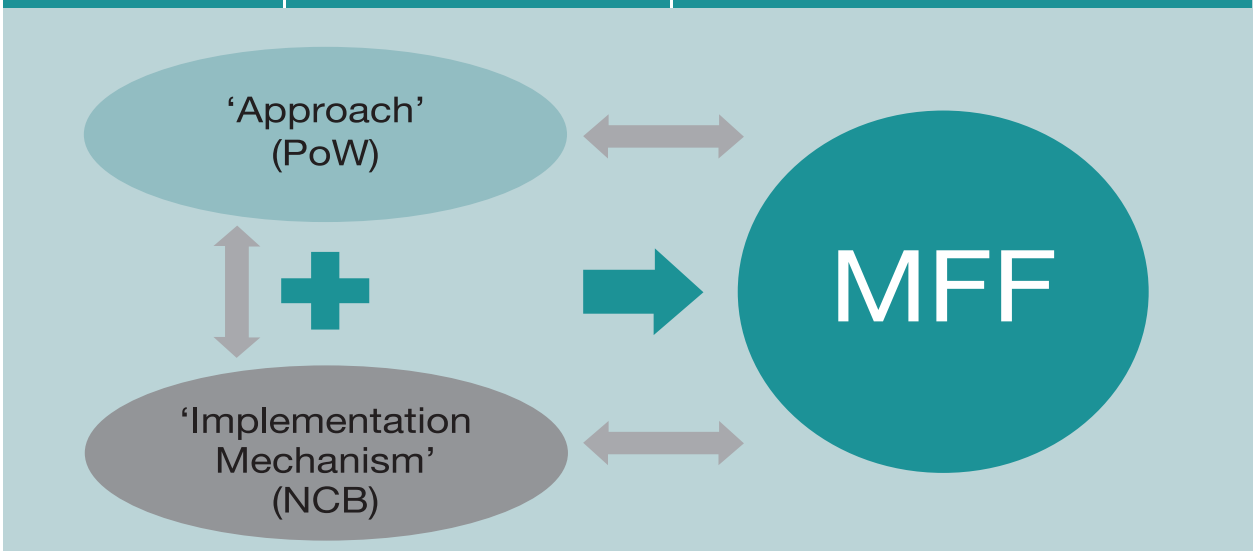
1.2 National Strategy and Action Plan - Defining a Strategic Framework

For defining a 'strategic framework' for the *National Strategy and Action Plan (NSAP)* for Pakistan, two separate contexts are being outlined that would be 'integrated' to evolve 'strategic directions' and 'action plans' for contributing towards attaining the objectives of sustainable coastal management at the 'national' and 'regional' level.

For instituting a viable 'National ICM Regime', it would be important to first 'identify' the potential priority areas for action and the associated benefits that an ICM approach can deliver. The benefits could manifest in terms of protecting the integrity of sensitive ecosystems and improving the livelihoods of coastal communities. The cycle of sustainability will get completed with the coupling of tangible financial benefits that can be shared at the national level – in short, there is a need to develop a 'vision' that then drives the 'process'. 'End goal' identification should also be associated with the 'constraints' and 'opportunities' that litter the path and have to be navigated and utilised respectively.

Figure 1 - MFF - A Forum for Building Consensus and Facilitating Action

Context 1	The Task	Facilitation for a 'Pakistan ICM Regime'
Context 2	The Facilitative Mechanism	MFF - (PoW & NCB)



The PoW contextualising the MFF can suitably assist in establishing the 'priority areas of action' and in setting the 'appropriate landmarks' in the 'ICM Roadmap'. A hitherto 'unexplored potential' of the NCB has been assessed in the present NSAP for 'steering' the 'process' not just in terms of managing 'project implementation' but also for acting as a 'forum' for continuing dialogue, discussion and consensus building among the key stakeholders on critical challenges in policy formulation and institutional reforms related to the coastal resources management.

1.3 Aichi Biodiversity Targets - The Overarching Framework for Biodiversity

The various 'strategies' worked out to protect and utilise biodiversity resources at the *COP 11* in *Hyderabad, India (2011)* can offer a very relevant and appropriate framework for 'customising' efforts for Pakistan. Within this context, the *Strategic Plan for Biodiversity 2011-20* suggests a holistic construct for action. The *Strategic Plan* consists of *20* biodiversity targets for 2020, also termed the *Aichi Biodiversity Targets (to which Pakistan is a signatory).* The *Plan* deals simultaneously with broader issues in policy and governance, participatory approaches, and mainstreaming of cross cutting issues like climate change, gender and knowledge management. At the same time, it sets some very specific 'landmarks' for benchmarking progress such as establishing a conservation target of 17% of terrestrial and inland water areas and 10% of marine and coastal areas and restoring at least 15% of degraded areas through conservation and restoration activities. The *20 Aichi Biodiversity Targets* can also be aligned with the MFF PoWs and their interface and mapping can assist in structuring a suitable strategic framework for action *(See Matrix 2)*.

1.4 Hyogo Framework for Action - Framework for Disaster Risk Reduction and Resilience

The 10-year Hyogo Framework for Action (HFA)[1] came out of the World Conference held in Kobe, Hyogo, Japan in January 2005. It was developed and agreed on with the many partners needed to reduce disaster risk - governments, international agencies, disaster experts and many others - bringing them into a common system of coordination. It is the first plan to explain, describe and detail the work that is required from all the different sectors and stakeholders to reduce disaster losses. The HFA outlines five priorities for action, and offers guiding principles and practical means for achieving disaster resilience. Its goal is to substantially reduce disaster losses by 2015 by building the resilience of nations and communities against disasters. This means reducing loss of lives and social, economic, and environmental assets when hazards strike[2]. MFF PoWs are, therefore, consistent with HFA and the investment in these PoWs will directly contribute to the attainment of HFA goals.

1.5. Strategies to Respond to the Impacts of Climate Change - Mitigation and Adaptation

Societies can respond to climate change by reducing Greenhouse Gas (GHG) emissions and enhancing sinks and reservoirs – known as mitigation. The capacity to do so depends on socio-economic and environmental circumstances and the availability of information and technology. On the other hand, adaptation refers to adjustments in ecological, social, or economic systems in response to actual or expected climatic stimuli and their effects or impacts. It refers to changes in processes, practices, and structures to moderate potential damages or to benefit from opportunities associated with climate change.

1. http://www.unisdr.org/we/inform/publications/1037
2. http://www.preventionweb.net/posthfa/

Many countries have developed climate change policies, action plans or strategies on a national level. Pakistan, in September 2012, passed its National Climate Change Policy, which in fact mentions coastal and marine ecosystems as particularly vulnerable. A national climate change action plan has been developed. However, taking a decentralised and bottom-up approach, in the multi-tiered, inclusive and needs and vulnerability based process of developing *Local Adaptation Plans of Action (LAPA),* the ownership rests with the non-state actors. Key benefits expected from alignment of the national plans and LAPAs are improved integration between planned and autonomous adaptation, targeting of resources to the most vulnerable, and bridging the gaps between vulnerability assessments and planning and implementation. The LAPA is intended to be practical so that national and top-down assessments of climatic risks are integrated with bottom-up planning of adaptation needs, options and priorities.

2 STATE OF THE COAST

This *section* profiles the physical environment, natural resources, communities and livelihoods in the coastal region in Pakistan that has a land area of about 796,000 sq. km and a population of 180 million and is situated in the north-west part of the South Asian sub-continent.

2.1 Physical and Natural Environment[3]

Pakistan's coastline is about 990 km long and the *Exclusive Economic Zone (EEZ)* covers an area of about 240,000 sq. km. The maritime zone of Pakistan, including the continental shelf, extends up to 350 nautical miles from the coastline. The shelf of the coast is dominated by the Indus (a major river of Pakistan) canyon. The continental shelf varies in size distinctly along the Sindh and the Balochistan provincial coasts. The seaward coastal zone up to 12 Nautical Miles (NM) from the coastline is basically within the jurisdiction of the two provinces (Sindh and Balochistan). The coastal zone beyond the 12 NM up to 24 NM is the contiguous zone and beyond the 12 NM up to 200 NM is under the jurisdiction of the federal government. However, the protection and conservation of the coastal resources is the responsibility of the federal government, which also has the authority for legislation and its enforcement within a 3 mile limit of the ports and within the 12 to 200 NM of the EEZ.

The two coasts exhibit varying climatic and physical characteristics and are influenced by the extreme most reaches of the 'Indian Monsoon' weather and the 'Mediterranean weather'. Coincidentally, this division almost falls on the Sindh – Balochistan administrative border. The Sindh coast can further be sub-divided into two parts, namely, the Indus Delta / Creek system and the Karachi *(capital city of Sindh province)* Mega City coast. Balochistan coast can also be sub-divided into the Lasbella and the Gwadar *(districts of Balochistan province)* coasts.

The **Sindh** coastal region, stretching over 220 kms, is located in the south-eastern part of the country between the Indian borderline along Sir Creek on the east to Hub River along the Balochistan coast on the west. Approximately 300,000 sq. km of the Indus water-shed, of which 50% is located outside Pakistan *(India, China & Afghanistan),* is drained by the Indus River. The Indus Delta *(approx. 1000 sq. miles)* is the most prominent ecological feature of the Sindh coast *(covering 85% of the coastal belt in Sindh),* the coastal morphology of which is characterised by a network of tidal creeks formed as

3. Integrated Coastal Zone Management Plan for Pakistan, IUCN, Muhammad Tahir Qureshi, 2011.

a result of changes in river beds and a large number of small and large islands with scattered mangrove vegetation. The Indus Delta has the largest arid climate mangroves in the world. The Karachi coast constitutes a coastal belt of about 100 km length situated between the Indus Delta on the south-east and the Hub River on the west. Most of the coast, with the exception of scattered patches of mangroves, is devoid of any other kind of vegetation. Karachi city is the commercial and industrial hub of Pakistan along with being a busy port. The wildlife along the Pakistan coast consists of both marine and terrestrial species.

The **Balochistan** coast extends from the mouth of the Hub River in the east to the middle of Gwater Bay (bordering Iran) in the west and stretches over a distance of about 770 km. There are a few indentations in the coastline, which can be classified as follows (a) embayed coast; (b) tidal lagoons; (c) mouth of small coastal rivers. The Balochistan coast is hyper-arid to arid (sub) tropical and includes piedmont plains and low hill ranges. The small and ephemeral rivers hardly influence salinity and / or turbidity of the coastal waters. Locally, small tidal mangrove forests, natural and artificial, are present on the mouth of seasonal rivers. The extent and diversity of turbidity in these bays is considerable. The biodiversity of Balochistan's diverse coastal features with its beaches, sand dunes, sea cliffs, rocky headlands, intertidal mudflats, deltas, estuaries, tidal lagoons, bays, islands and shelf areas remains undocumented. The Indus River is part of a major flyway for birds between Siberia and warmer lands to the south.

2.1.1 Geomorphology of the Coastline

The Sindh passive coastline is characterised by mudflats, delta wetlands, estuary systems and a wide and almost flat continental shelf. The Balochistan coastline is characterised by four types of land forms, namely, raised beaches, sand dunes, playas and pediments. The soil cover along the coast is generally in-situ or zonal and mainly composed of sand and silt. Geomorphology and geology of Sindh coast can be studied in two parts, i.e. *(1)* the area between Cape Monze and Korangi in the east *(Karachi coast)* characterised by wide surf zone, cliff beaches, sea arch, sea notch and river silt; and *(2)* the area east and south-east of Korangi towards Rann of Kutch characterised by Indus Delta creek system, wet and marshy lands. Three rivers, namely Hub *(perennial),* Lyari and Malir *(non-perennial)* drain the area between Cape Monze and Korangi Creek. The prominent geomorphologic features of Karachi coast comprise shallow lagoons, sea cliffs, sea stacks and terraces - wave cut platforms, sea caves and notches, which dot this part of the Sindh coast. The major physiographic features of the Northern Arabian Sea are the Indus Fan in the east and Oman Basin in the west, both of which are separated by the Murry Ridge. The Murry Ridge extends south-west from the continental slope near Karachi for a distance of over 750 km[4].

2.1.2 Climate

The climate of Pakistan is tropical and is dominated by the monsoon regime. The average rainfall on the coast of Sindh amounts to about 200 mm and that on the coast of Balochistan to about 100 mm per year. The South-West (SW) monsoon season lasts from May to September and the North-East (NE) lasts from November to March, with April and October being the transition months. Wind speeds during SW monsoons are about 25-30 knots and those during NE are 5-10 knots. Atmospheric and oceanic circulation during the South-West monsoon is therefore more vigorous than during the North-East monsoon. The SW monsoon circulation appears to penetrate deeper affecting the movements of water masses below the thermo cline whereas the drift during the NE monsoon is rather shallow.

The tides are the mixed semidiurnal type with two highs and two lows each day. The tidal range is about 3.5 m with a slightly higher range on the coast of Sindh. At low spring tides the mudflats and rocky beaches become exposed to about 1.5 km on an occasional spot, particularly on the

4. United Nations ESCAP in Co-operation with Environment and Urban Affairs Division, Government of Pakistan / National Institute of Oceanography, Government of Pakistan) - 1990 - Coastal Environmental Management Plan for Pakistan

coast of Sindh. The surface temperature ranges between 23.8°C and 28.7°C for the Indus Delta, 23.5°C and 29.1°C for off Karachi and 23.5°C and 29.3°C off Balochistan coast.

Climate change is likely to increase the frequency and intensity of cyclonic disturbances, yet no definite trend has been established in case of cyclonic storms and severe cyclonic storms. Moreover, the short periods of fluctuation of 2-6 years are predominant. The historical data analysis shows that both coasts are equally vulnerable with June being the most vulnerable month for both coasts.

2.1.3 Land Use

The Indus deltaic coast is sparsely populated with small, predominantly fishing, communities living along the creek system of the coast. The most prominent ecological feature is the mangrove forests along the Karachi coast. Karachi city, on the other hand, is a major hub of activity being the main commercial and industrial centre of Pakistan having an estimated population of approximately 18 million. A naval facility, a shipyard and several power plants are situated along the Karachi coast. The Balochistan coast is sparsely populated with scattered fishing communities. Natural mangrove vegetation is limited. A deep seaport has been constructed in Gwadar. A Pakistan Navy facility exists at Ormara. Fish harbours have been developed at Pasni, Gwadar Dam and Jiwani. A coastal highway links Karachi with all the coastal towns of Balochistan. The coastal area therefore, has the potential of witnessing greater commercial activity and infra-structure development.

2.1.4 Biodiversity (Ecosystem, Habitats and Species Diversity)

The coastal and marine areas of Pakistan are rich in biodiversity. At least 12 species of marine dolphins and whales have been recorded in the Sindh-Balochistan waters. The identified species include five dolphin species, one porpoise species, two species of the toothed whale and four species of the baleen whale. Three species of endangered marine turtles are reported from Pakistan's coasts, which include the Green Turtles (*Chelonia mydas*), Olive Ridley Turtles (*Lepidochelys olivacea*) and Leather Back Turtles. The most important beaches that are used as nesting grounds are Sandspit, Ormara (Tak), Astola Island and Jiwani. The terrestrial species include partridges, jackal, fox, porcupine, butterflies, dragonflies, snakes, lizards and chinkara. The main habitats for migratory birds and other waterfowl are wetlands, estuaries and lagoons.

In 1980, the Lasbella Wildlife Sanctuary was created comprising an area of 1,687,579 hectares. Later it was reduced in size to 165,024 hectares and re-designated as Hingol National Park. In the late nineties, the estuarine area was also included in the National Park. It is one of the largest national parks in Pakistan. It stretches over three districts: Uthal, Awaran and Gwader. The wildlife of the park, which borders the coast, includes ibex, urial, leopard, gazelle and marsh crocodiles. The mangrove forests along the Balochistan coast cover an area of about 7304 ha. The distribution of natural mangrove forests is mainly restricted to the site of Miani Hor and Kalmat Hor (intertidal lagoons) and Gwater Bay. However, IUCN has introduced mangroves in the river estuaries which include Phore River Estuary, Hingol River Estuary, Shadi Kor, Sawad River, Ankara, Shabi, and the first ever mangrove plantation on the sand dunes in Gawadar town at GDA-1 & GDA-2.

The vegetation along the Sindh coast is dominated by mangrove forests. The forest covers an area of approximately 100,000 ha, stretching over a span of about 200 km from south of Karachi to the India-Pakistan border. Eight species of mangroves have been reported, though only four are surviving at present, of which *A. marina* is the most abundant (95%). The dense mangrove forests are present on the fringes of Korangi, Phitti, Khudi, Khahi, Patiani and Daboo creeks in the northern block and Khajhar, Pakhar and Sir Creeks in the southern block. This ecosystem provides a rich habitat for the wildlife of terrestrial and marine origins. The mammals of mangrove forests in the Indus Delta include jackals, wild boar, tropical dolphins, porpoises and occasional visitors such as tooth whales.

Box 2 **Pakistan's Mangrove Ecosystem**

The economic importance of mangroves in Pakistan largely comes from the fishery resource that they harbour. An estimated 80% of the fish caught in coastal waters spend at least part of their life cycle as fry in the mangrove creeks, or depend on the food web within the mangrove ecosystem. Shrimp fishery is the major fish export of mangroves, accounting for 68% of the $100 million of the foreign exchange the country earns from fisheries exports. The mangrove swamps of the Sindh coastal zone are extensive, presently spread over approximately 100,000 hectares (ha) compared with 8058 ha along the Balochistan coast. The coastal zone also has large areas of bare mudflats. The system is intersected by large and small creeks that allow tidal water to move into and out of the area during the twice-daily ebb and flow of the tides. The mangrove swamps are made up of species of trees that are adapted to survive in brackish water or seawater. The main species in the area is the black mangrove, *Avicennia marina,* which has aerial roots growing up out of the mud. The swamps also have less common species of mangrove, which along the Sindh coast includes the red mangrove, *Rhizophora mucronata, Ceriops tagal* and *Aegiceras corniculatum*. Several species of marine seaweed also grow in mangrove swamps, often as algal mats on the surface of the mud.

The mangrove swamps, bare mudflats, and mangrove creeks support many animals along the Sindh coast. These include a large number of invertebrates, such as mussels, oysters, and shrimp, as well as many species of fish in the creeks. The young stages of shrimp and fish live in the creeks, and move offshore as they grow. Some species of birds also use the swamps as wintering grounds during their long distance migrations. The mangrove trees are used for firewood and building, while the mangrove green shoots and leaves are used as fodder for livestock by the local communities. The 100,000 people living along the northern edge of the Indus Delta use an estimated 18,000 tons of mangrove firewood each year. At certain times of the year, about 16,000 camels are herded into the mangroves and left to browse for about 6 months. The creeks provide a source of shrimp and fish for the local village fisher folk working from small inshore boats. Bees that live in the mangroves and above the high tide level inland provide honey, which is a valuable marketed commodity.

Mangrove swamp ecosystems face a number of threats, as they are an exploitable natural resource for the rural communities along the Pakistan coast. Man-made and natural impacts have degraded the mangroves. These include (i) construction of dams and barrages, (ii) freshwater diversion for irrigation, (iii) decrease in freshwater inflow and sediment load, and (iv) increase in salinity. For example, the estimated historic freshwater flow down the Indus is about 150 million acre feet (MAF) per year (180 billion cubic metres). However, over the past 70 years, water abstraction for irrigation has reduced the supply of freshwater in the Indus Delta. Other threats include domestic and industrial pollution, overgrazing, cutting of mangroves by rural communities, cyclones and storms,and coastal erosion.

Sea level rise, as one impact of climate change, poses a major long-term environmental threat to the Sindh coastline and its mangrove swamps. Over the past century, the rise has been 1.1 millimetres per year. While the predicted sea level rise of 2.00 millimetres per year will support mangrove growth, anything above this rate would cause a loss of mangroves. This would require replanting species with longer propagules, such as Rhizophora mucronata, and propagating Avicennia marina on higher grounds, as is occurring along the Balochistan coastline.

Source: Sindh Coastal Community Development Project, December 2006

Besides, 21 species of reptiles and 2 species of amphibians have been recorded from Keti Bundar[5]. Among these, three species of lizards, one species of poisonous snakes and two species of marine snakes have been reported. In addition, about 200 species of fishes have been reported from the delta. The Indus Delta with its coastal wetlands attracts a number of migratory birds, particularly water fowl. In all, 56 species of birds belonging to 6 orders and 14 families are found in the Sindh coastal waters. Some of these birds are resident and others are migratory in nature. Among the marine turtle species the Green and Olive Ridley turtles frequently visit the beaches of the Karachi coast for nesting purpose.

2.2 Socio-economic

Apart from the multi-faceted economic activities taking place in Karachi's vicinity, most of the economics associated with the coastal regions of Pakistan centre around fishing / forestry and related businesses. Fisheries in Pakistan are concentrated in shallow coastal waters, the estuarine system of Indus and associated creeks and to a lesser extent, in the deeper part of the ocean. A major part of the fishing fleet of Pakistan confines its activity to coastal waters up to 20 – 25 miles from the coast due to lack of adequate navigational aids and small sized fishing crafts with practically no storage / catch preservation facilities.

Traditionally, agriculture, forestry and fishing played almost equal roles in the socio-economic patterns of the coastal communities. However, it is largely held that the decreasing availability of fresh water *(damming and diversion of Indus water upstream for agriculture)* and the mechanisation of the fishing industry has caused fishing to become the dominant economic pursuit; and forestry and agriculture, particularly forestry, have decreased in importance. However, the forestry sector continues to play a role in the life of the coastal communities. The role of the forests is primarily local in character. They only meet the routine needs of the local communities for fuel, construction material and fodder. Agricultural activities are still widely practiced in the coastal parts of Thatta/Badin districts and in the Hub, Sonmiani and Phore areas with the major crops being cotton, banana, wheat, rice, pulses, vegetables, fodder and fruits.[6]

2.2.1 Fisheries and Aquaculture

The economy of Pakistan is predominantly based upon agriculture. This sector contributes about 26% of the GDP and provides employment to about 52% of the labour force of the country. Fisheries, which forms a part of the agriculture sector, contributes only 0.5% of the GDP of Pakistan and 1% of the labour force is employed in this sector. However, marine fishery is the main economic activity along the Balochistan coast and, in general, an important economic activity in coastal Pakistan. Despite low contribution of fisheries in GDP and employment, export earnings from this sector are substantial. Export of fish and fishery products have yielded, on an average, a sum of Rs.8.8 billion per year. These exports are critically dependent upon environmental sustainability, and that sustainability is threatened. Although a major part of the fishing fleet of Pakistan is mechanised, the vessels are ill-equipped and as such fisheries are considered as small scale. Fisheries activities in Pakistan are concentrated in shallow coastal waters, the estuarine system of Indus and associated creeks and to a lesser extent, in the deeper part of the ocean. Owing to lack of navigational aids and small size of the fishing boats, major part of the fishing fleet of Pakistan confines its activity to coastal waters up to 25-30 kms from the coast.

Shrimp trawling, which is the mainstay of the fisheries in Pakistan is mainly carried out in shallow waters up to an isobaths of 20-30 metres. Shrimp trawling grounds are located in Sindh and in backwaters of Sonmiani and Kalmat Bay, Ormara, Pasni, Gwadar and Jiwani. The Sindh coast facing the Indus deltaic creeks,

5. WWF Pakistan, Preliminary Environmental Baseline Study of the Indus for All Programme Site

6. United Nations ESCAP in Co-operation with Environment and Urban Affairs Division, Government of Pakistan / National Institute of Oceanography, Government of Pakistan - 1990 - Coastal Environmental Management Plan for Pakistan

especially at the mouth of the inlets (creeks), backwater Kalmat and Sonmiani bay and famous Shamal Bunder in Balochistan are exceptionally rich in shrimp stock. Shrimping activity along Sonmiani coast is carried out in shallow water near Gadani, Phor and Sapat. Although, under Balochistan Sea Fisheries (Amendment) Act, 1986, there is a ban on trawling in the territorial waters of Balochistan, appreciable quantities of shrimp are harvested (although illegally) from Balochistan waters especially from Ormara to Jiwani area. Species like mullets, silver whitening and other small sized demersal fishes, especially juveniles of large commercially important estuarine fish, are harvested from shallow waters in the creek area of Indus and other small rivers and also in enclosed and semi-enclosed bays throughout the coastline.[7]

2.2.2 Industry

About 70% of the total industry of Pakistan is located in Karachi city. The major industry comprises of textiles, chemicals, pharmaceuticals, electronic goods, food, oil refineries, tanneries, iron and steel, and thermal power generation, etc. The total number of industrial units in Karachi is estimated to be about 6,000.[8]

Outside of Karachi, the main industrial activities are: the new port in Gwadar, through which inter alia oil and gas will be shipped, creating a risk for water pollution; the Hub industrial area and marble city just west of Karachi; and the Gadani shipbreaking grounds, which has already majorly polluted water, beach and surrounding areas because of improper handling.

Environmental pollution, especially brown pollution, is considerable in the Labella district, due to the operation of 135 industrial units (Hub, Windar, Uthal, Gadani Ship Breaking, Marble City and other sources discussed in the respective sections).

2.2.3 Shipping / Trade

Karachi Port and Port Muhammad Bin Qasim *(both located in Karachi City)* are the main ports of Pakistan and form the inlet and outlet points of almost all of the country's imports and exports. The two main ports receive about 2000 ships annually and handle cargo exceeding 20 million tons per year.[9]

Gadani shipbreaking in Lasbella district was started by, and is also currently managed by, the Balochistan Development Authority (BDA).

The port of Gwadar on the western most part of Balochistan has been newly constructed between 2002 and 2007 and is now operated by the China Overseas Port Holding Company.

2.2.4 Tourism

The coastal belt of Pakistan, with the exception of some basic recreational infrastructure / outlets along the Karachi coast, is presently not served with tourism related infrastructure. However, tremendous potential exists. The Indus Deltaic coast has numerous islands and harbours. The network of creeks and islands offers a sound potential for developing holiday resorts featuring a variety of water sports and nature tourism. There are some additional features such as mud volcanoes, turtle beaches and sites of archaeological / religious interest. For example, a Hindu Temple at Hanglaj in the Hingol River valley surrounded by mud volcanoes and a water pond (Aneel Kumb) is dedicated to a Hindu goddess. Similarly, the Astola Island is considered by Hindus to be an abode of their goddess *'Kali Devi'*. Thousands of Hindu pilgrims from all over the world visit these sites annually.[10] Buzy Pass (natural carvings on mud mountains), Princess of Hope, Mud Volcano (Chundar Gup), Sapat Bundar, Kund Malir, and Ras Malan are some beautiful spots for tourism development.

7. Integrated Coastal Zone Management Plan for Pakistan, IUCN, Muhammad Tahir Qureshi, 2011.
8. United Nations ESCAP in Co-operation with Environment and Urban Affairs Division, Government of Pakistan / National Institute of Oceanography, Government of Pakistan – 1990 – Coastal Environmental Management Plan for Pakistan.
9. United Nations ESCAP in Co-operation with Environment and Urban Affairs Division, Government of Pakistan / National Institute of Oceanography, Government of Pakistan –1990 – Coastal Environmental Management Plan for Pakistan
10. Sindh Forest & Wildlife Department & The World Bank – June 14-16, 1999 – Proceedings of National Seminar on Mangrove Ecosystem Dynamics of the Indus Delta.

3 CHALLENGES IN SUSTAINABLE COASTAL MANAGEMENT

Following is a discussion on the major 'threats' and 'constraints' with reference to the requirement of sustainable coastal management in Pakistan.

3.1 Threats

The beaches and coastal waters of Pakistan are relatively free from man-made pollution, except in harbours, industrial areas, urban discharge points and water front development sites. High grade pollution has not developed, because the coastal belt is devoid of industry and large population concentrations, except in the Karachi vicinity. However, projects such as Gwadar Deep Sea Port, Mirani Dam, construction of jetties/villages, coastal highway, mining of coal in Thar *(Sindh)*, copper / gold in Saindak *(Balochistan)*, and other similar projects open up the chances of growth of significant levels of human settlements along the coast. Provision of essential services and infrastructure, such as potable water and roads, could greatly expedite the development of large scale settlements. In places, there is a complete loss of open spaces at the seafront. This eventuality, in the absence of any coordinated and integrated coastal zone development / management and monitoring plan, is considered as a threat to maintaining the pristine environment of the coast and critically impacting the natural, desirable and sustainable land use status of the coast.

3.1.1 Industrial / Urban Pollution

As mentioned earlier, 70% of the total industry of Pakistan is located in Karachi city and in the Bin Qasim Industrial Area. Most of the industry is located in the Sindh Industrial Trading Estate *(S.I.T.E)*, Landhi Industrial Trading Estate *(L.I.T.E)*, Korangi Industrial Area, West Wharf Industrial Area of Sindh and Hub Industrial Trading Estate *(H.I.T.E)* of Balochistan. Sindh Industrial Trading Estate (S.I.T.E) covers an area of about 1600 hectares and houses 2500 industrial units.[11] The pollutants they discharge include heavy metals, organic matter *(also including benzene and toluene),* oils and greases and other toxic chemicals. Waste is discharged, mostly untreated into the Lyari River, which drains into the Arabian Sea in the Karachi Harbour area, via the Manora Channel. The river has also been known to carry calcium, alum, sulphates, magnesium, sodium, potassium, arsenic, halides and bicarbonates. The S.I.T.E area is responsible for about half of the total industrial polluted discharges of Karachi. Landhi Industrial Trading Estate (L.I.T.E) and the Korangi Industrial Trading Estate (K.I.T.E) discharge their effluents in the

11. United Nations ESCAP in Co-operation with Environment and Urban Affairs Division, Government of Pakistan / National Institute of Oceanography, Government of Pakistan – 1990 – Coastal Environmental Management Plan for Pakistan.

mangrove populated mud flats of Korangi Creek. There are six power plants on the Karachi Coast and one power plant on the mouth of the Hub Estuary. They utilise huge quantities of seawater for cooling, and discharge heated effluent in the adjacent environment. Another possible source of thermal pollution is the Karachi Nuclear Power Plant *(KANUPP)* located 18 km north-west of Karachi. It is a 137 MW heavy water modulated and cooled natural uranium horizontal tube reactor. About ¾ heat is released into the sea through a long effluent channel[12]. There is absence of any comprehensive data / analysis linking and evaluating the exact impact of the industrial / urban discharges on the flora / fauna and other aspects of the ecosystems and coastal environment which receive these wastes / pollutants.

Along the Balochistan coast, the development of the Gadani beach for ship breaking resulted in the ruining of a first class recreation and tourism facility, and became a major source of marine pollution. Fishing activity in the coastal waters of Gadani has been eliminated due to the ship-breaking industry. The breaking, storage, transportation, disposal of wastes and other operations create impact but the most important part of the operation is the cleaning of the vessels before breaking. This is supposed to be performed outside Pakistan's territorial waters, in another country, before the vessels are berthed at Gadani.

The industrial estates in the nearby Hub area discharge untreated wastes, which find their way to the coast.[13] Untreated effluents from the H.I.T.E (Hub Industrial and Trading Estate) industries and Marble City established in 2008-2009 near Hub are discharged into the Hub River; there are also issues of emissions and unsafe disposal of industrial solid waste. The environmental concerns about marble processing units in Marble City relate to air pollution and discharge of liquid waste in the wet cutting process[14].

The environmental impacts of ongoing and proposed projects such as the Winder and Hingol Dam, Gwadar Deep Sea Port, Gadani ship breaking facility, Hub Industrial area, etc. need to be very carefully assessed and appropriate steps taken to mitigate any adverse impacts to the coastal land, communities and ecology.

3.1.2 Dumping of Solid Waste

Due to the lack of adequate sanitation facilities inland, solid waste generated in the small coastal towns and villages, along with a significant portion of the urban waste of Karachi *(municipal /industrial)* is dumped randomly along the coast, which is flushed into the coastal ecosystems at high tide. Urban Karachi generates about 8000–10000 tons/day of solid waste. Due to inadequate hauling /transfer / disposal *(landfill)* facilities, approximately 60% of the waste remains uncollected, is either burnt, or deposited directly into storm drains or coastal rivers *(Lyari / Malir)* which ultimately transport this domestic / commercial / toxic industrial / hospital waste into the coast. This is one of the major causes of the reduced aesthetic and recreational potential of the coast. Components of waste, such as plastic bags, are known to damage the mechanised fishing crafts and harm marine life. This issue has received little attention and significance in pollution debates related to the coast. However, it is a problem, which is growing in magnitude and could pose an even more potent threat to our ecosystem if the coastal lands are developed without giving due consideration and priority to provisions of effective management and disposal of solid waste inland.

3.1.3 Pollutant Discharges via Terrestrial Streams

Along with freshwater, rivers also bring the run-off from agricultural fields. The agricultural pollutants such as pesticides, herbicides, and fertilisers carried by the river have adverse impacts on the coastal ecology. Contributions of the Indus are reduced due to intermittent low discharge. However, coastal rivers like Malir,

12. UNEP Regional Seas Reports and Studies No. 77 – 1986 – Environmental Problems of the Marine and Coastal Areas of Pakistan, National Report
13. IUCN – 2000, Balochistan Conservation Strategy.
14. Lasbella District Government (2011). Lasbella - Integrated District Development Vision. IUCN Pakistan, Quetta, Pakistan.

Lyari and Hub transport heavy loads of pollutants into the sea.

3.1.4 Over-exploitation of Natural Resources

As has been discussed earlier, the communities residing in the mangrove forested regimes, such as inter tidal creeks, lagoons, and estuaries, do exploit the mangroves to fulfil their daily living needs, which may include use of mangroves as fuel woods, fodder and house construction material. Pressures are more intense in more densely populated areas such as the Korangi Creek area of the Karachi coast.

Reckless over-exploitation of marine living resources has led to depletion of many wild stocks that had traditionally supported commercial fisheries. The fishing grounds in the coastal areas are under heavy fishing pressure from the mechanised boats and fixed nets in the delta area and are among the major source of depletion of fish stocks. The trawlers and the harmful fine mesh nets (Bolo Gujo nets) fixed in the creek areas catch large quantities of juvenile fish of larger species and small edible fishes as well as endangered, associated or dependent species, without any consideration of target or non-target species. Harmful fishing practices, coupled with weak governance, have led to the depletion of some of the stocks and pose a serious threat to other stocks. Shrimp and lobster have already been over-fished; crabs, razor clams and many other shellfish are at the verge of collapse.

3.1.5 Coastal Land-use Change

Although a development plan for the Karachi coastline exists, development along the Karachi coast does not follow the requirements of any planning. Such a planning document was prepared by the Karachi Development Authority in 1987-88, but was never implemented. Unplanned growth and development along the Karachi coast includes both formal housing and recreation oriented development and the mushrooming of unauthorised fishing villages. Impact on the coastal ecology and hydrology has not been documented. However, the coastal profile is highly disorganised in the absence of proper land management. Land reclamation activities are limited to the Karachi coast where land has been reclaimed in the harbour area for port management related activities and also in the urban cantonments along the coastal area for urban development / housing and commercial / recreational projects. Impact of these activities could be indicated in the severe erosion along the coastline due to turbulent wave action.

3.1.6 Lack of Freshwater Inflow from the Indus River

Since the Indus River is by far the main source of fresh water for the whole country, most of its water is withdrawn by upper riparian for agricultural, industrial and domestic use. Over the years, increasing amounts of water have been withdrawn for the expansion of irrigation (accelerated by rising temperatures and hence evaporation increases), so that less water finally reaches the Delta. The requirement for 'environmental flows', to keep the ecosystem in the Indus Delta healthy and viable, has never been assessed for informed decision making and allocation of water for various uses throughout the country.

3.1.7 Sea Level Rise and Saline Intrusion

The long term, tidal observations reveal an average annual sea level rise of 1.1 mm/year along the Karachi coast between the period 1860 to 2000. Therefore, one can assume a 6 cm rise in the sea level during the next 50 years. This means that the sea line will intrude upto 1-2 kilometres further inland from the existing Pakistan. (Khan, et. Al n.d in USAID and Ministry of Finance, Pakistan, 2010). Saltwater intrusion is the movement of saline water into freshwater aquifers, which can lead to contamination of drinking water sources and render fertile agricultural land unusable and barren. Saltwater intrusion occurs naturally to some degree in most coastal aquifers, since saltwater has a higher mineral content than freshwater it is denser and has a higher water pressure. Sea intrusion and coastal erosion can also be aggravated by sea level rise (due to global climate change) if not countered with adequate measures and

management. Reportedly, the Indus Delta has lost almost two million acres of land to the sea due to ground water contamination and salinisation of arable land. Coastal erosion is another threat, including barrages, to mangroves and coastal habitations.

3.1.8 Natural Disasters

The coastal areas of Pakistan face several threats of cyclones, storms and other climate change related risks. The frequency and intensity has increased manifold and the period 1971-2001 records 14 cyclones.

The cyclone 2A that struck the southern districts of the province of Sindh in 1999 wiped out 73 settlements, and resulted in the loss of 168 lives, nearly 0.6 million people were affected and 11,000 cattle were killed. It destroyed 1,800 small and big boats and partially damaged 642 boats, causing a cumulative loss of Rs. 380 million. The losses to the infrastructure were estimated at Rs. 750 million. In 2007, the tropical cyclone Yemyin struck the coastal towns of Ormara and Pasni, resulting in flash floods claiming the lives of 730 people and displacing approximately 350,000 people and damaging and killing more than two million livestock[15].In August-September 2011, District Badin in Sindh province received record breaking rainfall of 615.3 millimetres (24.22 in) during the monsoon spell breaking earlier recorded 121 millimetres (4.8 in) in Badin in 1936[16]. Marginalised groups, e.g. women, the poor, and indigenous peoples suffer the most from such climate related disasters.

3.2 Constraints

Currently, no umbrella national legislation exists to protect the coastal and marine resources in general or in any specific area of ecological significance. However, relevant programmes on wetlands under *Ramsar Convention* and *Pakistan National Conservation Strategy* do cover / protect some of the coastal ecosystems. Over 345,000 hectares of mangroves forest land have been declared as protected forests in 1958 and Keti Bundar area of the Indus Delta has been declared as a wildlife sanctuary under the *Sindh Wildlife Ordinance 1972.* Similarly, about 722 hectares of mangrove forests in Miani Hor are protected since 1958 and their wildlife is also protected under *Balochistan Wildlife Ordinance.* An extensive administrative framework of local, provincial and federal agencies operates all along the Pakistan coast but without any coherent approach. Most of their planning, development and conservation are done in isolation and are little known to others due to lack of coordination. In the absence of legislation, designated responsibilities, appropriate well-defined procedures and the means of institutional capacity building, management of marine and coastal areas is in a disarray. Non-government organisations, such as IUCN, WWF, Shirkat Gah, TCCR, etc., are actively involved in this sector and have worked out model conservation projects with the co-operation of the local coastal inhabitants. However, the limited resources of NGOs cannot influence the vast coastal and marine areas of the country without the full engagement of state authorities. Pakistan's Exclusive Economic Zone (EEZ) is almost equal to the landmass of the country. Maritime Security Agency *(MSA)* is the only agency present throughout the Pakistan Coast. Legislative support, with specific regulations, needs to be updated for marine and coastal management. Unlike pollution, there appear to be no provincial laws that explicitly aim to protect marine resources.

3.2.1 Data Availability and Reliability

Presently, various organisations, both government and non-state, are engaged in research and documentation activities related to various aspects of the coastal ecology and environment. However an issue of concern is that these efforts have not been coordinated and integrated to specifically address the coastal zone's ecologically sensitive areas. As a consequence, information about any particular zone or area of

15. 10 Worst Natural Disasters in History of Pakistan, http://listphobia.com/2010/08/17/10-worst-natural-disasters-in-history-of-pakistan/
16. http://en.wikipedia.org/wiki/2011_Sindh_Floods

ecological importance is available in bits and pieces, lacking coherence and consolidation. Lack of capacity and sustained monitoring, analysis of the coastal zone ecology and processes on long term and scientific basis, hinders the ecological and environmental status of the coast. This severely limits the scope and viability of planning and implementation efforts. It follows from the above, that adequate and reliable data *(constantly updated / verified by independent sources)* is not readily available. Randomly collected data cannot be used to draw a reliable and true information profile of coastal and marine resources and their linkages with human activities. Critical issues identified include, the lack of development of co-relation between coastal pollution, land reclamation, climatic and hydrological processes, etc., and their impact on the coastal ecosystems. Determination of exploitable resource capacity and sustainability for use needs to be documented as baseline data for future reference. While it has been established that our prominent ecological resources, such as mangroves ecosystem, are depleting, enough scientific data has not been generated nor sufficient and quality analysis been carried out to develop scientifically acceptable and reliable co-relationships between resource depletion and causes. Furthermore, knowledge is not adequately available, shared and used for informed decision making, especially on the value of biodiversity and coastal ecosystems. This, combined with a lack of vision and consideration of future threats (climate change, population pressure, urbanisation, etc.), renders the coastal environment invisible and, therefore, not considered.

3.2.2 Policies / Legislation / Jurisdiction / Enforcement

The presence of a multiplicity of agencies, institutions and organisations involved in the management of Pakistan's coastal areas, particularly in the critical Karachi coast / surrounding area without having any viable 'institutional interface', hinders the development of coordinated polices and plans for the coastal region. An administrative framework, dealing with coastal and marine resource management, has not been established. Similar is the state of relevant legislation and regulation. The policy and administrative jurisdictions of these agencies controlled by all tiers of governance, namely Federal, Provincial and Local, clash and overlap the competing interests which often characterise these relations. As such, no coordinated plan for our coastal region has ever been proposed or discussed. Most activities are taking place in isolation as an *'Ad-hoc'* approach towards problem solving, and processes are not consistently participatory to enhance ownership of the relevant stakeholders.

3.2.3 Lack of Infrastructure Development

Pakistan is still predominantly a rural based country and the level of urbanisation, particularly in the Sindh *(excluding Karachi)* and the Balochistan provinces is low. With the exception of Karachi / Hub region, no major urban settlement exists along the coast of Pakistan. Thus the economic importance and potential of the coast remains unrealised. In the case of Balochistan, lack of basic infrastructure, severe shortage of potable water, and low population density limit the chances of wide scale multi-faceted coastal zone development in the very near future. Moreover, due to the disturbed law and order situation, coastal areas have drawn limited public attraction by the people of Pakistan. Economic values of Pakistan coast / marine resources, in terms of *'eco-tourism'*, energy production, forestry and aqua-culture development need to be assessed and harnessed.

4 INTEGRATED COASTAL MANAGEMENT - A VISION FOR REFORM

An assessment of the status of Pakistan's coast and the challenges associated with sustainable coastal resource management reveal that there is a serious lack of visioning, coordination and integrated planning. However, a number of credible resource management programmes and initiatives are ongoing all along the coast for ecological and socio-economic uplift. It would, therefore, be highly unfair not to acknowledge the efforts of the government organisations and coastal communities aimed towards protecting and preserving the coastal environment and natural resources. These agencies include, among others, the *provincial Forest and Wildlife Departments, Provincial Fisheries Dept., Coastal Development Authority, EPA's, National Institute of Oceanography (NIO)*, *Space and Upper Atmospheric Research Organisation* (*SUPARCO)*, *Lasbela University of Water, Agriculture and Marine Sciences (LUWAMS)*, *Centre of Excellence in Marine Biology, University of Karachi, IUCN Pakistan, WWF Pakistan, TCCR, Shehri-Citizens for a Better Environment and private sector organisations.* However, the lack of co-ordination between the various concerned organisations and the absence of an *'integrated'* vision and approach for long term planning and development and conflict resolution are some of the fundamental issues that need to be addressed.

It is, therefore, desirable that logical and implementable legislative and institutional mechanisms for developing, administering and managing Pakistan's marine and coastal resources are established. In the absence of an effective mechanism for *'conflict resolution'*, competing and, at times, divergent interests clash; with the result that no meaningful or coordinated plan of action can be formulated and implemented. A case in point is the comprehensive *'Karachi Coastal Development Plan'*, prepared in 1987-88 by *the Karachi Development Authority (KDA)* in co-ordination with *UNDP,* which has not been implemented to date, despite the significant financial, recreational and ecological benefits it offers. Plans are prepared, not implemented and easily forgotten. Such an approach results in loss of credibility of the planning exercise. Even if plans are implemented, the implementation process fails to properly relate with the planning document.

Coastal areas are dynamic systems that are under continuous change. A coastal landscape changes daily as a consequence of tides and currents, certain extraneous factors also contribute to changes in coastal landscapes. More drastic changes are often noticeable as a consequence of hurricanes, tsunamis or other non-frequent events. Such drastic and non-drastic natural and human induced events have been part, and will continue being part, of the many processes and dynamics leading to the changes in coastal

landscapes that we see today. The term resilience is also intrinsic to change; there is no resilience without disturbance or change impacting an area, an ecosystem, a society or a structure. The important aspect about resilience is that it also incorporates the concept of returning to an equilibrium state after such initial shock, disturbance or change. A system is no longer resilient when after a specific threshold (exclusive for every system and force), the system changes and becomes a different system.

A serious shortcoming that is also linked with non-integrated interventions is the lack of a reliable and updated *'Data Bank'* of the physical, climatic, hydrologic and ecological features and processes of the Pakistan coast. The *'Data Bank'* exercise would assist in the much needed establishment of scientifically acceptable linkages between depletion / degradation of resources and the various activities impacting the coast. Concurrently, a strategic resilience building approach, with properly selected indicators, is instrumental to determining the directions and effectiveness of plans that the coastal action programmes are required to follow in order to build resilience of the coastal, socio-ecological systems. Conventional planning approaches require a paradigm shift.

Past practices have shown that the approach of treating the coastal zone in isolation, separate from the terrestrial activities having an impact upon the coast, has not worked. For example, no meaningful dialogue has been initiated between the coastal agencies and the industrial associations in Karachi, while the coastal ecology and environment continues to suffer from the negative effects of untreated industrial discharges. A change in approach and strategy from *'Coastal Zone Management'* to *'Integrated Coastal Zone Management' (ICZM)* is thus necessary.

4.1 What does an ICM Approach Offer?

Integrated coastal management (ICM) is a continuous and dynamic process of planning and managing the coastal area, which employs integrated, holistic and interactive approaches. ICM addresses a variety of threats challenging the sustainability of the coastal area, such as fishery resources depletion, habitat loss and degradation, sea-level rise, natural hazards, multiple-use conflicts, pollution, and poverty of coastal communities. ICM is designed to overcome the fragmentation inherent in the sectoral approach to resource management and the splits in jurisdiction among levels of government at the land-water interface. A key to successful ICM therefore lies in the design of an institutional process that allows interagency and multi-sectoral coordination and harmonization in a politically acceptable manner. ICM has emerged as the framework for realizing goals and objectives of sustainable ocean and coastal development in many different international forums, such as the *United Nations Conference on Environment and Development (UNCED) 1992* and the *World Summit on Sustainable Development (WSSD) 2002.* ICM also facilitates the achievement of the *United Nations Millennium Development Goals (MDGs)* in coasts and seas.

4.2 How does ICM Work?

ICM helps strengthen local coastal governance by providing a framework and processes for:

- Multi-sectoral and interagency coordination
- Engaging multi-stakeholders and various partners
- Promoting environmental investment
- Developing local capacity in integrated planning and management
- Applying sea-use zoning and area-based management
- Linking upstream and downstream concerns
- Building public and private partnerships

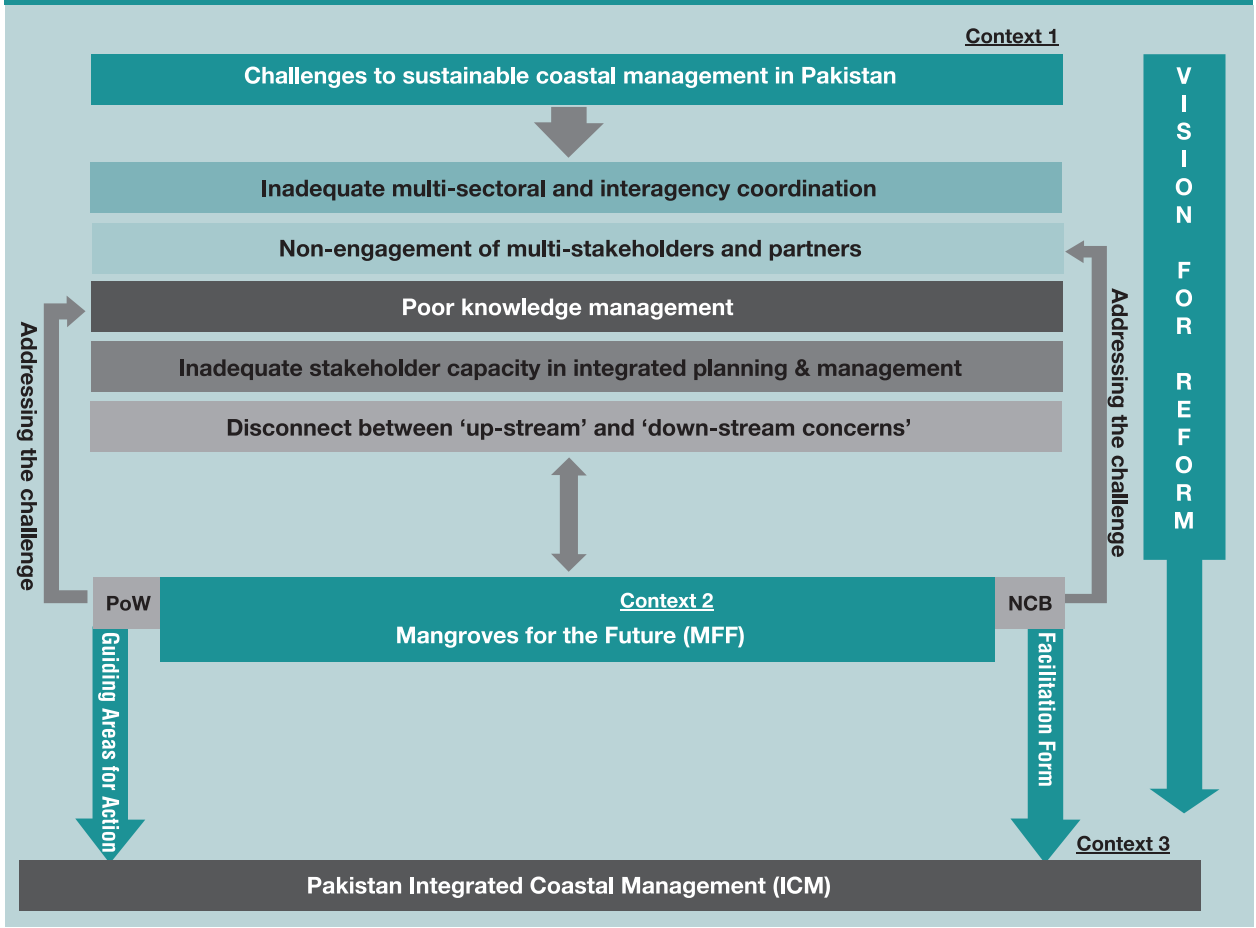
The strength of the ICM process is its reliance on scientific knowledge and information. This would be often the only way in which controversial

decisions, related to the multiple uses of coastal and marine resources, can be implemented and enforced. ICM thus enhances the interface between science and policy by drawing from various scientific tools, responsive and sensitive to management needs, including:

- Rapid appraisal and coastal profiling
- Environmental database and information management
- Environmental risk assessment and risk management
- Integrated environmental monitoring
- Coastal-use zoning and spatial planning
- Economic valuation of natural resources
- Socio-economic benefits and costs assessment
- Disaster Risk Reduction and Climate Change Resilience

In the 'approach' outlined above, the 'challenges' identified earlier are all being adequately addressed and it is therefore with this realisation that the MFF NSAP is also being structured and the coming sections will outline the strategic framework for establishing an appropriate 'MFF-Pakistan ICM Interface'.

Figure 2 - The 'Roadmap' to Pakistan ICM - a 'Multi-Contextual' and 'Relational Construct'



5 NATIONAL STRATEGY AND ACTION PLAN (NSAP)

The *MFF NSAP* for Pakistan has been framed based on an evaluation of how the MFF approach, characterised by efforts to facilitate partnership-based initiatives promoting investments in coastal ecosystems can be driven by a larger 'vision' of fostering an integrated, ocean-wide coastal area management approach, so that:

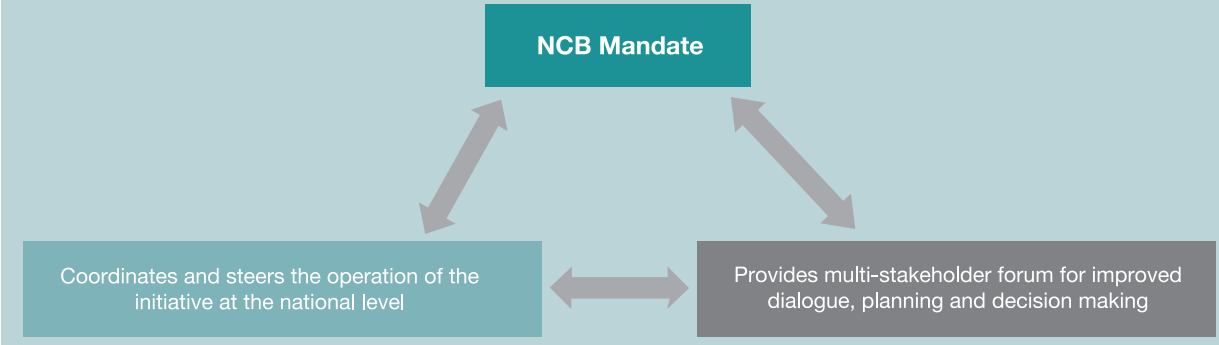
- It can be utilised for optimally contributing towards establishing a National ICM regime, and;
- Make Pakistan a 'productive' partner of the MFF family.

Sections 2 & 3 have analysed the 'status' of the coastal resources and identified the 'constraints' and 'opportunities' within the context of structuring a viable ICM Regime in Pakistan. The NSAP outlines a 'strategic framework' and a 'construct' for a role of MFF in contributing to the 'process' within some universally accepted defining markers of an ICM 'roadmap'. A 'cross-referential' and 'relational construct' can be established between an 'ICM Action Plan' and the 'MFF PoW' that can then be placed within the confines of the 'NCB Mandate'. It would therefore be instructive to first evaluate the 'mandate' vested in the NCB and then follow up with an assessment of how best the NCB can facilitate in designing and implementing a 'relational construct' between the 'MFF PoW' and an 'ICM Action Plan' for providing optimal dividends.

5.1 National Coordinating Body (NCB) – Towards a more 'Proactive' NCB

At the national level, MFF is coordinated and steered by NCB Pakistan through strengthening existing mechanisms for coastal management by bringing together different agencies, sectors and civil society groups. PoWs are implemented through a series of individual projects linked to a common goal and strategy, but are spread out geographically, temporally, and in terms of management and implementation responsibility. The MFF NCB serves to coordinate and steer the operation of the initiative at the national level, as well as to provide a multi-stakeholder forum to improved dialogue, planning and decision making by the different agencies involved in coastal management.

Figure 3 - NCB - Splitting the Mandate



The *Terms of Reference* of the MFF NCB list the 'major responsibilities' of an NCB that can, for the purpose of better articulation and thinking behind the framing of this NSAP, be categorised under two separate 'themes' that can be construed very clearly by breaking the 'broader mandate' stated above to (a) *Coordinate and steer the operation of the initiative at the national level; (b) Provide multi-stakeholder forum for improved dialogue, planning and decision making.* Based on this understanding, the 'major responsibilities of NCB can be 'realigned' as per Box 3.

What comes out is a fairly even spread. However, the purpose of 'separating out' the NCB responsibilities does not, in any way, imply that there is an internal 'disconnect', when placed within the wider context of a unified 'vision'. The splitted functions 'link' strategically and contribute as an 'organic whole' to realising the shared 'vision'. What this 'categorisation' aims to illustrate is a 'strategic advantage' that can be gained by mobilising the capacity of NCB at two separate levels that while having varying scales in terms of scope of action and the guiding agenda, complement and strengthen one another for achieving progress towards the end goal.

In the following discussion, the context and possible areas for 'strategic intervention' for a more 'pro-active' NCB are discussed:

5.1.1 Context

The discussion in *Section 2* has clearly indicated that one of the most insurmountable road-blocks in the way of promoting an 'integrated' approach towards coastal management in Pakistan has

Box 3 — **NCB Mandate**

MFF Specific (Projects)	Multi-stakeholder Forum (Dialogue and Consensus Building)
Steer and coordinate the implementation and delivery of MFF at a national level - calling, reviewing, and endorsing projects, budgeting, monitoring and reporting to RSC	Steer and coordinate the implementation and delivery of MFF at a national level - calling, reviewing, and endorsing projects, budgeting, monitoring and reporting to RSC
Ensure regular communication, learning and information-sharing between MFF projects	Promote harmonised monitoring and management of coastal ecosystems for sustainable local livelihoods and development
Support capacity - building at national and local levels through MFF	Promote national dialogues and sharing of lessons learned for improved practices and policies in coastal zone management and development
Encourage resource mobilisation to implement the PoWs under the MFF	Facilitate linkages between on-going and new initiatives which contribute towards MFF Sustain ownership of NCB at the national level

been the absence of 'institutional spaces' and 'coordinating mechanisms' where all the 'multi-faceted' and 'multi-tiered' stakeholders can build consensus towards a common agenda. The starting point for an ICM is the structuring of a 'framework' that can facilitate multi-sectoral and interagency coordination by engaging the relevant stakeholders. It is quite evident that, if properly utilised, the MFF NCB can give us a head-start in fulfilling this fundamental ICM requirement as it provides both a 'forum' and the 'associated mandate' to assist in addressing this critical gap. The NCB can comprise of both government and civil society members. At least half of the members have to be from civil society, including the private sector, NGOs, academic and research institutes, etc. This 'composition matrix' serves multiple purposes. Government institutions that are spread out in sectors, tiers of governance and also spatially (coastal zone and land based) can sit together in a sustained manner to act together whereas presence of the private sector and trade and business representatives can open up new 'avenues' in exploring and fostering public-private partnerships. Civil society input and transparency in actions is ensured, while at the same time, providing the critically important 'public legitimacy' to the actions taken.

The MFF NCB charts for itself a 'pro-active' role where alongside 'steering' MFF specific initiatives (small and large grants projects), it uses the NCB platform to build consensus and formulate possible options and strategies for 'integrated action' to be formalised and advocate on formulation/implementation of supportive legislative and policy fragments.

5.1.2 Implementation Measures

The NCB should specifically utilise the PoW listed in the thematic areas – 'apply knowledge', 'empower civil society' and 'enhance governance' to create a viable interface with the 'Aichi Biodiversity Targets', Hyogo Framework of Action (disaster risk reduction) and National Climate Change Policy to develop consensus for formulating the structural framework and implementation process of a National ICM regime. This can be done through working both within the NCB membership and seeking an 'outreach' for collaborating with relevant stakeholders outside the ambit of the NCB. Some actions could be of a 'direct nature' such as brainstorming for conceptualising legislative and institutional 'blueprints' while the other actions could be of a 'supportive' and 'indirect' nature, such as facilitating a process of 'knowledge management' so that the ICM can rely on appropriate scientific knowledge and basis for instituting actions for 'capacity building' of all relevant stakeholders - another area to be addressed *(for details, see Matrix 1 & 2).*

The process of MFF facilitation in establishing an 'ICM regime' can be 'phased' and spread out in 'stages' of involvement for greater clarity and impact. These 'phases' can be defined as follows:

- ***Phase 1*** **–**Setting vision for ICM, building 'consensus' for and facilitating through 'on-ground projects' (MFF based and linkages with other national projects) the formulation of consolidated data bank and the 'legislative' and 'institutional space' for an 'ICM regime', and extending outreach for building 'partnerships' with a wider set of stakeholders – private sector, NGOs/CBOs, media, academia, etc.

- ***Phase 2*** **–** Channelising the bulk of initiatives within the 'ICM regime' and dovetailing the MFF initiatives with the 'ICM regime' in terms of project support and facilitating exposure and linkages with regional/international best practices.

- ***Phase 3*** – Coordinate with and facilitate the application of a comprehensive 'monitoring and evaluation' regime to assess progress, set revised 'benchmarks' and incorporate adjustments (if required) in the strategy and implementation plan.

The MFF NCB is in a unique position to act as an 'incubator' for nursing and sustaining efforts for the establishment of an ICM regime both in terms

Box 4	MFF Outreach - 'Strategic Partnerships'
Area of Action	**Outreach Partner/s**
Knowledge Management	Academia
Investment in Resource Development and Conservation	Private Sector
Communications	Media

of its 'composition' and also the working 'mandate' it is vested with. While at the national level the NCB can mobilise and catalyse both relevant 'stakeholders' and appropriate 'actions', – at the regional and international level it can leverage support in 'knowledge management' and forging 'partnerships' that can be 'multi-dimensional' in nature.

5.2 Extending MFF Outreach – Forming Strategic Partnerships

The MFF programme and the NCB can specifically explore fostering some 'strategic partnerships' that can assist in optimising the influence of its initiatives by serving as 'force-multipliers' in suitably extending outreach, both in terms of 'scale' and the corresponding 'impacts'. In this regard, a few critical 'partnership' possibilities are being discussed in Box 4.

5.2.1 Knowledge Management

A key partnership that can be formalised is with relevant 'academic institutions' with a view to 'investing in the future'. Through facilitating actions for building capacities in academic institutions (both government and private) to act as 'centres of excellence', in terms of being 'resource banks' for accessing knowledge and expertise and as 'providers' of the critical human resource - the future conservationists, ecologists, planners, economists, etc. - that can sustain the process of viable management and utilisation of our coastal riches. A wide-range of academic institutions can be targeted, such as universities (for example, the University of Karachi, Bahria University, Karachi, the NED Engineering University, Karachi and the Lasbella University), universities/departments dealing with physical and social sciences and universities/departments dealing with business and financial management disciplines, etc. In this regard, the following 'strategic' actions could be pursued:

- Facilitating 'training' and 'academic' upgrade opportunities for selected staff and faculty of relevant academic institutions.
- Facilitating 'student exchange' programmes for cross country fertilisation of ideas and knowledge between the future knowledge managers of our coastal management initiatives.
- Exploring options for supporting / establishing 'departments' and initiating specified courses and degree programmes in the area of ICM in relevant academic institutions.
- Building capacities in GIS band monitoring and analysis of coastal change.
- Facilitating strong partnership linkages in the area of 'knowledge management' between relevant government authorities/agencies and academic institutions and incentivise access and use of such knowledge– such as formation of a consolidated data bank.

5.2.2 Investment in Resource Development and Conservation

There is a totally un-explored and potentially beneficial area for partnership between 'coastal managers' and the 'private sector', to promote investment both in measures for protection and conservation and eco-friendly utilisation of coastal land and resources. In this regard, the MFF can play a critically important role in

collaborating with the relevant private sector enterprises – for example, financial entities/banks, companies specialised in energy extraction and production, recreational and tourism development and management enterprises. This collaboration can manifest in working out the broad outlines of a 'coastal zone financial investment and resource utilisation plan' that focuses on the following factors which are critical to attracting and sustaining private sector investment:

- Soliciting relevant expertise for outlining potential areas/sectors for private sector engagement/partnership and 'economic valuation' of ecological and financial benefits.

- Recommending and facilitating actions that promote enabling 'policy' and 'management' spheres for private sector investment, sustainable conservation and utilisation of coastal land/resources.

- Identification of appropriate 'institutional interfaces'/instituting additional institutions, for collaboration of the private sector with agencies dealing with coastal land/resources; example land owners/service providers/regulators, etc.

- Identify potential areas of private sector 'capacity building' and exposure to environmentally friendly business practices.

- Identify possible 'models' for collaboration and partnership – distribution of roles, responsibilities and functions – financing, development, management, re-investments of revenues, etc.

- Provide information and data to firms, e.g. on the economic values of coastal ecosystems, and linking them up with CSOs and/or government actors.

In the process of consultation and evaluation of the scale and shape of private sector investment, key stakeholders would be the representative bodies, such as the *Federation of Pakistan Chamber of Commerce and Industry (FPCCI),and* city based chambers of commerce and industry, such as the *Karachi Chamber of Commerce and Industry (KCCI).* In this regard, it would be most helpful if such bodies constitute as 'official' members of the MFF NCB. In addition, private sector entities which are relevant, credible and have a history of investing in progressive environmental improvement and conservation programmes - example – pro-active *Corporate Social Responsibility (CSR)* - should be approached. Best practices and success stories from prior engagement with the private sector within the country and regionally should be collated and made available.

A framework for reference and adaptation could be the 'Green Development Mechanism (GDM),' an innovative financial mechanism that was put forward in the 'COP 10' of the CBD at Nagoya, Japan in 2010. GDM aims to mobilise private finance by linking biodiversity supply with biodiversity demand through a market mechanism. For instance, by establishing a standards and an accrediting process for certifying the management of geographically-defined areas in accordance with the CBD, and by facilitating a functional market for those areas. GDM would enable the financing of GDM-certified areas by willing businesses, investors, consumers and other interested parties such as private foundations and NGOs. A GDM, through developing a new market-based process, could enable 'biodiversity exporters' from developing countries to secure new international funding for their projects.

5.2.3 Communication

A vital requirement for the success of an ICM programme is that it is 'participatory' and the participation is of an 'informed' nature. This can only happen if a viable 'communication strategy' is interwoven with the ICM planning process. The ICM process and the 'communication' aspect of it should not run 'parallel' to each other, rather the 'communication strategy' should form part of the overall ICM planning and implementation process. In this regard, the MFF/NCB is well placed to play a significant role to initiate and

facilitate such a process. The process can be initiated by identifying appropriate 'media' partners and 'areas of relevance' that can form integral parts of the 'ICM Communication Strategy'. MFF can collaborate with the relevant 'media groups' – print and electronic –and work out the broad outlines of an 'ICM Communication Strategy' for policy makers, coastal managers, private sector and communities. It may focus on the following factors critical to maximising the 'integration' and 'coordination' of key stakeholders and making the process an important agenda of national growth and sustainability:

- To look into structuring the 'communication-interface' between key ICM stakeholders – government, civil society, private sector, external support agencies, regional and international stakeholders.

- ICM related information dissemination via electronic and print media to the general public.

- Involvement of youth and gender based groups, educational institutes (schools, colleges, universities) for proactive participation in the ICM implementation process.

- Developing targeted 'media campaigns' around the key focus areas of the ICM – such as granting ICM 'priority status' in the national development process reflected by appropriate policy and financial interventions, environmental and socio-economic benefits of ICM, potential for promoting 'sustainable tourism' etc.

- Strengthening 'community – coast' relationship through sustained coverage of the ecological, recreational and sporting potential of the coast – example eco-tourism (mangrove trails, bird watching, turtle watch, etc.), research and education, water sports (boating, scuba diving, para-sailing, etc.), sports fishing, beach recreation, etc.

- (Policy) Guidance documented and communicated based on MFF experiences.

5.3 Strategic 'Contextualisation' of MFF Initiatives

When considering a topic as vast and multi-dimensional as 'ICM' there are a number of important 'cross cutting' sectors and thematic areas that play an important role in offering both challenges and opportunities that require to be factored in the ICM planning process. Two such strategic 'contexts' are being discussed for consideration and action by the MFF/NCB while shaping the contours of the national 'ICM regime' for Pakistan.

5.3.1 Climate Change Adaptation

While uncertainty regarding the accuracy of various projections and scenarios related with climate change (especially when downscaled) remains, there is a strong consensus that the global climate is changing and that the impacts are already being experienced, also in Pakistan. In many areas, average temperatures are increasing, the sea level is rising and extreme weather events such as, tropical cyclones, strong rains with flooding or long dry periods have increased in the past years. Within this context, a critical understanding is that it is the human influence that is largely responsible for these rapid shifts in climatic and associated weather patterns that are quite possibly pushing the earth's climate beyond a tipping point, where certain adverse impacts and consequences may become irreversible. This alarming realisation is now lending a sense of global urgency for devising appropriate systems, processes and methodologies to meet this challenge. The global response to climate challenge is presently being geared towards implementing *mitigation* and *adaptation* strategies. Mitigation within the context of climate change refers to the reduction of *greenhouse* gas (GHG) emissions and their capture and storage. As such, industry, energy, transportation and urban areas, though still mostly in the developed world, are the main focus of mitigation strategies development and

implementation. Drawing on the definitions of the *Intergovernmental Panel on Climate Change (IPCC), adaptation* to (human-induced, or 'anthropogenic') climate change is understood to include all actions to reduce the *vulnerability* of a system (e.g. a city), population group (e.g. a vulnerable population in a city) or an individual or household to the adverse impacts of anticipated climate change. Considering the relatively low emissions and yet high vulnerabilities of developing countries, adaptation takes a stronger focus than mitigation in these countries. Mitigation and adaptation, though, are processes that need not be considered contradictory to each other - rather they complement each other in that focusing on one also indirectly strengthens the capacity of the other. The outcome of successful adaptation is *resilience* – and is a product of governments, enterprises, civil society organisations, households and individuals with strong adaptive capacity. It usually requires a capacity to anticipate climate change and plan needed adaptations.[17]

MFF NCB's work could dovetail well with the implementation of the 'National Climate Change Adaptation Plan' following the notification of the 'National Climate Change Policy', which mentions coastal and marine ecosystems as particularly vulnerable.The link between climate change and need of coastal adaptation has been figured out prominently in the *Pakistan Climate Change Adaptation Plan, prepared by the Ministry of Climate Change, Islamabad.* (See Table 1).

Some critical challenges and opportunities that exist within the context of climate change are discussed below separately for the coastal belt along the Sindh and Balochistan coast:

5.3.1.1 Climate Change Risks along the Sindh Coast

In this discussion, the focus is on Karachi city and the coastal belts of Thatta and Badin districts. Sea-level rise is the 'climate change impact' most relevant to the coastal land and associated resources. Sea level rise refers to the increase in the mean level of the oceans. Within the context of 'sea level rise' *(see Section 2),* the following focus areas can be considered.

- Damage to bio-diversity/ecosystems

Table 1 Climate Change Adaptiation - The Policy Context

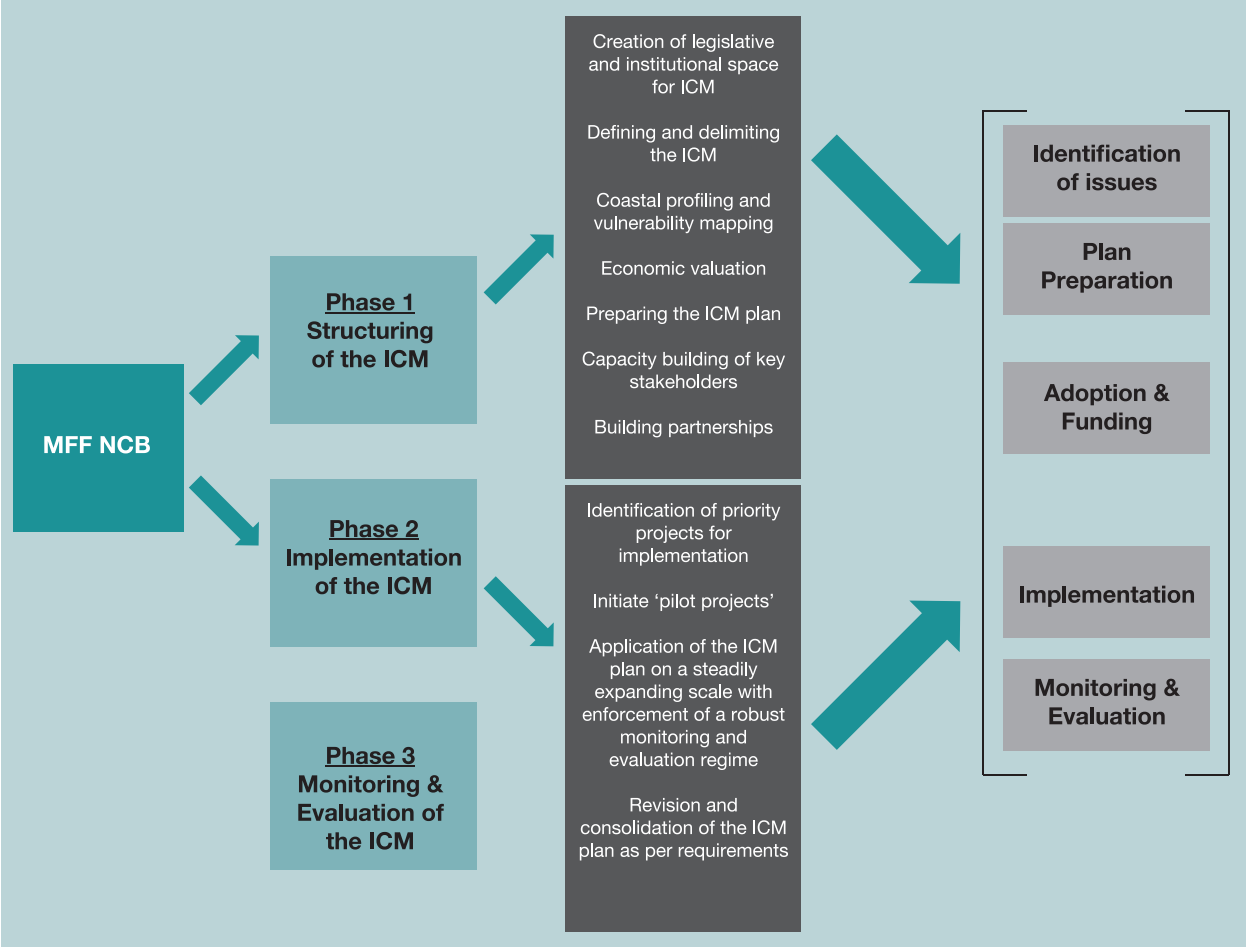
Relevant 'themes' of Pakistan's Draft Climate Change Action Plan (2012) organised on a 'sector by sector' basis and with supporting strategies for 'adaptation'

Disaster Preparedness					
Increased awareness of the impact of climate change related disasters and our capacity to respond	Address the important gaps in our knowledge of the natural processes that cause hazards	Develop integrated hazard mitigation strategies	Assess future likely flood levels in the Indus River System against future climate change scenarios	Provide reliable information on natural disasters and early warning where and when it is needed	Develop climate change resilient infrastructure
Bio-diversity					
Strengthen institutional set up to materialise efforts towards biodiversity conservation	Enhance scientific research on biodiversity conservation	Enhance national and provincial capacities to identify, conserve and monitor conservation processes		Map out vulnerability of ecosystems to climate change in mountainous areas for appropriate actions	
Coastal & marine eco-systems					
Develop adaptation to climate change impacts on coastal & marine ecosystems					
Wetlands					
Protect the habitat of birds and biodiversity including fish in the wetlands ecosystem			Ensure sustainability of wetlands ecosystem in Pakistan		

Source: Scoping a Combined Programme of Work on Climate Compatible Development for Pakistan, Workshop Proceedings (July 19, 2012) - Global Climate Adaptation Partnership, Hagler Bailly, Pakistan.

17. Global Report on Human Settlements 2011, United Nations Human Settlements Programme

Figure 4 - MFF - ICM Interface: The Process



- Damage to sensitive government installations and residential/recreational and commercial properties
- Livelihoods loss for fishing communities
- Land degradation

Sea level rise, by itself and in combination with other coastal hazards, such as intense storms, can have many interacting consequences. Possible hazards include:

- Salt water intrusion
- Inundation and flooding
- Storm surges
- Coastal erosion

The risks posed by **sea level rise** itself for Coastal Sindh may be negligible in the short term and timeframe of this strategy, but may become a cause for concern in the longer run as other risks are accelerated. There is a dire lack of downscaled climate change scenario and data for Pakistan, yet climate change requires the consideration of all possibilities and dealing with forecasts and projections rather than certainties and *predictions.* The most viable and cost effective approach to minimising the possible impacts of sea level rise in the long term is the integration of measures into infrastructure design and development and land use planning in the short term. Such an approach would translate the integration of long term risks of climate change into policy and planning, and management. An ICM approach can thus provide the most suitable planning and implementation regime to meet the associated challenges across sectors.

The implications of extreme weather events, such as cyclones, pose a more urgent and intense threat to the coastal areas of Karachi. Major flooding associated with a major cyclonic event can result in serious damage to businesses and residential complexes, disruption of economic activity (e.g. at the Karachi Port and Fish Harbour), injuries and fatalities, inundation and damage to low lying residential / recreational areas and coastal fishing communities. Furthermore, inundation of water during storms can disrupt and contaminate water supplies. *The National Institute of Oceanography* (NIO) is of the view that the ground subsidence rates in the Indus deltaic region due to lack of sediment flux and excessive ground water extraction are probably in the range of 2-4 mm per year. The ground subsidence has already resulted in seawater intrusion upstream of the delta extending up to 80 km in the coastal areas of Thatta, Hyderabad and Badin districts (Panhwar 1999; Inam et al. 2007). The intrusion of sea water into the Indus deltaic region has occurred due to insufficient flow of Indus water downstream Kotri barrage. An average of 35 MAF went downstream Kotri during the period 1976-77 to 2002-03; it varied between 0.8 MAF in 2000-01 (when the Indus River System inflow was 103 MAF) and 92 MAF in 1994-95 (when the IRS inflow was 166 MAF) (Government of Pakistan, 2005).

Sea intrusion will impact 300,000 people of the coastal areas of Thatta district alone. Moreover, salt intrusion will make the agricultural land even more unsuitable for cultivation. Based on the number of fishing boats around Gharo, Keti Bundar, Kharo Chan, and Shah Bundar, an estimated 20,000 people could be directly impacted on an immediate basis, with many more families affected over the medium term[18].

In terms of communities located in the immediate risk zone, the most significant human settlements, both in terms of their exposure and vulnerability, are the fishing communities residing in fishing villages dotted along the coast. The fisheries sector supports livelihoods and that too of extremely vulnerable fisherfolk communities. Fishery is an export driven sector and the *Karachi Port* and the *Karachi Fish Harbour* play a critical role in sustaining its functions. For exports, the major fishery is for prawns and the bulk of the catch is landed in Karachi where there are export facilities, and where the competent authority - the Federal Marine Fisheries Department is based. It is estimated that 100,000 people (10,000 families) together with more than 30,000 (household heads) from *Karachi Fish Harbour, Ibrahim Hyderi* (most populated coastal fishing village) and other landing centres in *Korangi Creek* and elsewhere near Karachi depend on fisheries.[19]

Public and Private Infrastructure - That may be at risk from climate change impact dominates large sections of Karachi's coastline. This infrastructure includes a nuclear power plant, harbours and ports, sewage treatment plants along with housing, business and recreational resources.

Ecosystems - At extreme risk may be the tidal wetlands and critically important 'habitats' such as the Sandspit/Hawksbay beach ecosystem – one of the most important 'green turtle' nesting sites in the world.

The possible hazards associated with sea level rise have the capacity of damaging, in cases irreversibly, the exposed ecosystems, as well as the health, resilience and provision of ecosystem services.

Cyclones/Storms are a Major Concern Along the Thatta and Badin Coastal Areas

Districts Thatta and Badin have experienced hazards from both inland and from the ocean, thus experiencing constant change. Cyclones, heavy rainfall, droughts, sea intrusion, land degradation and floods have followed in quick

18. Pakistan Coastal and Inland Community Development Project, 2005, ADB Technical Assistance Consultants Report (Financed by the Japan Special Fund) – Prepared by ANZDEC Limited Consultants, ANZDEC Limited, New Zealand – in cooperation with Resource Monitoring and Development Group, Pakistan and SEBCON (Pvt.) Limited Pakistan

19. IUCN/District Government Badin, Government of Sindh – 2006, District Vision Badin, A Framework for Sustainable Development

succession in both these districts during recent decades. The intervening respite is normally short. Major disasters in recent years include the cyclone in 1964/65, heavy rainfall in 1973, floods during 1988, torrential rainfall in 1994, the cyclone in 1999, and floods in the years 2003 and 2010. In the floods in 2003, for example, the number of people affected in Badin exceeded 360,000. In terms of damage to property, some 22,567 houses were destroyed, 160 villages were inundated, and 80,937 hectares of standing crops were obliterated. More than 200,000 villagers were rendered homeless. The precipitation of 350 or 450 mm, coupled with a huge surge of saltwater from the breaches of the Left Bank Outfall Drain (LBOD), further aggravated the situation in Badin and Golarchi/Shaheed Fazil Rahu talukas.[20]

5.3.1.2 Climate Change Risks along the Balochistan Coast

In Balochistan, the monsoon is a major phenomenon that has shaped the coastline of the region. During monsoon, the coast is subject to wave attacks, with waves reaching heights of 3.5 metres. Spring tides reach a height of over 3 metres, and backed by strong winds, raise the sea level further, producing occasional strong surges that penetrate sheltered lagoons. Also, there is a continuous process of erosion and accretion. Erosion is particularly prominent at Gwadar, Gadani and Dumb Bandar, Phore, Kund Malir, Sapat, Ormara, Pasni, Gawader and Jiwani areas. In summer, easterly long-shore currents redeposit eroded materials along the coast. To further complicate the picture, the sea level is rising slowly due to climate change, at rates of about 1.1 millimetres a year. This may contribute to salinity problems that may penetrate groundwater supply along the coast.

The Balochistan coast is also susceptible to geophysical hazards such as earthquakes and tsunamis. The coast sits on a major subduction zone. In 1945, an earthquake with a magnitude of 8.3 on the Richter scale and associated tsunamis destroyed some coastal villages at Pasni in Gwadar district. Sheikh (1992) describes the Mekran coast as one of the most seismically active regions in Pakistan. Seismic records for the period 1851-1990 show that there have been 193 earthquakes of magnitude 4.0 and above. In the meantime, sea bottom upheaval has resulted in shallow areas being formed near Astola Island, Ormara and the Hingol Rivers. Mud volcanoes, many of them active and emitting methane, are common features along the coast. In 1998, a small island suddenly appeared near the coast and another small island appeared in November, 2010 near Sapat Bundar which remained visible for more than two months before disappearing with tidal currents. The presence of mud volcanoes, the sudden emergence of new islands, changes in bathymetry and historical evidence of earth tremors and tsunamis, all testify to the forces that accompany movements in the earth's crust in the coastal zone. A rise in sea level, while small in the short term, may have significant impacts over time when viewed in the context of the dynamic processes that characterise the Balochistan coast.[21]

The coastal areas of Lasbella District have also remained vulnerable to a host of disasters including tsunami (1945), cyclone (Phet -2010), earthquakes and droughts (1998-2004). Yet, there is also a high incidence of floods in the district. Flash floods develop quickly, sometimes in a few minutes, without any visible signs of rain. The Porali River and the Phore stream (near the eastern boundary of the Hingol National Park) carry flash floods that have often destroyed or damaged bridges on the Coastal Highway and Karachi-Quetta RCD Highway. Floods also damage housing, sewerage systems and storm water drains in urban centres and cause landslides, mudslides and soil erosion.[22]

As with the case of other climate change scenarios, here again, there is a desperate need for research, filling the data gaps and using the data for informed decision making, starting with

20. Sindh Coastal Community Development Project, December 2006

21. IUCN – 2000, Balochistan Conservation Strategy

22. IUCN/Lasbela District Government – 2011, Lasbela District Development Vision

the outlining of areas of greatest vulnerability to coastal hazards. Shoreline inventories should be completed for public and private infrastructure and assets in addition to assessing the status of threatened biodiversity and ecosystems. The relevant agencies and authorities must continue to monitor the coastal processes for improved understanding of impacts of sea level rise. Protective measures against flooding such as, constructing flood protection barriers, sea walls, beach nourishment or diverting and concentrating flood waters to more confined locations should be considered. Another long term threat for which consideration can be given now is within the context of what is termed as 'residual damage' – where irreversible damage takes place from a climate change scenario. This is more relevant in the case of sea level rise as rising sea level and resulting erosion may result in permanent loss of land to the sea.

As is evident from this 'context setting', linking the 'climate change adaptation' challenges with the drive towards a comprehensive ICM regime and the supportive framework of MFF is logical and, if effectively managed, can lead to a 'win-win' situation.

5.4 Gender

In mobilising civil society in Pakistan around gender and climate change issues, there is an urgent need to raise awareness about the national processes currently underway to address this issue. Together with this, there is a need to raise understanding on the specific implications of coastal processes on gender inequality in order to put forward recommended responses that are required from a Pakistani perspective. Women and disadvantaged groups (elderly persons and children) suffer disproportionately from coastal disasters and extreme events. The role of 'empowered women' will be critical in coping effectively with the impacts of climatic and other changes. There is a need to identify constraints to the meaningful participation of women and other marginalised groups in decision making processes while designing interventions relating to coastal livelihoods, development and climate change adaptation in order to address disparities in gender differences in vulnerabilities and capabilities. The following key areas for 'gender focus' can be considered within the ICM context for building capacities of women in:

- Improving sanitation & hygiene at household level.
- Improving livelihoods house shields development.
- Facilitating market linkages.
- Energy conservation and alternates.
- Environmental stewardship.
- Role in climate change adaptation measures such as forestation programmes, soil erosion, community based early warning/ monitoring initiatives, building breakwaters, dikes and barriers against rising tides.

MFF can promote better 'networking' of civil society groups working on gender issues and facilitate exposure to regional and international best practices. An 'empowered' role of women would not only contribute to better management of coastal resources but would result in livelihoods improvement resulting in lowering 'poverty' levels and improving the health and hygiene of the entire family and communities.

Gender mainstreaming in all policy, planning, information communications and project based interventions related to the coastal areas is highly recommended.

5.4.1 Taking Guidance from the MFF Mid-Term Review 2012

A very useful exercise that recently took place was the 'MFF Mid-Term Review'. The 'Review' has helped in identifying some critical gaps and recommending important strategic adjustments at policy and implementation levels. Discussed below are some specific recommendations of the 'MFF Mid-Term Review' that find particular reference to the role of NCB and how it can be

mobilised to achieve the Pakistan NSAP objectives:

Recommendation #2 recommends MFF to focus on developing strategies to address coastal 'property rights/tenure' issues and finds special relevance to our coastal land - a critical challenge is inappropriate land usage and associated land reclamation. The Pakistan MFF NCB could facilitate initiatives towards land use planning/mapping of coastal land use and also in making progress in securing the property/tenure rights of coastal village communities. This could help in monitoring of land use practices. Grant projects that look into such issues could help. Also, proactive discussion and consensus building at the NCB platform could help in setting the direction towards creating supportive policy and institutional mechanism for addressing such news.

Recommendation #5 suggests consideration by the Regional Steering Committee (RSC) of different scenarios for 'growth and phase out' of MFF as a donor dependent programme that includes the option of evolution of NCB and NSAP towards 'integration with national policy platforms'. This scenario sits well with the vision and approach identified in the present NSAP where the MFF NCB is facilitating progress towards a larger objective of establishing a viable ICM regime in Pakistan. The NCB in advance could prepare for transition and take measures for integration of actions suggested in the NSAP in sectoral plans of agencies working along the coast.

Recommendations #8 and #9 deal with better targeting of 'small grant programmes' so that they remain grounded and linked with the realities and needs of local communities. The NCB needs to strategically handle the nature, scope and ambit of the small and medium grant programmes. While 'small grant programmes' could remain grounded in area-specific and community focused projects, the 'medium grant programmes' could widen the focus to look at the larger picture by targeting policy, applied research and management related matters that encompass the larger coastal zone.

Recommendation #12 suggests 'clustering' of projects for more targeted learning exchanges and networking. The NCB could facilitate greater exchanges of ideas and skills transfer between projects that could be 'clustered' using various types of criteria. By adopting resilience approach, the NCB should identify geographic and thematic priorities along the coast based on detailed situation analysis to make the MFF grants more strategic and coherent to achieve more visible impacts on the ground, and to upscale learning from such interventions through participatory monitoring, learning and evaluation (MLE).

Pakistan NSAP Strategy & Action Plan Matrix

MFF Pakistan - ICM Interface

(The following list of actions would require from the NCB and other coastal stakeholders as a mix 'outreach/facilitation' and 'grant based interventions')

Programmes of Work (PoWs)	NCB Strategic Actions	Priority Level	Focal Institutions	Anticipated Outcomes
Apply knowledge	**Improve knowledge for management 1**			
	i. Coastal Profiling – 'environmental and socio-economic' profiling and 'vulnerability mapping' of the 'Coastal Zone' (special emphasis on utilisation of GIS technology, modelling and scenario building (e.g. for climate change and population change) (15)	Short-term	Climate Change Division, Coastal Development Authorities of Sindh and Balochistan, National Institute of Oceanography, NDMA, PDMAs of Sindh and Balochistan, Meteorological Department, Universities, UNDP, WWF, IUCN and CSOs	'Science-Management' integration by developing scientifically researched 'coastal zone database' and capacity enhancement of relevant agencies
	ii. Rank hazards and vulnerabilities in order of importance to be addressed through ICM with participation of all stakeholders (15)	Short-term		
	iii. Develop and regularly update an open access database for all relevant knowledge (19)	Medium-term	Climate Change Division, Coastal Development Authorities of Sindh and Balochistan, National Institute of Oceanography, Meteorological Department, academic institutions, Higher Education Commission, UNDP, WWF, IUCN and CSOs	
	iv. Institutional strengthening and capacity enhancement of R&D and relevant academic institutions for conducting applied community based research and studies in coastal biodiversity and ecosystems (19)	Medium-term		
	v. Introduction of ICM courses at different academic levels, develop and/or update curricula (19)	Short-term		
	vi. Integration of 'media' and CSOs in knowledge management initiatives (1) vii. Produce documentaries and case studies for advocacy and highlighting coastal issues (1)	Short-term	Media organisations, UNDP, WWF, IUCN, CSOs	
	viii. Translation of knowledge products (e.g. gender, climate change information, resilience guidebooks, manuals) into national and vernacular languages (Urdu, Sindhi, Balochi etc.) (1)	Long-term	Ministry of Climate Change, UNDP, WWF, IUCN, CSOs, academic institutions	

Programmes of Work (PoWs)	NCB Strategic Actions	Priority Level	Focal Institutions	Anticipated Outcomes
	Adopting 'reef to ridge' approaches *(MFF/NCB can play a crucial role by developing consensus on key implementation gaps)*			
	i. Promoting adoption of policies and practices that complement and support sustainable management of upstream and downstream ecosystems based on learning from such approaches and practices globally and assessment of their applicability for Pakistan's coasts (3, 5, 6, 10, 14)	Long-term	Ministry of Climate Change, Ministry of Water & Power, NDMA, DMAs of Sindh and Balochistan, UNDP, WWF, IUCN, CSOs, media	'Consensus building' on the 'framework' between 'inter-sectoral', 'inter government', and 'spatially separated' stakeholders
	ii. Support actions that promote participatory decision making processes to address coastal challenges (10, 14)	Short-term	Ministry of Climate Change, Coastal Development Authorities of Sindh and Balochistan, Forest and Fisheries Departments of Sindh and Balochistan, Port Authorities of Sindh and Balochistan, Karachi Port Trust, NDMA, PDMAs of Sindh and Balochistan, UNDP, WWF, IUCN, CSOs, media	
	iii. Advocate linkages between upstream and downstream ecosystems and their sustainable uses (14)	Long-term		
	iv. Build a shared vision for ICM / coastal zones in Pakistan that is deliberated with all relevant stakeholders, is forward looking and integrated (14)	Medium-term	All relevant federal, provincial, district level stakeholders and local communities	
	Integrating economic valuation (*Assessment of the 'economic potential' of coastal land and resources* – *working in collaboration with the private sector and coastal communities - 'investment plans' for viable projects inform decision making)*			
	i. Conducting economic valuation studies on coastal ecosystems and biodiversity resources and integrate the same in decision-making processes (19, 2)	Short-term	Ministry of Climate Change, Coastal Development Authorities of Sindh and Balochistan, Forest and Fisheries Departments of Sindh and Balochistan, academic and research institutions, UNDP, WWF, IUCN, CSOs	Building a 'financially viable' and 'environmentally sustainable' economic value base of the coastal land and resources
	ii. Promote activities that create opportunities to harness and add value to ecosystems products and services, such as 'Carbon Potential of Mangroves' (7, 15, 16)	Short-term		
	iii. Support environmentally friendly small scale aquaculture activities that are consistent with sustainable management of coastal mangroves and other coastal ecosystems (7)	Medium-term	Fisheries Departments of Sindh and Balochistan, UNDP, WWF, IUCN, CSOs, private sector	
	iv. Explore, assess and promote medicinal and commercial values of seaweeds and algae and other marine resources, including fuel extraction potential from algae, and NTFPs, and assess their value chain enhancement and market potentials (16)	Medium-term	Ministry of Climate Change, Coastal Development Authorities of Sindh and Balochistan, Forest and Fisheries Departments of Sindh and Balochistan, Private Sector, CSOs, UNDP, WWF,	

Programmes of Work (PoWs)	NCB Strategic Actions	Priority Level	Focal Institutions	Anticipated Outcomes
	v. Promote local and indigenous 'arts and crafts' based on sustainable use of coastal biodiversity (16)	Long-term	IUCN, PPAF, Trade and Tourism Authorities	
	Applying learning, monitoring and evaluation			
	i. Develop 'sustainability indicators' for multiple level assessment of the health and resilience of the coast in the context of 'ICM based diagnosis and treatment' (5, 15)	Short-term	Ministry of Climate Change, Coastal Development Authorities of Sindh and Balochistan, Forest and Fisheries Departments of Sindh and Balochistan, Academic and Research Institutions, NDMA, PDMAs of Sindh and Balochistan, UNDP, UNEP, FAO, WWF, IUCN, CSOs	'Sustainability' of actions taken through employment of a comprehensive and continuous 'monitoring & evaluation' regime
	ii. Development of a comprehensive 'monitoring & evaluation regime' for continuous data collection, monitoring and evaluation (19) *In this regard a possible tool for use and reference could be the City Biodiversity Index (CBI), also known as the 'Singapore Index on Cities' Biodiversity' (developed in COP 9). It can be recommended as a viable tool for 'gaps' identification, self-assessment and planning and setting 'benchmarks' for progress monitoring*	Short-term		
	iii. Document and disseminate'success stories' and best practices on sustainable use of coastal biodiversity such as, under MFF Grant Project and other coastal programmes (19)	Short-term	Ministry of Climate Change, Coastal Development Authorities of Sindh and Balochistan, UNDP, UNEP, FAO, WWF, IUCN, CSOs	
Empower civil society	**Promoting civil society engagement**			
	i. Encouraging participatory natural resources governance through encouraging partnerships between civil society, government and private sector (4, 17)	Short-term	Ministry of Climate Change, Coastal Development Authorities of Sindh and Balochistan, Forest and Fisheries Departments of Sindh and Balochistan, UNDP, UNEP, FAO, WWF, IUCN, CSOs, PPAF, private sector	'Structuring' and 'promotion' of a 'meaningful' and 'integrated' role of the civil society in sustainable coastal management
	ii. Capacity building of civil society in project cycle management (19)	Short-term	UNDP, UNEP, FAO, WWF, IUCN, CSOs	
	iii. NCB to act as sounding board for project experiences, to bring out and assess lessons and to advise projects (19)	Short-term	Ministry of Climate Change, IUCN, NCB member organisations	

Programmes of Work (PoWs)	NCB Strategic Actions	Priority Level	Focal Institutions	Anticipated Outcomes
	iv. Support advocacy programmes that influence policy and practice change (1)	Medium-term	Ministry of Climate Change, Coastal Development Authorities of Sindh and Balochistan, Forest and Fisheries Departments of Sindh and Balochistan, UNDP, UNEP, FAO, WWF, IUCN, CSOs, PPAF, private sector	
	v. Awareness raising and capacity building of media and private sector in environmental reporting and monitoring (1)	Short-term	Ministry of Climate Change, media organisations, UNDP, WWF, IUCN, CSOs and private sector	
	vi. Engaging media in advocacy, highlighting coastal management issues and promoting best policies and practices (1)	Short-term		
	vii. Engaging academia in promoting community based research and making this knowledge more widely accessible (19)	Medium	Ministry of Climate Change, Higher Education Commission, academic and research institutions, UNDP, WWF, IUCN, CSOs	
	Building capacity for management			
	i. Capacity building programmes for coastal community to act as 'environmental stewards' for ecosystem protection (14)	Short-term	Ministry of Climate Change, Coastal Development Authorities of Sindh and Balochistan, Forest and Fisheries Departments of Sindh and Balochistan, NDMA, PDMAs of Sindh and Balochistan, UNDP, WWF, IUCN, CSOs	'Empowering' of coastal communities and other civil society stakeholders to act as 'informed' and 'pro-active' 'environmental stewards'
	ii. Development of 'regional linkages' to organise experience sharing events and exposure trips to promote learning and adoption of best practices by various stakeholders (19)	Short-term		
	iii. Capacity building of communities to monitor environmental changes, understand livelihoods implications, and envision actions / projects (7,10)	Short-term		
	iv. Encourage participatory and inclusive planning processes such as Local Adaptation Plans of Action (15)	Short-term		
	Supporting environmentally sustainable livelihoods 6			
	i. Providing knowledge, guidance (such as standards) to the fishing industry, related infrastructure and allied facilities (6)	Short-term	Ministry of Climate Change, Coastal Development Authorities of Sindh and Balochistan , Fisheries Departments of Sindh and Forest Departments Balochistan, UNDP, WWF, IUCN, PPAF, CSOs	
	ii. Encouraging value addition to coastal resources, reduction in post-harvest losses and fostering market linkages (6)			

Programmes of Work (PoWs)	NCB Strategic Actions	Priority Level	Focal Institutions	Anticipated Outcomes
	iii. Utilising mangrove forests for 'honey bee' production (7)	Short-term		Nurturing of an 'environmentally viable' co-existence between 'coastal ecosystems' and 'dependent communities
	iv. Encouraging locally appropriate, efficient and sustainable energy options for coastal communities (also insular systems) such as, establishment of woodlots, wind and solar energy that help in promoting sustainable use of coastal resources (7)	Short-term		
	v. Promote new coastal ecosystem based livelihood initiatives such as 'ecotourism' and environmentally friendly aquaculture in abandoned or degraded community lands (7)	Medium-term		
	Improving community resilience			
	i. Strengthen capacities of institutions and stakeholders in resilience analysis of socio-ecological systems by integrating scientific and social/indigenous knowledge to develop a vision for sustainable development and formulate strategies and actions for its achievement (*In this regard it is important to promote importance of traditional taxonomic knowledge of indigenous and local communities in the context of the Global Taxonomy Initiative undertaken at COP 11*, (15, 18)	Short-term to Medium-term	Ministry of Climate Change, Coastal Development Authorities of Sindh and Balochistan , Forest and Fisheries Departments of Sindh and Balochistan, Port Authorities of Sindh and Balochistan, National Institute of Oceanography NDMA, PDMAs of Sindh and Balochistan, UNDP, WWF, IUCN, PPAF, CSOs	Strengthening of the 'adaptive capacity' of coastal communities to better negotiate the climate change challenges
	ii. Develop surrogates or proxy indicators to measure resilience of social and ecological systems (15)	Medium-term		
	iii. Promote the establishment and use of Early Warning Systems for coastal hazards and disasters (15)	Short-term		
	iv. Build capacity on the use of EWS as well as on anticipation, coping and recovering from coastal hazards (15)	Short-term		

Programmes of Work (PoWs)	NCB Strategic Actions	Priority Level	Focal Institutions	Anticipated Outcomes
Enhance governance	**Supporting national coastal programmes** *MFF facilitation can be extended at two separate levels (example, technical and knowledge support, leveraging finances, forming partnerships, support at independent institutional level after dialogue and consensus at MFF platform, etc.)*			
	i. Support policy implementation – example National Climate Change Policy - and feed lessons into development of Climate Change Action Plan (20)	Short-term	All relevant federal, provincial, civil society and private sector organisations, UN and donors agencies	Strengthening of 'supportive linkages' with national programmes and coastal governance
	ii. Encourage formulation of new policies and guidelines based on best practices (17)	Medium-term		
	iii. Support advocacy initiatives that influence national policy and practices in relevant sectors (17)	Short-term		
	iv. Build capacities and knowledge of coastal managers in integrated coastal management through training and academic courses (19)	Short-term		
	v. Ensure linkages between on-going coastal programmes (20)	Short-term	Ministry of Climate Change, IUCN, NCB member organisations, Chambers of Commerce & Industries, donor agencies	
	vi. Promote ownership and sustainability of MFF programme priorities through collaborative and locally financed initiatives by the government and private sector, support leveraging local and international financing (20)	Medium-term		
	vii. Encourage better governance models of coastal resources for example through; (4) - Improved governance by government - Improved governance by private sector - Partnerships between government and/or private sector and communities (public-private, public-social, and private-social partnerships)	Short-term		

Programmes of Work (PoWs)	NCB Strategic Actions	Priority Level	Focal Institutions	Anticipated Outcomes
	Strengthening integrated coastal planning *A critical requirement of ICM is to have the 'legislative instruments' and 'institutional structures' in place for effective implementation. In this regard MFF Programme can serve as an ideal platform for building 'consensus' on the 'blueprints' of the required measures*			
	i. Build capacity of NCB through horizontal and vertical linkages for learning, also across the region (20)	Short-term	Ministry of Climate Change, MFF, UNDP, WWF, IUCN, donor agencies	Structuring of the 'ICM framework'
	ii. Promote comprehensive (i.e. integrated) land-use planning of coastal areas (5)	Medium-term	Ministry of Climate Change, IUCN, NCB member organisations, media, CSOs, NDMA, PDMAs of Sindh and Balochistan, private sector	
	iii. Establish working groups to identify thematic and geographic priorities for implementation of ICM (5, 11)	Short-term		
	iv. Demonstrate effectiveness of ICM approaches by collating lessons and best practices of successful ICM approaches and practices within and outside of MFF (19)	Short-term		
	v. Deliberate and advocate integration of climate change adaptation and of disaster risk reduction in ICM, coastal planning and coastal interventions (19)	Short-term		
	vi. Strengthen roles of existing National and Provincial level 'Coastal Management Authorities' as the 'focal institutions' for sustainable development and management of coastal resources (14)	Short-term	Ministry of Climate Change, Planning & Development Departments of Sindh & Balochistan, Coastal Development Authorities of Sindh and Balochistan, Forest and Fisheries Departments of Sindh and Balochistan, Port Authorities of Sindh and Balochistan, NDMA, PDMAs of Sindh and Balochistan, UNDP, WWF, IUCN, CSOs, private sector, Chambers of Commerce & Industries, donors, private sector	
	vii. Support improved regulations for coastal areas management and their enforcement including land use planning (17)	Medium-term		
	viii. Support input of climate change data and considerations into coastal planning (10)	Short-term		

Programmes of Work (PoWs)	NCB Strategic Actions	Priority Level	Focal Institutions	Anticipated Outcomes
	Contributing to marine protected areas ***Based on the findings of the 'coastal profiling - environmental and socio-economic, ecological and vulnerability mapping' and the 'defining' and 'delimiting' of the 'coastal zone' – the MFF can assist both through the 'project based' and 'consensus building/outreach' approach to better regulate existing, and identify, new protected areas***			
	i. Support improved regulation and protection of the coastal and marine biodiversity hot spots (11, 17)	Medium-term	Ministry of Climate Change, Ministry of Defence, Forest & Wildlife Departments of Sindh and Balochistan, WWF and IUCN	Improved coastal zone governance
	ii. Explore potential areas for declaring as sites of special concern such as, marine protected areas, natural heritage sites, Biosphere Reserves, Ramsar sites (11)	Short-term		
	iii. Identifying potential 'new' protected areas – both within the 'national' and 'international' protected categories (11)	Medium-term	Ministry of Climate Change, Forest & Wildlife Departments of Sindh and Balochistan, WWF and IUCN	
	Promoting management, assessment and monitoring 6,			
	i. Human resource development and technology upgrade of agencies vested with management and regulatory control with support of civil society for effective monitoring & evaluation of coastal land/resources (19)	Short-term to Medium-term	Ministry of Climate Change, Coastal Development Authorities of Sindh and Balochistan, Forest and Fisheries Departments of Sindh and Balochistan, Port Authorities of Sindh and Balochistan, National Institute of Oceanography, Ministry of Defence, NDMA, DMAs of Sindh and Balochistan, UNDP, UNEP, FAO, WWF, IUCN, PPAF, private sector, Chambers of Commerce & Industries, donor agencies	Strengthening of the 'institutional capacity' for robust 'monitoring and evaluation'
	ii. Strengthen/update database on coastal and marine resources through scientific studies and analysing trends (19)	Short-term		
	iii. Developing indicators for monitoring of health of coastal ecosystems (5, 19)	Short-term		
	iv. Establishing monitoring protocols and guidelines and encourage participatory monitoring practices (5, 19)	Short-term		
	Encouraging sustainable business practices 4			
	i. Development of 'models' for collaboration and partnerships – distribution of roles, responsibilities and functions – financing, development, management, re-investments of revenues, etc. (4)	Short-term	Ministry of Climate Change, Coastal Development Authorities of Sindh and Balochistan , Forest and Fisheries Departments of Sindh and Balochistan, Port Authorities of Sindh and Balochistan, UNDP, UNEP, FAO, WWF, IUCN, PPAF, private sector, Chambers of Commerce & Industries, donors,	Investment in 'sustainable coastal protection' and 'resource mobilisation'
	ii. Support establishment of consortia of private sector and other relevant stakeholders (4)	Short-term		

Programmes of Work (PoWs)	NCB Strategic Actions	Priority Level	Focal Institutions	Anticipated Outcomes
	iii. Raise awareness in business sector on opportunities for responsible business practices in coastal areas and NRM overall (1, 4, 8)	Short-term	Social Venture Funds, Insurance Companies	
	iv. Support formulation and adaption of protocols and guidelines of responsible business practices (4, 8)	Short-term		
	v. Encourage co-financing by private sector under CSR to address coastal issues (4)	Short-term		
	vi. Assess and encourage opportunities for 'Payment for Ecosystem Services' such as between urban Karachi and delta ecosystems, or between upstream water users and delta (3)	Medium-term		
Note: *1. The **facilitative** and **action based** interventions of the MFF for supporting viable progress on the ICM process would be distributed within the three separate 'phases' of action identified earlier (see Figure 2)* *2. Numbers against each action represent contribution of the action to achievement of relevant Aichi strategic goals and biodiversity targets*				

The following Matrix establishes critical linkages between the Aichi strategic goals and targets and the MFF POWs and Pakistan MFF NSAP strategic actions

Aichi Strategic Targets	NSAP Strategic Actions
Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society	
Target 1: By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.	▪ Integration of 'media' and CSOs in knowledge management initiatives. ▪ Produce documentaries and case studies for advocacy and highlighting coastal issues. ▪ Translation of knowledge products (e.g. gender, climate change information, resilience guidebooks, manuals) into national and vernacular languages (Urdu, Sindhi, Balochi, etc.). ▪ Supporting advocacy programmes that influence policy and practice change. ▪ Awareness raising and capacity building of media in environmental reporting. ▪ Engaging media in policy advocacy, highlighting coastal management issues and promoting best practices. ▪ Raise awareness in business sector on opportunities for responsible business practices in coastal areas and NRM overall.
Target 2: By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.	▪ Conduct economic valuation studies on coastal ecosystems and biodiversity resources and integrate the same in decision-making processes.
Target 3: By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimise or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions.	▪ Assess and encourage opportunities for 'Payment for Ecosystem Services' such as between urban Karachi and delta ecosystems, or between upstream water users and delta. ▪ Investing in REDD+ (carbon) for alternate livelihood means so as to decrease burden on ecosystem.
Target 4: By 2020, at the latest, Governments, businesses and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.	▪ Support actions that promote participatory decision making processes to address coastal challenges, e.g. federal and provincial water management authorities, relevant local authorities, private sector, business groups of coastal cities/towns, legislators and policy makers and media. ▪ Encourage better governance models of coastal resources, for example through; ○ Improved governance by government ○ Improved governance by private sector ○ Partnerships between government and/or private sector and communities (public-private, public-social, and private-social partnerships)

Aichi Strategic Targets	NSAP Strategic Actions
	▪ Development of 'models' for collaboration and partnerships – distribution of roles, responsibilities and functions – financing, development, management, re-investments of revenues, etc. ▪ Supporting establishment of consortia of private sector and other relevant stakeholders. ▪ Encouraging co-financing initiatives under CSR by the private sector to address coastal issues.
Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use	
Target 5: By 2020, the rate of loss of all natural habitats, including forests, is at least halved and, where feasible, brought close to zero, and degradation and fragmentation is significantly reduced.	▪ Encouraging participatory natural resources governance through encouraging partnerships between civil society and government. ▪ Encouraging locally appropriate, efficient and sustainable energy options for coastal communities (also insular systems) such as, establishment of woodlots, wind and solar energy that help in promoting sustainable use of coastal resources.
Target 6: By 2020, all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.	▪ Providing knowledge, guidance (such as standards) to the fishing industry, related infrastructure and allied facilities. ▪ Encouraging value addition to coastal resources and fostering market linkages, reduction in post-harvest losses.
Target 7: By 2020, areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.	▪ Support environmentally friendly small scale aquaculture activities that are consistent with sustainable management of coastal mangroves and other coastal ecosystems. ▪ Promote new coastal ecosystem based livelihood initiatives such as 'ecotourism' and environmental friendly aquaculture in abandoned or degraded community lands. ▪ Utilising mangrove forests for 'honey bee' production.
Target 8: By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.	▪ Support formulation and adaption of protocols and guidelines of responsible business practices.
Target 9: By 2020, invasive alien species and pathways are identified and prioritised, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.	

Aichi Strategic Targets	NSAP Strategic Actions
Target 10: By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimised, so as to maintain their integrity and functioning.	▪ Support input of climate change data and considerations into coastal planning.
Strategic Goal C: Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity	
Target 11: By 2020, at least 17 percent of terrestrial and inland water, and 10 percent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascapes.	• Support improved regulation and protection of the coastal and marine biodiversity hot spots. • Explore potential areas for declaring as sites of special concern such as, marine protected areas, natural heritage sites, Biosphere Reserves, Ramsar sites. • Identifying potential 'new' protected areas – both within the' national' and 'international' protected categories.
Target 12: By 2020, the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.	
Target 13: By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimising genetic erosion and safeguarding their genetic diversity	
Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services	
Target 14: By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.	▪ Build a shared vision for ICM / coastal zones in Pakistan that is deliberated with all relevant stakeholders, is forward looking, and integrated. ▪ Advocate linkages between upstream and downstream ecosystems and their sustainable uses. ▪ Demonstrate effectiveness of piloting ICM approaches by collating lessons and best practices of successful ICM approaches and practices within and outside of MFF. ▪ Strengthening roles of existing National and Provincial level 'Coastal Management Authorities' as the 'focal implementation bodies' in sustainable management of coastal resources. ▪ Capacity building programmes for coastal communities to act as 'environmental stewards' for ecosystem protection.

Aichi Strategic Targets	NSAP Strategic Actions
	▪ Capacity building of communities to monitor environmental changes, understand livelihoods implications, and envision alternative actions / projects.
Target 15: By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 percent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.	▪ Coastal Profiling – 'environmental and socio-economic' profiling and 'vulnerability mapping' of the 'Coastal Zone' (special emphasis on utilisation of GIS technology, modelling and scenario building (e.g. for climate change and population change). ▪ Rank hazards and vulnerabilities in order of importance to be addressed through ICM, in participation of all stakeholders. ▪ Encourage participatory and inclusive planning processes such as Local Adaptation Plans of Action. ▪ Strengthen local adaptation strategies and capacities to make them more effective and sustainable by integrating indigenous and scientific knowledge and by providing knowledge of alternative options. ▪ Develop surrogates or proxy indicators to measure resilience of social and ecological systems. ▪ Promote the establishment and use of Early Warning Systems for coastal hazards and disasters. ▪ Build capacity on the use of EWS as well as on anticipation, coping and recovering from coastal hazards.
Target 16: By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation is in force and operational, consistent with national legislation.	▪ Explore, assess and promote medicinal and commercial values of seaweeds and algae and other marine resources including fuel extraction potential from algae, and NTFPs, and assess their value chain enhancement and market potentials. ▪ Promote activities that create opportunities to harness and add value to ecosystems products and services, such as 'Carbon Potential of Mangroves.
Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building	
Target 17: By 2015, each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.	▪ Promote adoption of policies and practices that complement and support sustainable management of upstream and downstream ecosystems based on learning from such approaches and practices globally and assessment of their applicability for Pakistan's coasts. ▪ Promote comprehensive (i.e. integrated) land-use planning of coastal areas. ▪ Encourage formulation of new policies and guidelines based on best practices. ▪ Support advocacy initiatives that influence national policy and practices in relevant sectors.

Aichi Strategic Targets	NSAP Strategic Actions
	▪ Establish working groups to identify thematic and geographic priorities for implementation of ICM. ▪ Support improved regulations for coastal areas management and their enforcement, including land use planning.
Target 18: By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.	▪ Promote the sharing of traditional taxonomic knowledge of local communities in the context of the Global Taxonomy Initiative undertaken at CBD COP. ▪ Promotion of local and indigenous 'arts and crafts' based on sustainable use of coastal biodiversity. (*In this regard it is important to promote importance of traditional taxonomic knowledge of indigenous and local communities in the context of the Global Taxonomy Initiative undertaken at COP 11*)
Target 19: By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.	▪ Develop 'sustainability indicators' for multiple level assessment of the health and resilience of the coast in the context of 'ICM based diagnosis and treatment'. ▪ Develop and regularly update an open access database for all relevant knowledge. ▪ Institutional strengthening and capacity enhancement of R&D and relevant academic institutions for conducting applied community based research and studies in coastal biodiversity and ecosystems. ▪ Introduction of ICM courses at different academic levels, develop and/or update curricula. ▪ Development of a comprehensive 'monitoring & evaluation regime' for continuous data collection, monitoring and evaluation of the 'actions taken'. ▪ Documenting 'success stories' and best practices on sustainable use of coastal biodiversity under MFF Grant Project and other coastal programmes. ▪ Enhance linkages of lessons learned in Pakistan to international platforms and communities of practice, such as, for example, the Poverty and Environment Initiative (PEI). ▪ NCB to act as sounding board for project experiences, to bring out and assess lessons and to advise projects. ▪ Capacity building of civil society in project cycle management. ▪ Engaging academia in promoting community based research and making this knowledge more accessible. ▪ Development of 'regional linkages' to organise experience sharing events and exposure trips for 'skills transfer' opportunities for various stakeholders.

Aichi Strategic Targets	NSAP Strategic Actions
	▪ Build capacity of NCB through horizontal and vertical linkages for learning, also across the region. ▪ Deliberate and disseminate recommendations on the integration of climate change adaptation and of disaster risk reduction in ICM, coastal planning and coastal interventions. ▪ 'Human resource development' and 'technology upgrade' of agencies vested with 'management' and 'regulatory control' with support of civil society for effective 'monitoring & evaluation' of coastal land/resources. ▪ Strengthen/update database on coastal and marine resources through scientific studies and analysing trends. ▪ Developing indicators for monitoring of health of coastal ecosystems (5, 19) ▪ Establish monitoring protocols and guidelines and encourage participatory monitoring practices (5, 19)
Target 20: By 2020, at the latest, the mobilisation of financial resources for effectively implementing the Strategic Plan 2011 - 2020 from all sources and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilisation should increase substantially from the current levels. This target will be subject to changes contingent to resources needs assessments to be developed and reported by Parties.	▪ Support policy implementation – example National Climate Change Policy - and feed lessons into development of Climate Change Action Plan (15) ▪ Build capacities and knowledge of coastal managers in integrated coastal management through training and academic courses (19) ▪ Ensure linkages between on-going coastal programmes (20) ▪ Promote ownership and sustainability of MFF programme priorities through collaborative and locally financed initiatives by the government and private sector, support leveraging local and international financing (20)

Annex-I: Composition of National Coordinating Body of MFF Pakistan

Ministries, Government Departments and Government Agencies		
1	Secretary Climate Change Division Government of Pakistan, Islamabad	Chair
2	Inspector General Forests Climate Change Division Government of Pakistan, Islamabad	Member Secretary
3	Secretary Forest & Wildlife Department Government of Sindh, Karachi	Member
4	Secretary Forest & Wildlife Department Government of Balochistan, Quetta	Member
5	Director General Sindh Coastal Development Authority, Karachi	Member
6	Director General Balochistan Coastal Development Authority Government of Balochistan, Gawadar	Member
7	Secretary Sindh Fisheries Department Government of Sindh, Karachi	Member
8	Secretary Fisheries Department Government of Balochistan, Quetta	Member
9	Director General National Institute of Oceanography, Karachi	Member
10	Chairman Karachi Port Trust, Karachi	Member
11	Chairman Port Qasim Authority, Karachi	Member
12	Chairman Gawadar Port Authority Gawadar, Balochistan	Member
13	Director Maritime Affairs & Environment Control Plan's Division, Naval Headquarters, Islamabad	Member
14	Deputy Chief (Maritime Affairs Wing) Ministry of Defence, Islamabad	Member
15	Administrator Defence Housing Authority, Karachi	Member
Non-Government Organisations; Civil Society		
16	Director General WWF Pakistan, Lahore	Member

17	Chief Executive Officer Indus Earth, Karachi	Member
18	Shehri-Citizens for a Better Environment Karachi	Member
19	CEO/Managing Director Pakistan Poverty Alleviation Fund, Islamabad	Member
	Institutional Partners	
20	Country Representative IUCN Pakistan, Karachi	Member
21	Country Director UNDP Pakistan, Islamabad	Member
22	Country Director FAO Pakistan, Islamabad	Member
	Academia and Research Institutions	
23	HEJ Research Institute University of Karachi, Karachi	Member
	Private Sector	
24	President Engro-Polymer & Chemicals Ltd., Karachi	Member

Climate Change Division

Mangroves for the Future
INVESTING IN COASTAL ECOSYSTEMS

About Mangroves for the Future

Mangroves for the Future (MFF) is a unique partner-led initiative to promote investment in coastal ecosystem conservation for sustainable development. It provides a collaborative platform among the many different agencies, sectors and countries who are addressing challenges to coastal ecosystem and livelihood issues, to work towards a common goal.

MFF builds on a history of coastal management interventions after the 2004 Indian Ocean tsunami, especially the call to continue the momentum and partnerships generated by the immediate post-tsunami response. It initially focused on the countries worst-affected by the tsunami; India, Indonesia, Maldives, Seychelles, Sri Lanka and Thailand. MFF has recently expanded to include Bangladesh, Cambodia, Pakistan and Viet Nam. MFF will continue to reach out to other countries of the region that face similar issues, with the overall aim to promote an integrated ocean wide approach to coastal zone management.

The initiative uses mangroves as a flagship ecosystem, but MFF is inclusive of all coastal ecosystems, including coral reefs, estuaries, lagoons, sandy beaches, sea grasses and wetlands. Its long-term management strategy is based on identified needs and priorities for long-term sustainable coastal ecosystem management. These priorities emerged from extensive consultations with over 200 individuals and 160 institutions involved in coastal management when the initiative was established in 2006.

MFF seeks to achieve demonstrable results in influencing regional cooperation, national programme support, private sector engagement and community action. This will be achieved using a strategy of generating knowledge, empowering institutions and individuals to promote good governance in coastal ecosystem management.

Learn more at: www.mangrovesforthefuture.org

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