2011 PAKISTAN FLOODS

Preliminary Damage and Needs Assessment

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Acknowledgements

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Abbreviations and Acronyms

ADB	Asian Development Bank
ADR	Alternate Dispute Resolution
AG	Auditor General
AJK	Azad Jammu and Kashmir
ANC	Antenatal Care
ARI	Acute Respiratory Infections
ARL	Attock Refinery Limited
ATM	Automated Teller Machine
BBB	Building Back Better
BBS	Building Back Smarter
BHU	Basic Health Unit
BID	Balochistan Irrigation and Power Department
BISP	Benazir Income Support Program
BOD	Burden of Disease
BPL	BYCO Petroleum Limited
BSF	Business Support Fund
CAA	Civil Aviation Authority
CBDRM	Community Based Disaster Risk Management
CBO	Community Based Organization
CCA	Climate Change Adaptation
CCI	Council of Common Interest
CCT	Conditional Cash Transfers
CD	Completely Damaged
CDCP	Citizens' Damage Compensation Program
CDD	Community Driven Development
CIDA	Canadian International Development Agency
CNG	Compressed Natural Gas
CNIC	Computerized National Identity Card
CPI	Consumer Price Index
CSO	Civil Society Organization
CSR	Composite Schedule of Rates
DDMA	District Disaster Management Authority
DCO	District Coordination Officer
DEWS	Disease Early Warning System
DFID	Department for International Development
DHIS	District Health Information System
DHQ	Distant Headquarter
DISCO	Distribution Company

DMAs	Disaster Management Authorities
DNA	Damage and Needs Assessment
DOH	Department of Health
DPOD	Duro Puran Outfall Drain
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
EAD	Economic Affairs Division
EC	European Commission
EDO	Executive District Officer
EmOC	Emergency Obstetric Care
EmONC	Emergency Obstetric and Newborn Care
EPI	Expanded Program of Immunization
ERC	Emergency Response Cell
ERRA	Earthquake Reconstruction and Rehabilitation Authority
ESSAF	Environmental and Social Screening and Assessment Framework
EU	European Union
EWIRS	Early Warning and Incident Response System
FAO	Food and Agriculture Organization
FATA	Federally Administered Tribal Areas
FBS	Federal Bureau of Statistics
FFC	Federal Flood Commission
FLFC	First Level Care Facility
FMIS	Financial Management Information System
FP	Flood Protection
FSR	Financial Stability Review
GIS	Geographic Information System
GB	Gilgit-Baltistan
GDP	Gross Domestic Product
GFDRR	Global Facility for Disaster Reduction and Recovery
GIS	Geographic Information System
GOB	Government of Balochistan
GOP	Government of Pakistan
GoPb	Government of Punjab
GoS	Government of Sindh
GST	General Sales Tax
HDI	Human Development Index
HEPR	Health Emergency Preparedness and Response
HHs	Households
HIES	Household Integrated Economic Survey
HMIS	Health Management Information System
HRM	Hazard Risk Management
ILO	International Labor Organization
INGO	International Non-Government Organization
IPP	Independent Power Producer
IsDB	Islamic Development Bank

JICA	Japan International Cooperation Agency
KESC	Karachi Electric Supply Company
KFW	Kreditanstalt für Wiederaufbau
KP	Khyber Pakhtunkhwa
KPOD	Kadhan Patiji Outfall Drain
LBOD	Left Bank Outfall Drain
LG	Local Government
LGD	Local Government Department
LFS	Labor Force Surveys
LPG	Liquefied Petroleum Gas
LS	Larkana Sehwan
M&E	Monitoring and Evaluation
MCH	Mother and Child Health
MCRA	Multi-Cluster Risk Analysis
MDGs	Millennium Development Goals
MF	Micro Finance
MFI	Microfinance Institution
MFPs	Micro Finance Providers
MGCL	Mari Gas Company Limited
MIS	Management Information System
MNCH	Maternal Neonate and Child Health
MoE	Ministry of Environment
MoF	Ministry of Finance
MoIT	Ministry of Information and Technology
MOU	Memorandum of Understanding
MoWP	Ministry of Water and Power
MPNR	Ministry of Petroleum and Natural Resources
MSME	Micro Small and Medium Enterprises
MSW	Municipal Solid Waste
MTDF	Medium Term Development Framework
NADRA	National Database and Registration Authority
NDMA	National Disaster Management Authority
NDMC	National Disaster Management Commission
NDMO	National Disaster Management Ordinance
NDRMF	National Disaster Risk Management Framework
NER	Net Enrollment Rate
NFC	National Finance Commission
NGO	Non-Government Organization
NHA	National Highway Authority
NIC	National Identity Card
NODMC	National Oversight Disaster Management Council
NPLs	Non-Performing Loans
NRL	National Refinery Limited
NRSP	National Rural Support Program
NTDC	National Transmission and Dispatch Company

OECD	Organization of Economic Cooperation and Development
OGDCL	Oil and Gas Development Corporation Ltd
OMC	Oil Marketing Company
P&DD	Planning and Development Departments
PARCO	Pak-Arab Refinery Ltd
PBM	Pakistan Bait-ul-Maal
PC	Planning Commission
PD	Partially Damaged
P&DDs	Planning and Development Departments
PDMA	Provincial Disaster Management Authority
PDMC	Provincial Disaster Management Commission
PDWP	Provincial Development Working Party
PEPA	Pakistan Environmental Protection Agency
PFM	Public Financial Management
PFMA	Public Financial Management and Accountability
PHC	Primary Health Care
PHED	Public Health Engineering Department
PID	Provincial Irrigation Department
PIFRA	Project to Improve Financial Reporting and Auditing
PMD	Pakistan Meteorological Department
PMES	Project Monitoring and Evaluation System
PPAF	Pakistan Poverty Alleviation Fund
PPPs	Public Private Partnerships
PPRA	Public Procurement Regulatory Authority
PRL	Pakistan Refinery Limited
PRSP	Poverty Reduction Strategy Paper
PSDP	Public Sector Development program
PSLM	Pakistan Social and Living Standards Measurement Survey
PSO	Pakistan State Oil
PSP	Public Sector Power
PTA	Pakistan Telecommunication Association
PTAs	Parent Teacher Associations
RHC	Rural Health Center
RR	Recovery and Reconstruction
SCs	School Councils
SBP	State Bank of Pakistan
SHYDO	Sarhad Hydropower Development Organization
SID	Sindh Irrigation and Power Department
SM	Sagyun Matiari
SMCs	School Management Committees
SMEDA	Small and Medium Enterprise Development Authority
SNA	Social Network Analysis
SNGPL	Sui Northern Gas Pipeline Ltd
SOP	Standard Operating Procedure
SPRA	Special Purchase and Resale Agreement

SSGCL	Sui Southern Gas Company Ltd
SUPARCO	Space and Upper Atmosphere Research Commission
T&C	Transport and Communication
TCF	Trillion Cubic Feet
THQ	Tehsil Headquarter
TLC	Temporary Learning Center
UN	United Nations
UNDP	United Nations Development Program
UN-ECLAC	United Nations Economic Commission for Latin America and the Caribbean
UNICEF	United Nations Children Fund
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
UNOSAT	United Nations Operational Satellite Application Program
USAID	United States Agency for International
W&S	Works and Services Department
WAPDA	Water and Power Development Authority
WATSAN	Water Supply and Sanitation
WB	World Bank
WFP	World Food Programme
WHO	World Health Organization
WWF	World Wildlife Fund

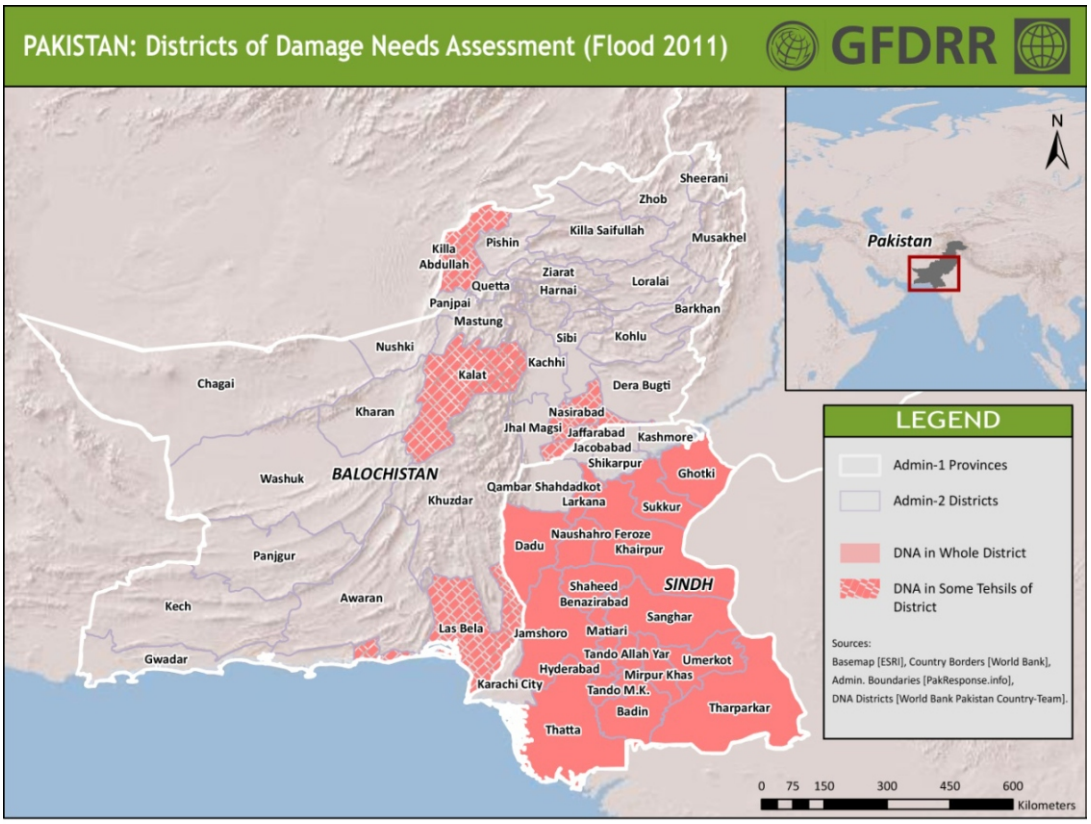
Weights and Measures

ft^3/sec	cubic foot per second
ha	hectare
km	Kilometer
km^2	square kilometer
km^3	cubic kilometer
kV	Kilovolt
m^3/sec	cubic meter per second
mm	Millimeter
MW	Megawatt

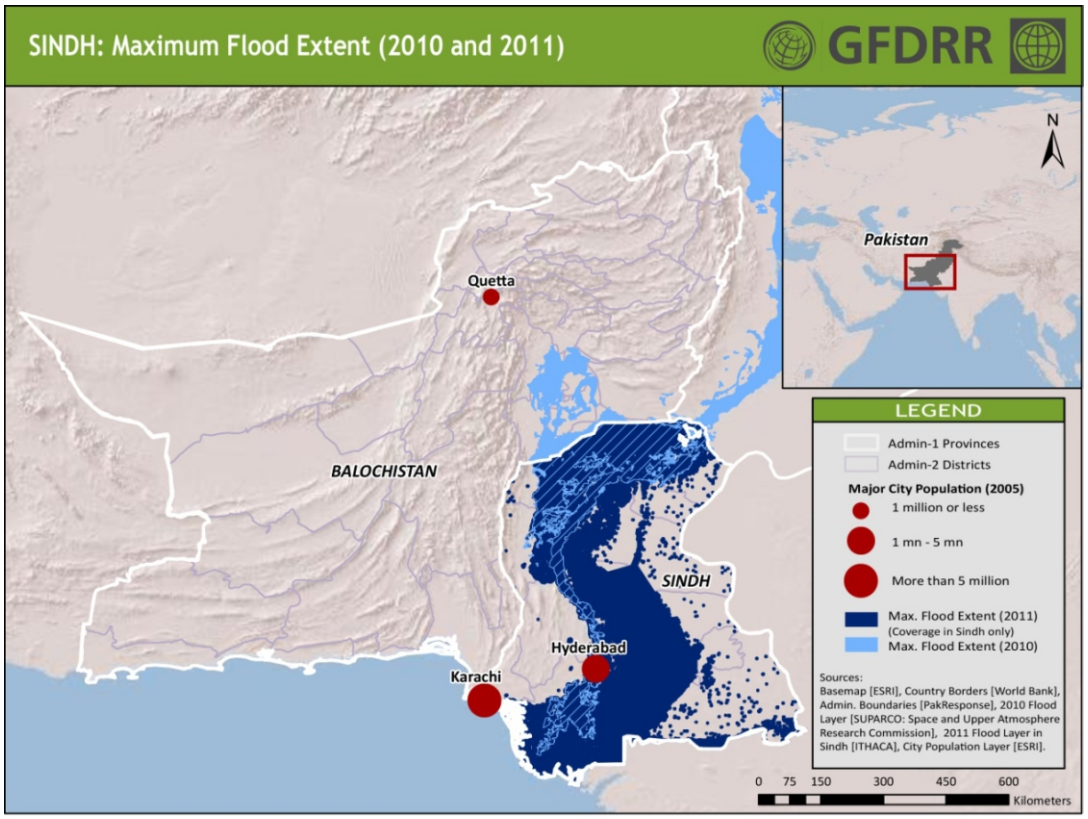
Currency and Equivalents

Currency Unit = Pakistan Rupee

US$ = PKR 87



Disclaimer: This map was produced by GFDRR, The World Bank for the Pakistan 2011 Flood DNA report. The boundaries, colors, denominations, and any other information shown on this map do not imply, on the part of The World Bank Group, any judgement on the legal status of any territory, or any endorsement of acceptance of such boundaries.



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Executive Summary

Disaster Overview

Pakistan experienced severe flooding after torrential monsoon rains hit southern Sindh and the adjoining areas of Punjab and north-eastern Balochistan in August 2011. Flash floods triggered by the monsoon rain caused severe damage to infrastructure in the affected areas. According to the National Disaster Management Authority (NDMA) the floods have affected 9.6 million people, killing 520 people and causing injuries to more than 1180 people. Entire villages and urban centers have been flooded, homes have been destroyed, and over a million acres of crops and agricultural lands have been damaged. The impact of the flooding in 2011 cannot be seen in isolation. In 2010, 20 million people were affected by the largest floods in living memory, many of whom were still in the recovery phase. In severely affected areas, food insecurity and malnutrition were already at critical levels before this year's new wave of rains and flooding.

About the Damage and Needs Assessment

In the wake of the floods, the Government of Pakistan has requested the Asian Development Bank (ADB) and the World Bank (WB) to assist in undertaking a Damage and Needs Assessment (DNA). The DNA assesses the extent of the damage and the needs for rehabilitation and reconstruction of the damaged assets and infrastructure, and restoration of livelihoods and economic productivity. It provides the strategic underpinnings for medium- to long-term post-floods reconstruction, recovery planning, prioritization, and programming. This report quantifies physical damage and presents sector level recovery and reconstruction strategies. Taking into account the extent of the damage and the proposed strategies, the report then quantifies corresponding needs.

Scope and sectors

At the request of the Federal and Provincial governments the DNA assesses damages and needs for 17 districts in Sindh and five districts in Balochistan, focusing on seven cross-cutting themes and nine sectors (Table 1). Damages and needs for the different sectors and themes are summarized in the report and presented in detail in the annexes.

Table 1: Sectors and Themes of the DNA

Cross-cutting themes	Sectors
1. Economic assessment	1. Housing
2. Governance Infrastructure	2. Water Supply and Sanitation
3. Social Protection and Livelihoods	3. Transport and Communications
4. Economic assessment	4. Energy
5. Governance Infrastructure	5. Agriculture, Livestock and Fisheries
6. Social Protection and Livelihoods	6. Irrigation, and Flood Management
	7. Health
	8. Education
	9. Private Sector, Industries and Financial Sector

With respect to financial costs the DNA considers three assessment categories:

- *Direct damage* refers to the monetary value of the completely or partially destroyed assets – such as social, physical and economic infrastructure–immediately after a disaster. Wherever possible, the direct damage to assets is determined in "as was" condition (i.e. at their book values);
- *Indirect losses* are income losses and comprise of both the change in flow of goods and services and in other economic flows –such as increased expenses, curtailed production and diminished revenue–which arise from the direct damage to production capacity and social and economic infrastructure;
- *Reconstruction costs* measure the costs of rebuilding lost assets and restoring lost services. They are generally assessed as the replacement costs with a premium added for *building back smarter*.

Methodology

To conduct the assessment the sector teams relied on secondary data at provincial, district and sub-district *(tehsil)*level provided by relevant provincial and district government departments.

All secondary data received was verified and validated by the DNA sector teams using statistical tools, rationality and plausibility checks and cross-sector damage analysis. Validation techniques included field inspection visits, interviews with relevant stakeholders, and desk reviews.

Once the validation process was completed the sector teams conducted a comparative pre- and post-disaster assessment of infrastructure and services affected by the floods.

Coordination

The DNA team, led by the WB and ADB, was supported by the United Nations (UN) and bilateral donors. The Global Facility for Disaster Reduction and Recovery (GFDRR) provided financial support as well as technical expertise in disaster risk management and capacity building. Furthermore, the DNA team maintained close liaison with the NDMA, Provincial Disaster Management Authorities (PDMA), and the Planning and Development Departments (P&DD) of Sindh and Balochistan, throughout the assessment, including the provision of regular DNA progress updates.

Consultations

The DNA team actively engaged with the civil society and non-governmental organizations that were operating in the affected areas throughout the assessment. Their role has been extremely important during the data validation process given their unique knowledge of the situation on the field.

A consultation session was held on November 2, 2011, with local and international NGOs and civil society organizations. The session was organized by the DNA team in collaboration with UN. The DNA team apprised the participants on all aspects of the DNA exercise and received valuable feedback from the participants on social issues related to 2010 floods and the lessons learnt, as well as the social impact of the 2011 floods. Furthermore, sector teams also held consultations with various sector specific stakeholders dealing with floods, including a host of government and non-governmental entities.

Summary Table of Total Damage and Reconstruction Costs

This report presents: (i) estimated direct damage and indirect losses amounting to approximately PKR 324.5 billion (US$ 3.7 billion) and; (ii) estimated cost of recovery and reconstruction needs at PKR 239 billion (US$ 2.7 billion).

The direct damage costs are estimated at PKR 279.5 billion, while indirect losses equal approximately PKR 45 billion. The highest damages occurred in the agriculture, livestock and fisheries sector, calculated at just over PKR 160 billion (US$ 1.84 billion). A detailed breakdown of damage costs is provided in Table 2.

Table 2: Estimate of Total Damage Costs by Sector

Sector	Direct Damages PKR millions	Indirect Losses PKR millions	Total Damage	
			PKR millions	USD millions
1. Social Infrastructure				
Housing	77,420	8,046	85,465	982
Health	432	826	1,258	14
Education	10,157	1,856	12,014	138
Subtotal	**88,009**	**10,728**	**98,737**	**1,135**
2. Physical Infrastructure				
Irrigation & Flood Management	4,763		4,763	55
Transport & Communications	16,386	10,082	26,468	304
Water Supply & Sanitation	500	704	1,204	14
Energy	457	783	1,240	14
Subtotal	**22,106**	**11,569**	**33,674**	**387**
3. Economic Sectors				
Agriculture, Livestock & Fisheries	142,358	17,749	160,107	1,840
Private Sector, Industries and Financial Sector	22,694	4,560	27,254	313
Social & Gender	39	5	44	1
Subtotal	**165,091**	**22,313**	**187,405**	**2,154**
4. Cross Cutting Sectors				
Governance	1,571	382	1,953	22
Environment	2,763		2,763	32
Subtotal	**4,334**	**382**	**4,716**	**54**
Total	**279,540**	**44,992**	**324,533**	**3,730**

The recommended reconstruction needs, are based on the lessons learnt from the Floods 2010 DNA, and are inclusive of Build Back Smarter (BBS) factor. Reconstruction costs are estimated at PKR 239 billion (US$ 2.7 billion). A detailed breakdown of reconstruction costs is provided in Table 3.

Table 3: Estimate of Total Reconstruction Costs by Sector

Sector	Reconstruction Needs	
	PKR millions	USD millions
1. Social Infrastructure		
Housing	91,510	1,0512
Health	864	10
Education	22,589	138
Subtotal	**114,963**	**1,321**
2. Physical Infrastructure		
Irrigation & Flood Management	9,526	110
Transport & Communications	33,902	390
Water Supply & Sanitation	1,900	22
Energy	292	3
Subtotal	**45,620**	**524**
3. Economic Sectors		
Agriculture, Livestock & Fisheries	26,590.0	306
Private Sector, Industries and Financial Sector	8,178	94
Social & Gender	65	1
Social Protection	34,126	392
3. Cross Cutting Sectors		
Governance	4,769	55
Disaster Risk Management	1,827	21
Environment	2,874	33
Subtotal	**9,470**	**109**
Total	**239,011**	**2,747**

Table 4 presents a breakdown of the total estimated damage and reconstruction costs by province.

Table 4: Estimated Damage and Reconstruction Costs by Province / Area

Province	Damage Costs		Reconstruction Option 1	
	PKR millions	USD millions	PKR millions	USD millions
Sindh	310,778	3,572	219,618	2,524
Balochistan	12,356	142	6,035	69
Federal / Cross Cutting Sectors	1,405	16	13,353	153
National Total	**324,533**	**3,730**	**239,011**	**2,747**

Report Outline

The introductory sections of the report contextualize the disaster by describing Pakistan's social and economic context and the background to the floods, particularly in light of the record floods that hit the country in 2010 (Chapter 1). The methodology used to conduct the assessment is explained in Chapter 2. An overview of the macro-economic impact of the floods is presented in Chapter 3, followed by a summary of the damages and needs for each sector in Chapter 4 (the detailed sector analyses are presented in the annexes to this report). In Chapter 5 the report suggests governance and institutional arrangements for the implementation of the reconstruction program, followed by an overview of cross-cutting issues that should be taken into consideration, including social considerations (Chapter 6), environmental considerations (Chapter 7), and disaster risk management (Chapter 8). Finally, Chapter 9 presents the guiding principles for reconstruction.

CHAPTER 1

The 2011 Floods

Overview

With the arrival of the annual monsoon in early August, parts of Pakistan including Lower Punjab, Sindh, Khyber-Pakhtunkhwa (KP) State of Azad Jammu & Kashmir (AJK) and Gilgit-Baltistan (GB) received varying degrees of heavy rainfall, resulting in the issuance of riverine / flash flood warnings for rivers Kabul, Swat and Chenab. Between August 10 and September 14, Central and Lower Sindh as well as parts of Balochistan received additional intense rainfall, heavily concentrated on the eastern side of the Indus River.

The precipitation during this period in parts of Sindh, was estimated to be 270 percent above normal rainfall patterns. Combined with the diverse topography of the region, including Sindh's low-lying and flat terrain, the continued heavy rains overwhelmed the absorption capacity of the soil, as well as flood-mitigation infrastructure, resulting in the inundation of substantial areas. Despite sustaining several breaches along its length, the Left Bank Outfall Drain (LBOD) of the Indus River that was not designed to drain rain or flood run-off, facilitated the drainage of a considerable volume of flood waters from Sindh province out to the Arabian Sea.

In Balochistan, flash flooding as well as overflowing local rivers and irrigation and drainage channels caused damages in approximately 14 districts, the worst of which (5 districts) were confined in the south and northern parts of the province.

As of January 2012, the NDMA estimated that approximately 9.6 million people have been affected in Sindh and Balochistan as a result of the floods, with 520 reported deaths and 1180 injured[1]. According to official sources, approximately 27,370 sq. km area has been affected, for which Sindh alone accounts for an estimated 27,000 sq. km.

The 2010 Floods

Pakistan has also experienced extraordinary rainfall over a year ago, between July and September 2010, in the north and north-western regions of the country, particularly KP, GB and AJK. The high-intensity rainfall resulted in the generation of unprecedented flood peaks in Swat, Kabul and Indus Rivers which affected the entire length of the country. The 2010 floods were assessed to be the worst since 1929. The United Nations (UN) termed the disaster as greater than the 2004 tsunami, the 2005 Pakistan earthquake and the 2010 Haiti earthquake, combined. At the time, NDMA had estimated that the floods affected 78 districts and covered over 100,000 sq. km. The floods affected approximately 20 million people, (more than one-tenth of Pakistan's population) with over 1,980 reported deaths and nearly 2,946 injured. About 1.6 million homes were destroyed, and thousands of acres of crops and agricultural lands were damaged with major soil erosion happening in some areas. The 2010 floods were concentrated along main rivers and caused by overflow of river banks and breaches of embankments. In comparison, the 2011 floods were driven by high intensity

[1] NDMA: Damages Monsoon 2011 (Sindh and Balochistan), January 16, 2012

unprecedented rainfall on the eastern side of the Indus River. Both events demonstrate changing climatic and weather pattern in the region and their intensity of recurrence. The joint ADB and WB-led Damage and Needs Assessment estimated total damage costs of the 2010 disaster at approximately PKR 854.8 billion (US$ 10.1 billion), while reconstruction costs ranged from PKR 578 billion to PKR 756 billion (US$ 6.8 billion to US$ 8.9 billion).

Social and Economic Context

For many years, Pakistan has been struggling not only with natural disasters but also issues related to security, political and economic turmoil. It has low social development indicators, the Legatum Prosperity Index 2011 ranks Pakistan 86th for entrepreneurship and opportunity, 96th for economy and health, 100th for Social Capital, 104th for personal freedom, 105thfor education and 109th for safety and security out of 110 countries. Human Development Index 2011 ranks Pakistan 145 out of 187 countries[1].Pakistan has a[2] Gender Inequality Index (GII) value of 0.573, ranking it 115 out of 146 countries in 2011. More than 50 percent of Pakistan's people suffer from multiple deprivations[3]. According to a 2008 UN joint assessment it is estimated that 45 million are severely food-insecure[4]and almost 40% of children are underweight. The literacy rate for over ten years is 57%,[5] being much higher in urban than rural areas and higher for men than for women.

Pakistan's economy continued to be affected by a fragile and uncertain political situation, adverse security conditions, energy shortages, and a weak policy environment. In addition, the economy has been seriously impacted by floods both in 2010 and 2011. In the wake of these immense challenges, the economy has shown a fair degree of resilience. For example, despite enduring the worst floods in the country's history in 2010, the economy posted a positive growth of 2.4 percent; and even with extensive damage caused by the floods to all major crops, the agriculture sector showed a growth rate of 1.2 percent. For the first time in many years, the current account balance showed a surplus, although small.

This less than expected economic impact of the floods was largely due to the concerted efforts and good management skills displayed by the communities and government to control economic losses caused by the floods. Government's support to the flood impacted population, especially in the form of cash grants to rebuild their livelihoods and homes, and appropriate agricultural packages for the flood hit areas, helped in limiting the cost of flood damage. However, the fiscal situation has remained weak, adversely impacting improvement in other macroeconomic indicators. Higher level of fiscal deficits not only implied increased level of debt liability, but the government's resort to heavy borrowing from the banking system to meet these deficits has been crowding out private investment and keeping the inflation rate high. Moreover, natural disasters have impacted the government efforts and ability to stabilize the economy and accelerate economic growth.

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[1] The 2011 Legatum Prosperity Index™ Rankings, Legatum Institute, London UK www.prosperity.com

[2] The Gender Inequality Index (GII) reflects gender-based inequalities in three dimensions – reproductive health, empowerment and economic activity. Reproductive health is measured by maternal mortality and adolescent fertility rates; empowerment is measured by the share of parliamentary seats held by each gender and attainment at secondary and higher education by each gender; and economic activity is measured by the labour market participation rate for each gender. The GII replaced the previous Gender related Development Index and Gender Empowerment Index. The GII shows the loss in human development due to inequality between female and male achievements in the three GII dimensions. Source: UNDP HDR 2011.

[3] Government of Pakistan, Economic Survey, Ministry of Finance,2010-11

[4] World Food Program at http://www.wfp.org/countries/pakistan

[5] Pakistan Social and Living Standards measurement survey (PSLM 2008-2009)

Economic framework

Although the macroeconomic framework presented by the government at the time of budget had some realistic estimates, the fiscal projections appeared to be overly optimistic. The budget aimed at reducing the fiscal deficit from 6.6 percent of GDP in 2010/11 to 4 percent in 2011/12.[1] While the government took some positive fiscal measures before and with the 2011/12 budget, these were grossly inadequate to support the kind of fiscal adjustment envisaged by the budget. In any event, government's macroeconomic framework became largely irrelevant due to some adverse developments. First, despite some positive measures taken by the government to expand the base of GST, an integrated VAT (or RGST) remains an unfulfilled wish. Second, the desired reduction in recurrent expenditure did not materialize, as efforts to lower power sector subsidies were largely unsuccessful as higher oil prices and change in fuel mix, from domestically produced natural gas to more expensive imported fuels, raised the cost of power generation. The floods are likely to add to these fiscal problems of the government.

Response to the 2011 floods

Government of Pakistan response

In the immediate aftermath of the floods, the government responded through the mobilization of national, provincial and district resources including the deployment of civil and armed forces personnel. Several infantry platoons of the army as well as medical and engineering teams were deployed in disaster affected areas to carry out search and rescue operations, which were further supported by helicopters and dozens of navy and coast guard personnel and boats. To support the national and provincial Disaster Risk Management (DRM) institutions, the Prime Minister's Flood Relief Committee was also formed to monitor rescue and relief activities. In parallel, small-scale engineering works were undertaken to strengthen flood mitigation infrastructure to avoid further damage and loss of lives. During the peak of the humanitarian crisis, almost 700,000 people were being housed in approximately 3,500 relief camp managed by the government, international partners, NGOs and civil society. As of January 2012, the NDMA reported the distribution of over 316,000 tents in the affected areas and 3.7 million ration packs, of which 48,000 ration packs were distributed in Balochistan. To provide immediate cash assistance to the flood affected population in Sindh, the provincial government, with support from the federal government, has disbursed approximately PKR 10.3 billion[2] through the Pakistan Card-based cash transfer scheme (PKR 10,000 per family).

International response

Initially the federal and provincial governments responded to the disaster through own resources, which however, were overwhelmed in the wake of the growing humanitarian crisis. Despite providing assistance during the unprecedented floods of 2010, the international community immediately responded to the appeal by the Government of Pakistan for international support for rescue and relief activities following 2011 floods. As of December 2, 2011, forty-six countries have pledged a total commitment of approximately US$ 260 million[3] including support in cash and in-kind. Furthermore, an emergency flood relief cell, established at the

[1] The 2010/11 fiscal deficit of 6.6 percent of GDP includes a one-time expenditure of 0.7 percent of GDP on payment of arrears of electricity subsidy. In other words, the 2011/12 budget aimed at reducing the "actual" fiscal deficit from 5.9 percent of GDP in 2010/11 to 4 percent in 2011/12.

[2] Figure as of January 18, 2012, obtained from PDMA Sindh website: http://www.pdma.rain.pk/rain2011/

[3] National Disaster Management Authority, Foreign Assistance for Floods 2011, December 2, 2011

Ministry of Foreign Affairs, closely liaised with the members of the diplomatic community and international organizations to coordinate international assistance.

The UN undertook an Initial Rapid Needs Assessment to focus on the immediate relief phase for the following clusters: (i) emergency shelter; (ii) food security; (iii) health and; (iv) water sanitation and hygiene. Based on these cluster assessments, the UN launched a US$ 356 million Rapid Response Plan in September 2011. As of April 2012, approximately, US$ 171 million or 48% were received in response to the UN's flash appeal.[1] In January 2012, the UN launched the Early Recovery Framework seeking a further US$ 439 million to continue flood response until September 2012, the funding for which has not yet started.

Civil society and private sector response

The response of civil society organizations and the private sector to the floods in Sindh and Balochistan was immediate, rapid and extensive. In many cases local NGOs acted as the first responders to the disaster and worked extensively with the Government to provide emergency relief support in the affected areas. The emergency relief support provisions included ration packs, water purification kits and tablets, shelter items (including tents, blankets and mosquito nets), sanitation kits and hygiene supplies, doctors and medical supplies, mobile and basic health care units especially for women and children. A particular focus has been placed on health care services to avoid the spread of water-borne infections and other diseases and to provide basic health care services, an example of which is an extensive program being implemented in the severely affected district of Tando Allah Yar in Sindh[2]. Media on their part covered the event extensively and played a significant role in raising awareness and mobilizing local and international resources for the disaster. Individuals and organizations from the private sector, both from Pakistan and the global community have contributed significantly to the flood relief effort alongside the government and donor community.

[1] UN, Pakistan Floods 2011 Early Recovery Framework, January 2012

[2] A US$165,000 program being implemented by a Pakistani NGO as reported in "USAID, Pakistan Floods, Fact Sheet # 4, Fiscal Year (FY) 2012, October 28, 2011"

CHAPTER 2

The DNA Methodology

The DNA has remained a Government-led overarching and consultative assessment, with the National Disaster Management Authority of Pakistan as the main coordination body at the federal level; and the respective Provincial Disaster Management Authorities (PDMAs) and P&D Departments at the provincial level.

The assessment flexibly applied the United Nations Economic Commission for Latin America and the Caribbean (UN ECLAC) methodology to suit the unique country situation.

The impact of the floods on each sector of the economy includes the following three costs: (i) Direct Damage; (ii) Indirect Losses; and (iii) Reconstruction Cost.

Direct Damage refers to the monetary value of completely or partially destroyed assets, such as social, physical and economic infrastructure calculated at the book value, or the depreciated value of lost immovable assets. Movable assets like goods, furniture, machineries and inventories lost during the disaster are valued at the replacement cost.

Indirect Losses are income losses, and comprise both the change of flow of goods and services and other economic flows such as increased expenses, curtailed production and diminished revenue, which arise from the direct damage to production capacity and social and economic infrastructure. Wherever possible damage and losses have been further split across public and private sectors to assist in macroeconomic analysis and to guide the development of public sector recovery strategies that optimally also take into account the recovery of private sector assets and services.

Reconstruction Costs are calculated using the replacement value (and not the book value) of assets and infrastructure. Coordination was maintained across different sectors to ensure there are no overlapping reconstruction and recovery costs and different factors used in calculations were consistently applied.

Build Back Smarter (BBS)

While calculating the reconstruction cost the principle of Building-Back-Smarter (BBS) has been applied. Under the BBS principle Building-Back-Better (BBB) has been selectively applied across sectors and within sectors to ensure a cost-optimized multi-hazard reconstruction. Under this approach, factors for right siting and right sizing have been introduced along with larger flood protection infrastructure improvements.

Data Collection

During the DNA of floods in 2010, customized and criteria-based sector templates for collection, collation and classification of secondary damage data were prepared, allowing simultaneous damage disaggregation at district and *tehsil* level and re-aggregation at provincial level, thus allowing room for later data validation at various levels and using various techniques. Prior to the commencement of DNA 2011, these data templates were further refined through consultations with government counterparts, as well as through the

incorporation of lessons learnt from the previous year. Extensive data training sessions were held for NDMA, PDMA and provincial line department officials and 25 DNA data consultants were deployed for data procurement and for extending support to provincial government departments in template-based consistent data collection in Sindh and Balochistan. A central DNA Data Team interacted closely with the field data consultants, sector teams and the provincial governments. Finally, to streamline the flow of information a web-based team room was created for data management based on specific procedures for data updating, cleaning, filtering and collation functions.

Damage Quantification

The process of damage and loss quantification broadly entailed the engagement and mobilization of national and international sector specialists for sector damage assessments and subsequent needs strategization and quantification. Sector teams mobilized during the DNA 2011 had been capacitated to quantify damages and recovery needs through the provision of elaborate training in the Damage and Loss Assessment (DaLA) methodology by the World Bank's Global Facility for Disaster Reduction and Recovery (GFDRR) team, during DNA 2010.

Validation

Damage validation was based on a multi-pronged approach including: (a) upfront data validation through desk review and detailed analysis of pre-disaster asset and infrastructure baseline data by the sector teams; (b) collective determination of percentage-based damage in sectors such as housing and the private sector for certain regions and provinces; (c) analytical validation of damage data by sector teams, employing techniques and plausibility checks such as relative-to-baseline analyses, disaggregated analysis at various levels, comparisons across vertical and horizontal streams of district and provincial data and; (d) limited, sample-based physical validation by the sector teams in the flood affected areas.

CHAPTER 3

Economic Impact

The Overall damage from 2011 floods is estimated at Rs 324.5 billion (1.6 percent of GDP), with direct damages amounting to 1.3 percent of GDP and indirect losses of 0.2 percent of GDP (Table 5). Unlike last year, when the floods affected each province and inundated one-fifth of the agricultural area, the 2011 floods remained confined to Sindh and Balochistan, with almost all (96 percent) of the damage occurring in Sindh. Although the 2011 floods were significantly less in intensity and duration than the 2010 floods, yet in terms of their economic impact, especially in Sindh, these were as devastating. In 2010, the total flood damage in Sindh was estimated at Rs 370 billion (8.4 percent of estimated provincial GDP), whereas the 2011 floods have caused an estimated damage of Rs 311 billion (or 6.1 percent of provincial GDP) in the province. This is mainly because 2010 floods devastated the areas on right bank of river Indus, which contains relatively poorer districts of Sindh with low economic activity. In 2011, the floods impacted the richer districts on the left bank of Indus. These districts constitute the agricultural heartland of the province. The damage just in agriculture is estimated to be Rs 151 billion as compared to Rs 194 billion in 2010. On the other hand, in Balochistan, damages in 2011, at Rs 12 billion, (or 1.4 percent of provincial GDP) were only about a quarter of Rs 53 billion (6.7 percent of provincial GDP) of damages suffered in 2010.

Table 5: Estimate of Total Damages and Reconstruction Costs

Sector	Indirect Losses	Indirect Losses	Total Damage		Reconstruction Cost	
	(Rs million)	(Rs	(Rs million)	(US$	(Rs Million)	(US$ million)
1. Social Infrastructure						
1.1 Housing	77,420	8,046	85,466	982	91,510	1,052
1.2 Health	432	826	1,258	14	864	10
1.3 Education	10,157	1,856	12,014	138	22,589	260
Sub-total	**88,009**	**10,728**	**98,738**	**1,135**	**114,963**	**1,321**
2. Physical Infrastructure						
2.1 Irrigation & Flood Management	4,763	0	4,763	55	9,526	110
2.2 Transport & Communications	16,386	10,082	26,468	304	33,902	390
2.3 Water Supply & Sanitation	500	704	1,204	14	1,900	22

2.4 Energy	457	783	1,240	14	292	3
Sub-total	**22,106**	**11,569**	**33,674**	**387**	**45,620**	**524**
3. Economic Sectors						
3.1Agriculture, Livestock & Fisheries	22,694	4,560	27,254	313	8,178	94
3.2 Private Sector /1	88,009	10,728	98,738	1,135	114,963	1,321
3.3 Social & Gender	39	5	44	1	65	1
3.4 Social Protection	0	0	0	0	34,126	392
Sub-total	165,091	22,314	187,405	2,154	68,959	793
4. Cross Cutting Sectors						
4.1 GovernanceManagement	4,763	0	4,763	55	9,526	110
4.2 Disaster and Risk Management	16,386	10,082	26,468	304	33,902	390
4.2 Environment	500	704	1,204	14	1,900	22
Sub-total	4,334	382	4,716	54	9,470	109
Total	279,540	44,992	324,533	3,730	239,011	2,747
(percent of **GDP**)	1.3%	0.2%	1.6%	1.6%	1.1%	1.1%

/1 Includes Commerce, Industry and Finance

The direct damages from floods are estimated by aggregating the market value of damage to agricultural crops, livestock and the "book-value" of partially or fully damaged physical infrastructure. Reconstruction of damaged assets has to be evaluated at current prices and so the reconstruction cost would depend on the mode of reconstruction and subsidy schemes adopted. This reconstruction cost is estimated to be about 1.1 percent of GDP.

The adverse impact on economic growth would be significant

As mentioned above, despite being substantially less in intensity, because of their location and timing, the 2011 floods are expected to have a significant effect on the economy. With large scale damage to agriculture and housing sectors, economic growth is likely to suffer a significant deceleration. Despite expectations of better than projected showing in Punjab, floods will cause a decline in growth of agriculture sector from 3.9 percent to 2.7 percent. This would also have some dampening effect on growth of downstream economic activities. Industry and services sector will experience relatively minor deceleration in growth. The overall economic growth is therefore projected to decline from its pre-flood projection of 4.2 percent to 3.8 percent.

Inflation is likely to remain high.

Since experiencing the commodity price shocks in 2007/08, inflation has remained high, mostly in double digits. This is mainly because of the weak fiscal policy stance has effectively eroded any impact on prices of a tight monetary policy pursued by the State Bank of Pakistan. Moreover, the pass-through effect of frequent adjustments of power tariffs and oil and gas prices have also kept the inflation level high. In 2010/11, inflation averaged a relatively high level of 13.7 percent. For 2011/12, original projections put inflation at 11.3 percent. However, during the first half of the fiscal year, the deceleration in inflation has been faster than expected, and year-on-year inflation dropped to single digit level (9.8 percent) in December 2011, despite a sharp depreciation of rupee. It is therefore projected that floods will cause the average inflation to increase to 11.6 percent.

Cost of relief, rehabilitation activities and repair and reconstruction of public infrastructure is likely to add to fiscal fragility

As mentioned above, a bulk of Pakistan's macroeconomic vulnerability stems from its fragile fiscal situation. Compared to the original fiscal deficit target of 4 percent of GDP, due to substantial overrun in power sector subsidy and revenue shortfall, the end-year fiscal deficit in 2010/11 was 6.6 percent of GDP. For 2011/12, the government again set a fiscal deficit target at 4 percent of GDP. However, given the lack of budgetary measures to achieve this target, a fiscal deficit of 6 percent of GDP was considered more realistic. After the floods, this estimate is likely to increase 6.4 percent of GDP as revenue are expected to fall by 0.1 percent of GDP and additional expenditure on relief, rehabilitation and reconstruction will cause an overrun of 0.3 percent of GDP in expenditure.

Balance of payments may also come under pressure

The current account deficit will also widen from 0.8 percent of GDP to 1.4 percent of GDP as damages, especially to the cotton crop, will adversely impact exports, whereas additional imports would be required to cover the supply losses caused by floods, agricultural inputs (fertilizers, pesticides, etc.) and construction material.

CHAPTER 4

Summary of Damage and Needs by Sector

Housing

Damage – PKR 85,465 million (US$ 982.4 million): The floods caused total or partial damage to an estimated 999,388 housing units in Sindh and Balochistan. An estimated 514,283 houses have been completely destroyed[1] and another 484,093 partially damaged[2]. Sindh province has suffered the overwhelming majority of damage to housing stock with 99% of the total affected housing stock. As expected, the extent of damage incurred to katcha houses has been far higher with 29% of the total katcha housing stock affected (903,000 housing units), out of which 495,000 housing units were completely destroyed. By contrast, only 7% of total pucca housing stock (96,000 housing units) has suffered damage, with about 19,000 being completely destroyed. The damages to housing structures, reflecting the depreciated value of the affected stock is US$ 630.3 million (US$ 433.2 million for completely destroyed houses and US$ 197.1 million for partially damaged houses). These are based on the average number of rooms in a typical house, averaged across all districts in each province to calculate average unit size for each province. The cost of a typical katcha and pucca house has been estimated using unit material and labor costs collected from the field by the DNA team. Damages to housing assets (depreciated) include: (a) US$ 207.3 million in household goods and assets, and US$ 52.3 millionin damages to household water and sanitation facilities for a total of US$ 259.6 million. Adding up the two categories of infrastructure and assets, total housing sector damage (depreciated) is estimated at US$ 889.9 million. Indirect losses including cost of debris removal and demolition; and cost of providing temporary shelter to affected households are estimated to be US$ 92.5 million.

Strategic Options for Housing Reconstruction: The objective of the housing reconstruction grant would be to replace a destroyed house with a new core unit, preferably of flood-resistant standards in areas at risk of recurrent flooding. Alternatively, a repair grant would help restore structurally damaged portions of houses to a livable state. Since parts of the affected area are prone to recurrent flood/cyclone risks, reconstruction of houses in these areas should be based on appropriate cost-effective, hazard-resistant engineering standards as far as possible. While this approach will increase initial costs of reconstruction to some extent, it will constitute the most economically efficient solution when viewed over the full useful life of these investments.

Recovery/Reconstruction Needs – PKR 91,510million (US$ 1051.8 million): These estimates are based on replacement of a destroyed house with a core unit of 500 sq.ft covered area, calculated on the basis of currently prevailing prices of materials and labor. As detailed in annex 10, Option-1, costing US$ 985.8 billion, is a base case providing for a uniform subsidy calculated on the basis of a katcha core unit. It is Not Recommended and is provided for comparison purposes only. Option-2, costing US$ 1.051 billion, offers a *Differential Subsidy* providing for reconstruction to flood-resistant standards for those units that are located within the flood hazard area. It is recommended for districts in Sindh which have experienced recurrent flooding over the last 10 years, and ensures optimal use of scarce public resources.

[1] This primarily includes washed away, fully collapsed, or structurally damaged houses with foundation failure or erosion of supporting walls

[2] This mostly includes cases of repairable damage.

Health

Damage – PKR 1,257.85 million (US$ 14.3 million): The floods caused by heavy rains in 2011 resulted in mild damage to the public health infrastructure in Sindh and Balochistan provinces. Basic health units and rural health centers suffered the most damage; accounting for 74 (52%) of the total 141 damaged facilities. Most of the secondary health care facilities largely remained un-affected and – except for short interruption, these facilities have continued service provision. No health staff is reported to have died or injured. In Sindh, of the total of 708 health facilities of various categories in the 11 districts where health sector was affected, 113 (16%) were damaged out of which 28 (4%) were fully damaged, and 85 (12%) were partially damaged. In Balochistan, of the total of 193 health facilities in the 3 affected districts, 28 (15%) were damaged out of which 13 (7%) were fully damaged and 15 (8%) were partially damaged. The damage caused to the health sector in the Sind province constitutes 7% of its total health facilities (1486); and 1% of the total health facilities (2075) in Balochistan.

Recovery/Reconstruction Needs – PKR 863.7 million (US$ 9.8 million): Total reconstruction cost estimates for the fully and partially damaged health facilities have been worked out as PKR 863.7 million (US$ 9.8 m)based on the government's local schedule of rates with a 15% addition for price escalation and build back smarter factor, and 10% addition for external development. In the medium- and long-term, a comprehensive health sector revitalization/restructuring strategy should aim at the provision of minimum standards of service delivery based on the key principles of equitable access to essential health care, timeliness, results, and accountability.

Education

Damage – PKR 12,013.78 million (US$ 138.1 million): Total number of educational institutions affected by the floods is 4,096 (Sindh: 3,892; Balochistan: 204). The damaged institutions are 9.8% of the total (Sindh: 9.9%, Balochistan: 7.20%) institutions in the affected districts and only 6.7% of the overall total educational institutions in the two provinces (Sindh: 8.0%, Balochistan: 1.7%). In Sindh, damaged schools for females are 1,032 (385 are fully damaged and 647 are partially damaged) or 26.5% of the total of 3,892 damaged schools, while damaged schools for males are 2,860 (1,022 are fully damaged and 1,838 are partially damaged) are 73.5% of the total of 3,892 damaged schools. In Balochistan, damaged schools for females are 51 (3 are fully damaged and 48 are partially damaged) or 25% of the total of 204 damaged schools, while damaged schools for males are 153 (17 are fully damaged and 136 are partially damaged) or 75% of the total of 204 damaged schools). The total damage and loss in both the provinces is PKR 12,013.8 million including indirect loss of PKR 1,856.4 million. In Sindh, total damage and loss is estimated at PKR 11,751.5 million including indirect loss of PKR 1,771.1 million and direct loss of PKR 9,980.3 million. In Balochistan, indirect and direct losses are PKR 85.11 million and PKR 177.1 million respectively.

Recovery/Reconstruction Needs – PKR 22,589.43 million (US$259.7 million): The total cost of reconstruction for all the damaged institutions of both the provinces is estimated to be PKR 20,733.1 million (US$ 238.3 million) of which requirement for Balochistan is estimated at PKR 544.5 million (US$ 6.3 million). Overall recovery and reconstruction needs are estimated to be PKR 22,589.4 million (US$ 259.7 million). Reconstruction needs for Sindh would be PKR 21,959.9 million (US$ 252.4 million) and those for Balochistan would be PKR 629.6 million (US$ 7.2 million). In addition to reconstruction cost of damaged institutions, other reconstruction needs include teacher orientation, facility-by-facility survey of damaged

institutions to work out actual needs of each institution, and provision of textbooks and other learning materials. Provision of free textbooks is the responsibility of each province as per the current policy.

Irrigation and Flood Management

Damage – PKR 4,763 million (US$ 54.75 million): The damage reported are in 38 irrigation divisions of Sindh province (PKR 3,936 million or US$ 45.2 million), and 14 irrigation divisions of Balochistan province (PKR 827 million or US$ 9.5 million). In Sind, fifteen divisions suffered damages exceeding US$ 2.5 million each. In Balochistan, three divisions have reported damages exceeding US$ 1.0 million. The damage estimates reflect the reconstruction requirement at depreciated value as most of the infrastructure is more than 15 years old. Indirect losses such as damage to crops due to flooding and disruption of irrigation supplies, siltation and water-logging of agricultural land are not covered in irrigation and flood sector.

Recovery/Reconstruction Needs – PKR 9,526 million (US$ 109.49 million): The reconstruction cost estimated for Sindh province is PKR 7,872 million (US$ 90.5 million) and for Balochistan is PKR 1,654 million (US$ 19 million). The proposed irrigation, drainage and flood protection sector reconstruction strategy is to restore all damaged infrastructures, and strengthen vulnerable and damaged sections before 2012 monsoon. Main drains in Sindh, particularly left bank outfall drain (LBOD) drained huge volume of water, which otherwise would have kept the farmlands inundated for a very long time also affecting the cropping in winter season. These drains have been designed to discharge sub-surface water for checking water logging of agricultural land. Their capacity should be enhanced for also draining storm water, after carrying out in-depth analysis and forecasting probable maximum rainfalls in next 20 to 50 years. Proper inlets need to be designed for collecting rain water. Strict monitoring is essential to avoid damages to drainage structures by the farmers. If annual maintenance is not carried out, before and after monsoon season, it would waste all investments made to improve these drains. Preparation of a maintenance manual is strongly recommended. For small dams, design parameters for estimating reservoir capacity, spillway capacity and crest levels, highest flood levels as well as dam configuration need to be revisited keeping in view the changing climate patterns, and rainfall intensities and durations. The present hydrological approaches of using historic data to estimate future trends need to be more carefully applied for designing dams and flood irrigation projects considering changing climatic patterns.

Transport and Communications

Damage – PKR 26,468 million (US$ 304 million): The damages in transport and communications sector involve various categories of roads, railways, bridges, and telecommunications infrastructure. Preliminary estimates indicate that 10% of the road network (approximately 8,385 km) and 190 km railway lines were damaged by the flood including bridges and allied structures. Most of the damages are on provincial highways and district roads of Sindh. Damage to the telecommunication infrastructure includes damages to cellular sites, exchange centers, equipment, power system and supporting civil works (US$1.9 million). Out of the estimated total damage and losses, the road subsector sustained the highest damage and losses (US$299 million) followed by the railway subsector (US$3 million). The affected mobility during the floods has mostly been restored through emergency measures. The floods have impaired the road asset condition which will continue to deteriorate faster if repairs, rehabilitation and restoration works remain deferred for a longer period. The indirect losses due to damages in road sector were also calculated based on an increase in the road user cost and using a phased recovery period.

Recovery/Reconstruction Needs – PKR 33,719 million (US $ 388 million): The reconstruction needs of the sector have been estimated at US $ 388 million, including US $ 5 million for railways and excluding US $ 2 million required in the telecommunication subsector as these were private assets with insurance coverage. Most of the reconstruction needs are in the road subsector (US $ 383 million). The recovery strategy varies across each subsector based on the nature of the responsible agency and the importance of the infrastructure. For telecommunications, the private sector operators have mobilized and carried out repairs, and restored telecom services. For roads, diversion routes were created and services restored. Emergency repairs on railway lines have been undertaken. As a short term measure, the National Highways Authority (NHA) has tasked the regional maintenance units to undertake the emergent works through pre-qualified contractors and using proceeds of the annual road maintenance funds. All reconstruction costs for railways and 10 percent of the road reconstruction costs are included in the short-term recovery phase for works to be completed within 12 months. The remaining road reconstruction will require careful prioritization to ensure efficient utilization of available resources. As most of the restoration works are not complex and thinly spread across wider geographic area, it is recommended that recovery and reconstruction works are packaged through small contracts engaging local construction firms and labor.

Water Supply and Sanitation (WATSAN)

Damage – PKR 1,203.6 million (US $ 14 million): Total damages for water supply and sanitation for both direct and indirect damages are PKR 1,160million and PKR 43.6 million in Sindh and Balochistan, respectively. Direct damages in Sindh are PKR 456.6 million in 378 reported schemes in the flood affected districts. These damages include PKR 147.6 million for public water supply and PKR 253million for public sanitation. An amount of Rs 56 million for community infrastructure damage is also included. In Balochistan, WATSAN damages have been assessed at PKR 46.6 million, in a total of 80 schemes. Indirect losses for Sindh have been calculated to at Rs 703.6 million. No such loss is calculated for Balochistan due to lack of data. Indirect losses which derives from higher expenditures related to (i) supplying potable water (tankers, cost of hand pumps, water tanks, purification and disinfection processes), and (ii) cleaning, wells, sewers and pipes; and for the loss of revenue from interrupted water supply services.

Recovery/Reconstruction Needs – PKR 1,900.2 million (US$ 22 million): The reconstruction needs inclusive of Build Back Smarter (BBS) Factor in Sindh and Balochistan are PKR 1,900.2 million which includes PKR 1,831.7 and PKR 68.5 million for each, respectively. In Sindh, it has been calculated to be PKR 833.24 million and PKR 998.5 million for water supply and sanitation, respectively. The reconstruction needs inclusive of BBS for Balochistan are only for water supply amounting to PKR 68.5 million. BBS has been evaluated for two parameters i.e. (i) technical upgrade factor and (ii) disaster mitigation factor. A 15% increment has been assumed for each of the proposed factors in all districts of Sindh and Balochistan. In addition, several other awareness, hygiene and disaster related factors have also been costed.

Agriculture, Livestock, and Fisheries

Damage – PKR 160,106 million (US$ 1,840 million): The floods have heavily impacted the agriculture sector, with damages to crops, livestock, fisheries, poultry and on-farm water distribution infrastructure. The total loss estimated isUS$ 1840.3 million, of which 89% is in the form of direct damage and 11% is in the form of indirect losses. Sindh suffered most with 94% of total damage and Balochistan with 6%. The losses were largest in the crops subsector, which accounted for 91.5%, including estimates of damages to Kharif crops; food and seed stocks; on-farm irrigation water facilities; and support services for crops, as well as indirect damages to the forthcoming Rabi 2011-12 and Kharif 2012 crops. Livestock subsector damages,

which include loss of animals and poultry, distress sales, and destruction of animal health support services, as well as indirect damages due to reduced milk production, accounts for 8.3% of total damages. Fisheries losses are estimated at around $3.4 million (0.2%) that accounts for private fish farms/ponds and hatcheries. A total of about 881 thousand ha or 53% of the planted areas was affected. The most affected crops are cotton with 74%damages to the overall planted area in the affected districts. The damages to rice were 33%, sugarcane 34%, vegetables 79% and fruits 32%. The livestock subsector losses were mainly in productivity of the large ruminants and deaths in small ruminants and poultry.

Recovery/Reconstruction Needs – PKR 26,590 million (US$ 306 million): The cost for recovery needs have been estimated at approximately US $ 306 million, which focus on the restoration of normalcy in the agriculture sector. The major recommendations include (i) support to small to medium farmers through the provision of seeds, fertilizers, tools and implements along with support for land preparation; provision of a livestock-based assistance package; (iii) partial subsidies for fishing communities and; (iv) partial rehabilitation of on-farm water management infrastructure, particularly tubewells.

Energy

Damage– PKR 1,240million (US $ 14.2 million): Damage to the energy sector was modest with total damage of PKR 1.2 billion (US $ 14.2 million), comprised of direct damage of PKR 456.5 million (US $ 5.2 million) and PKR 783 million (US $ 9 million) of indirect damage. In the power sector the total damage was PKR 281.5 (US $ 3.2 million) whereas in the petroleum sector total damage was PKR 958 million (US $ 11 million), out of which PKR 783 million (US $ 9 million) relates to indirect loses. In the power sector the majority of the direct damage is in distribution network with about 90% of the damages being to distribution transformers. Damages to the petroleum sector are very moderate, effecting only two upstream public owned (70% shares) gas fields.

Recovery/Reconstruction Needs – PKR 291.5million (US$ 3.34 million): Immediate needs for the power sector are PKR 281.5 million (US $ 3.2million) covering direct damages sustained by the public sector power companies. Needs for the petroleum sector are only PKR 10 million (US $ 0.1 million) covering the cost of direct damages suffered by public sector companies that were not insured. Key recommendations include fast track infrastructure restoration by diverting resources to restoration activities including utilizing existing stores and existing civil works contractors, fast track procurement for continuous replenishment of stores, and establish and implement standard emergency operating procedures. Recommended policy actions for the energy sector include establishing policy for unrecovered receivables from customers in the affected areas, and policy for compensation to public sector companies for providing free electricity or gas to flood affected population during relief and recovery.

Private Sector, Industries and Financial sector

Damage – PKR 27,254 million (313.3 million): Damage costs in the private are PKR 6,840 million (US $ 78.6 million).Although final estimates of the scale of the damage especially to the real sector are not yet available, it is quite evident that the floods have inflicted heavy losses to the infrastructure, property and standing crops, thereby directly affecting the inhabitants, farmers and workers alike. For the purpose of this report, losses to the sales revenues of the damaged enterprises and damages to the assets have been calculated with an assumption that the completely destroyed units will not be able to commence operations for at least a year, whereas the partially damaged would have started operations in a week's time. Financial sector damages amount to PKR 20.4 billion (US $ 234.6 million).The agriculture sector in the affected areas,

constitutes about 71 percent of loans by volume and 26 percent by amount. The agriculture credit was extended to almost all the affected districts in Sindh, and significant non-performing loans (NPLs) have been reported by one specialized bank for the zones of Mirpur Khas (US$ 56 million), Sukkur (US$ 44.5 million), Nawabshah (US$ 34 million) and Hyderabad (US$ 28 million). The State Bank of Pakistan (SBP) suspects that since the floods have rendered heavy losses to crops, property and businesses in Sindh, hence a number of additional borrowers are likely to default on their commitments. It is likely, that the NPLs for the province will exceed PKR 17 billion (US$ 195.4 million) which is more than double the amount of pre-flood NPLs. In short, an increase of about PKR 12.9 billion (US$ 148.3 million) in new NPLs is likely[1]. There have been no reports of damages to the Balochistan lending portfolios of the financial sectors. The penetration of the financial sector in the area is the lowest of all provinces, and there are very few micro-finance providers (MFPs) operating in Balochistan, who may report NPLs later in the year.

Recovery/Reconstruction Needs – PKR8,178 million (US$ 94 million): Analysis shows there is a need for recapitalization in the case of the micro-finance institutions (MFIs) and the specialized agriculture banks. Given that MFIs have limited ability to replenish capital when there are losses as in this case, they need to be rescued, and in the case of the specialized banks, their reserves are thin and their relatively undiversified portfolio limits their ability to make up the losses. The replenishment requirements of the micro-finance (MF) sub- sector in Sindh and Balochistan are around PKR 3,304 million (US$ 38 million).Meanwhile, the strong capital base of the commercial banking sector appears to help it withstand the losses inflicted by their additional NPLs. It is also worth noting that the final shape of the banking sector losses will become clearer when SBP publishes its next Financial Stability Review (FSR) in May 2012 for the second half of year 2011. The specialized banks with exposure to districts in Sindh and Balochistan may need immediate help as a big percentage of their portfolio comprised agricultural loans, and their refinancing need could go as high as PKR 4 billion (US$ 46 million). Regardless, no blanket write offs are recommended in the commercial banking and MF sectors. Such decisions should be made at the institutional level on case to case basis. Some of the MF borrowers will make genuine cases for loan write offs as many poor and transient poor households have lost their livelihoods and assets. It is recommended that women borrowers of the MF products should be given special consideration as they were already marginalized and hence more vulnerable to such shocks. No specific assistance is recommended for the insurance sector.To ensure that the viable enterprises are restored, it is estimated that a matching grant scheme of approximately PKR 870 million (US$ 10 million) would suffice. Of this amount, it is recommended that approximately 20% is routed through an agency like Small and Medium Enterprise Development Authority (SMEDA), which would target the small number of larger enterprises affected, and the remainder (80%) through the Pakistan Poverty Alleviation Fund (PPAF) which would target micro and very small enterprises where the bulk of the damage lies.

Social Protection and Livelihoods

Damage - Estimates for the total affected population in flood hit districts of Sindh and Balochistan are based on the total affected area. PSLM data is used to calculate post-flood poverty levels; this is combined with damage to housing and agriculture to estimate the number of severely affected poor and vulnerable households who require assistance to cope with the negative impact of the floods. The total is in the range of 801,897 to 851,439, representing 52-54 percent of the total affected population. The majority of these are in Sindh (786,917 to 836,311) and the rest in Balochistan. Districts with over 50 percent or more severely

[1] SBP (2011). Impact of Recent Floods on NPLs. Financial Stability Review – First Half 2011. Box 2.1 Page 33-34. Downloaded from www.sbp.gov.pk on Dec 20, 2011.

affected households are Badin, Dadu, Khairpur, Matiari, Mirpurkhas, Sanghar, Tando Allah Yar, Tando Muhammad Khan, and Thatta in Sindh, and Kalat, Jaffarabad, and Lasbela in Balochistan.

Recovery/ReconstructionNeeds – PKR 34,126 million (US$ 392 million): The poverty profile of flood affected districts in Sindh and Balochistan already shows a heavy concentration around the poverty line – meaning that an external shock such as the floods would have pushed many households into/deeper into poverty. To meet the immediate basic needs of poor and vulnerable affected families it is recommended that they be given cash or in kind transfers for a period of six months. For a food basket of PKR 6,680 the estimated cost is PKR 34,126 million[1] (US$ 392 million). At the same time a medium- and long-term perspective is required with measures that can mitigate the effects of future shocks, and that can help lift families out of poverty. These include large scale public works programs and other temporary employment schemes, vocational training to rebuild livelihoods and potentially the use of conditional cash transfers (CCT) linked to education building on already existing systems. The recent availability of nationwide BISP poverty database would allow better targeting and cross-sectoral collaboration opportunities to respond to future crises.

Social and Gender

Damage – PKR 43.6 million (US$ 0.5 million): The impact on people and livelihoods is more severe than the infrastructure damages. According to the National Disaster Management Authority (NDMA)[2], 9.6 million people are affected including 744,000 dislocated.Total deaths are reported as 520. In Sindh, 179 social welfare infrastructure units[3] serving a population of 41,140 people are partially or fully damaged. The direct damage estimated costs are PKR 39 million. Indirect costs are assessed as PKR 4.6 million. According to UN OCHA, the situation remains alarming with poor coverage of all essential sectors. Failure to meet Rabi cultivation will have severe consequences on farm dependent households. The report further documents increasing insecurity and violence against women, boys and girls. 70% of households are reported not have received any shelter, only 48% of funding has been received from the Rapid Response Plan and funding for the revised falsh appeal launched in February 2012 has yet to start.

Recovery/Recovery Needs – PKR 64.7 million (US$ 0.7 million) - More than 50 percent of Pakistan's population suffers from multiple deprivations[4]. Vulnerable groups, socially marginalized populations, women and children will suffer disproportionately from a failed response risking any opportunity for moving out of impoverishment. Reconstruction efforts should focus on providing secure shelter, food security; sustainable livelihood opportunities ensuring basic human needs are met. Critical is the need for effective national and provincial institutional arrangements. Sound gender disaggregated data collection for base line, and during and post-flood is essential for adequately addressing needs and priorities of flood-affected households.

Environment

Damage – PKR 2,762.7 million (US$ 31.8 million): In addition to causing loss of life, dislocation of millions, and huge losses to the economy, the floods in 2011 have also resulted in environmental damages, heightened environmental health risks and affected forests, wetlands and other natural systems. The floods have caused damages to trees and forest land, avenue and block plantation, forest nurseries, mangroves,

[1] Estimated cash grant support is based on a total of 851,439 severely affected households
[2] NDMA, Damages Monsoon 2011 (Sindh and Balochistan(January 16 2012)
[3] Social Welfare Department, Sindh Province. Social infrastructure is defined as centers such as orphanages, Dar-ul-uman women shelters child care and rehabilitation centers
[4] Government of Pakistan, Ministry of Finance, Economic Survey, 2010-11

wetlands, and Forest Department infrastructure. The floods have also caused contamination of drinking water, proliferation of disease vectors caused by stagnant water ponds, and accumulation of solid wastes – factors that would further exacerbate health risks for the affected population, particularly women and children. Environmental degradation and its effects on human health were already a significant development challenge in Pakistan, which has some of the highest prevalence rates in all of South Asia for child mortality, diarrhea and acute respiratory illnesses associated with environmental factors. The conditions created by the floods could result in a significant increase of these and other illnesses. No estimates are available for damages to other environmental resources such as wetlands and mangroves at this stage. To fill such damage data gaps, follow-up environmental studies have been proposed to address safe disposal of debris, leakage/spillage of hazardous and/or toxic substances, and damage to cultural heritage sites.

Recovery/Reconstruction Needs – PKR2,873.6 million (US$ 33.02 million): The floods were initiated by a natural phenomenon; however, anthropogenic interventions exacerbated them, particularly as destruction and degradation of natural ecosystems reduced their capacity to provide flood-protection services. Also, development of settlements and croplands in floodplains as well as blocking of natural drainage routes created the conditions for the current human tragedy. To avoid such disasters in the future, strengthening the resilience of the Indus Watershed is urgently needed, involving an approach that combines structural and non-structural measures that are strategic, feasible, and affordable to minimize vulnerability to extreme weather events. Such an approach also calls for an improved management of the Indus Basin's major natural resources through strengthened coordination of flood-related actions within and among the provinces. Towards this end, the following priority actions are proposed to be undertaken on immediate basis: 1) addressing environmental health priorities, including drinking water, sanitation, hygiene and indoor air quality; 2) reviewing/updating the flood protection strategy and master plan, and preparing a storm water drainage master plan; and 3) preparing land use plans and building regulation, and strengthening legal and institutional frameworks.

Governance Infrastructure

Damage – PKR 1,953 million (US$ 22.5 million): The rain floods caused severe disruption to functions and services of the public institutions because of damage to buildings, record and equipment and also by limiting access of the people to these institutions and temporary or permanent loss to institutional capacities. Impact of lower level of governance functions performed and services delivered as a consequence of impairment of institutional capacities and capabilities may include lower coverage and quality leading to higher risks of insecurity and vulnerability to the citizens, slower recovery and rehabilitation. Governance related institutions in the affected districts suffered direct damage to their buildings, record, furniture and equipment. Aggregate damage has been assessed and quantified to be PKR 1,953million. Total number of buildings reported to have been damaged is 648 in Sindh and 18 in Balochistan. Worst hit district in Sindh is Mirpurkhas where estimate of aggregate affected covered area is 845,000 sq feet, followed by Sanghar (299,000), Tharparkar (246,000), Shaheed Benazirabad (201,000). Civil Administration in Sindh suffered heaviest damage to its facilities, where 257 buildings were reported to have been partially damaged and 86 as completely destroyed. Damage to 137 police facilities and 24 and 14 facilities respectively for courts and prisons has been reported. Accounts Offices, Auqaf buildings, NADRA, Post Offices and other governance institutions shared the remaining damage. **Recovery/Reconstruction Needs – PKR4,768 million (US$ 54.816 million):** Bulk of the

reconstruction costs are the costs of repair and reconstructions of buildings. Cost of restoration of records and targeted capacity building have been estimated and included. Sector recovery strategies recommend short term actions for restoration of services through temporary arrangements and adjustments for space, human resources, records, equipment. For medium and long term, the recommendations include strategic actions for reconstruction/repair of hard physical assets, development of human and technology resources, standardized process for expenditure planning and execution, development of focused M&E and participatory planning and monitoring, considering the overall governance challenges.

CHAPTER 5

Governance and Institutional Arrangements

Implementation Arrangements

The overall scope of this flood disaster is relatively small compared to previous disaster events. However, considering the frequency of disasters and their varying extent in Pakistan the institutional arrangements have to be robust enough to cater for implementation requirements for this and all recent and future disasters. The arrangement should be able respond to reconstruction requirements in which efficiency, speed, disaster mitigation, transparency and accountability are fully embedded, as the focus is on immediate restoration or reconstruction of what existed and was in use against new works which are part of regular development cycle. The institutional arrangements also need to recognize the existing challenges in the routine public service delivery, including, increased role of provinces in implementation resulting from the 18th Constitutional Amendment, inadequate public financial management capabilities, human resources constraints, and complex intergovernmental coordination mechanisms. Special attention will also need to be paid to accountability and transparency concerns of the public and the development partners.

Institutional Framework

Having a clear institutional framework is essential for efficient and transparent reconstruction of damaged or destroyed facilities. This is to establish Government commitment to the early commencement of the reconstruction process and credibility for mobilizing resources. One of the main reason for inadequate resource mobilization after 2010 flood was the absence of such an institutional framework which although was recommended in the flood 2010 DNA report, but was not established. The following key guiding principles draw on lessons learned from the 2010 floods as well as from international post-disaster reconstruction experience.

Clarity of the overall mandates

Any large-scale reconstruction operation requires clear delineation of the mandates of the various levels of government as this provides the structure and clarity required for all stakeholders to work with maximum efficiency. In the case of this reconstruction program, this will mean a delineation of mandates in line with the 18th Constitutional Amendment. Any possible overlaps in the reconstruction function between institutions need to be eliminated in order that government institutions are placed firmly in the driving seat and reconstruction partners are well managed. In accordance with this, international experience has shown that, in the case of a national disaster, a single institution or body at the federal level needs to take the lead in overall coordination, monitoring and formulation of reconstruction policies and strategies, necessary for equity considerations. Since disaster impacts/mitigations do not necessarily recognize administrative boundaries, and with capacity gaps and the stress created by the floods and related reconstruction in the institutions handling public sector programs, the existence of a central level dedicated institution becomes even more critical. Based on the current mandates this role can be performed by the National Disaster

Management Authority (NDMA). The provincial and regional governments and federal agencies in case that some sectors are mandated to the federation, are to take the lead in implementation of the reconstruction of sector program including sector coordination, planning and monitoring at the provincial or agency level.

Early articulation of policies, strategy and standards

The provincial and regional governments have already started articulating their responses depending upon their capacity, especially after the 18th Amendment and given the urgency of reconstruction. The federal government needs to ensure that the overall reconstruction policies and strategies are articulated as soon as possible to avoid inconsistencies and major divergence in reconstruction approach and strategy among the provinces and regions.

Equitable allocation of resources

Floods have impacted the two provinces and the 22 districts located within them differentially depending upon location, topography and socioeconomic situation. This has given rise to diversity in the response and needs. The allocation of resources among provinces/districts has to be based on the needs and the associated disaster risks for reconstruction.

Setting a definite time frame for reconstruction implementation

Planning for reconstruction, a difficult task for any government, has been beset with challenges in the case of previous disasters in Pakistan.The efficiency of the reconstruction program would be greatly enhanced if the federal government, in consultation with the provinces, set a definite time frame for reconstruction implementation to instill an emergency mindset within government institutions and reconstruction partners (multilateral and bilateral institutions, and non-government organizations). The reconstruction implementation plan should take into account private and public sector capacities and systems and, in case of gaps, should include measures to fill these to complete the reconstruction program within the set time frame. Special policies, laws or special dispensations for reconstruction can then also be bound to this definite time frame to shorten reconstruction time lines.

Effective coordination

Effective coordination among all levels of government and reconstruction partners (government and donor agencies[1]) is essential and can best be achieved through government-led national, provincial and district level coordination forums and sectoral coordination where required. These forums will facilitate information sharing, better planning and collaboration among the multiple partners as well as more targeted management of reconstruction resources at all levels.The current clusters developed for relief and early recovery are inadequate for reconstruction purposes.

Enhanced transparency

Independent oversight and monitoring involving representatives of civil society is essential to achieve transparency. The Government had put in place the National Oversight Disaster Management Council (NODMC) comprising independent and reputable individuals from civil society after the 2010 floods.

[1] Including NGOs

However the council remained inactive during implementation. The Government should consider establishing a more robust independent oversight body with representation from partners organization, donors, civil society and academia, that accompanies the reconstruction process and reviews and reports regularly on the its progress, outcomes, and impacts to the general public. All key reports from the M&E system and internal/external audits should also be reviewed by this body.

Enhanced disclosure on reconstruction policies, strategies, criteria, procurements and plans to the Pakistani and international community could then be done through a pro-active and strategic communications program on reconstruction implementation, both at the federal and provincial levels. The expectations and information needs of the public, particularly the affected communities, should also be taken into account and any strategy to enhance transparency should be supported by a strong public awareness campaign, conducted at community level.

Implementation through existing government institutions as "first-choice" option

International practice has shown that implementation arrangements need to respect the mandate of existing institutions. Setting up parallel structures should be avoided to the extent possible. Existing institutions should be supported with additional capacity in short to medium term if required, in order to efficiently deliver against the additional requirements and expectations associated with large-scale reconstruction programs. Implementation responsibility should be delegated to the lowest level of government, to increase accountability and reconstruction outreach and in order to allow the fastest response possible to the dynamic situation on the ground.

Enhanced Accountability

Enhanced fiduciary safeguards and risk mitigation measures, including internal controls and external audits, should be adopted for the specific purposes of the reconstruction program. This will increase the credibility of the government's response in the eyes of the national and international public and will facilitate the mobilization of reconstruction funds and support. The existing public sector financial management systems (PIFRA) should be used where possible, augmented by robust integrated FMIS to track reconstruction/donor funding. Additional internal control/audit staff may be required at the district or regional (division) levels to strengthen internal controls in the affected areas. All reconstruction programs and projects channeled through the government's budget systems may be audited by the Auditor General (AG) of Pakistan as the external auditor in conformity with the International Standards of Auditing. Given the urgency of the reconstruction programs a dedicated Audit Unit may be established within the AG office to carry out special performance audits and provide annual audit reports efficiently. Some of these activities could be outsourced by the audit department if required. All accountability efforts should be made known to the public through a highly visible public awareness campaign so that all stakeholders are aware of the anti-corruption and transparency efforts of the government at all levels.

Institutionalizing fast-tracking

The speed at which the reconstruction program is delivered will be greatly enhanced if expedited approval procedures are put into place to govern both on-budget and off-budget projects. Procedures and systems to fast-track the reconstruction program especially for disbursements, procurement, and approvals should be

of capacity and reluctance on the part of implementing agencies unfamiliar with these procedures. The federal body coordinating reconstruction, in this case NDMA, could assist and technically back-stop mandated institutions to further elaborate and streamline the procedures for simplified projects and umbrella approval, public sector procurement, fund flow, and financial management. The fast-track procedures should be accompanied by clear systems, controls and instructions to minimize corruption and ensure accountability.

Incentivizing the human resource base

International experience has shown that to break the "business as usual" culture of the institutions handling reconstruction, special incentives for staff working on reconstruction are needed. Depending upon the role of the institution in the reconstruction, the incentives could be target-oriented and based on outputs. Return of government staff to the flood affected areas may be facilitated and incentive systems designed to attract and retain quality staff working under difficult conditions.

Full use of private sector capabilities

Private sector services and capacities play a important role in delivering effective reconstruction programs andshould be tapped where possible and appropriate. The additional capacities required in the short- to medium-term for reconstruction could also be outsourced so that government institutions can continue to perform their normal operations. The outsourcing could benefit from innovative options like turn-key (design-build) and public-private partnership models. Strict compliancewith, and efficient and transparent use of, fast-track procurement and implementation procedures could incentivize the participation of capable and reputable consulting firms, contractors and suppliers in reconstruction implementation.

Enhancing community participation

Community participation in reconstruction implementation should be promoted and facilitated. Options include partnerships with individual households through community-driven development (CDD) type mechanisms in the case of housing programs, and CBOs and NGOs to support reconstruction of community-infrastructure. Whichever mechanism is used, the affected communities need to be put at the center of the reconstruction process and be kept informed and up to date on progress and challenges. The communities themselves represent a key stakeholder group with considerable potential contribution. Past reconstruction programs around the world have repeatedly shown that if given the resources and the guidance, affected communities can play a substantial role in implementing reconstruction at local level.

Socially responsive implementation

The existing legal system is already stressed and cannot efficiently handle the additional burden posed by reconstruction activities. A timely and effective response to grievances and complaints, both individual and institutional (in relation to delays, procurement etc.), needs to be ensured through the establishment of effective grievance redress systems and complaints handling procedures. Ensuring timely redress will avoid delays in reconstruction implementation, as well as effectively protecting individual rights and entitlements. The system has to be supported by a monitoring mechanism to ensure its effectiveness. In addition, the existing systems have to be capacitated for a short term to provide dedicated, timely and efficient justice to the affected population where required. A public awareness campaign should support these efforts in order that stakeholders, in particular affected communities, are aware of their rights and entitlements and of

measures of redress. This will promote peaceful dispute resolution and promote the fact that the government is implementing an equitable reconstruction program.

Maintain social and environmental safeguards.

While the reconstruction program calls for accelerated implementation, social and environmental safeguards need to be maintained. This will require social and environmental review and approval procedures to be adjusted in view of the nature and urgency of the reconstruction program and at the same time development/acquisition of additional capacities to undertake these reviews and implement and monitor safeguard plans and their implementation.

Focusing on results

Monitoring and Evaluation (M&E) systems already exist at the provincial and federal level for public sector programs. However reconstruction programs, due to their urgency and multiplicity of donors, require real time segregated information. Internal and external M&E of reconstruction implementation will have to be integrated with existing systems to address the information and monitoring needs resulting from the flood response. The focus of monitoring should be on the process and results, in addition to the regular inputs and outputs monitoring and has to be implemented both at federal (NDMA) and provincial levels.

Flexible implementation modalities for external reconstruction partners

To maximize mobilization of external resources, external partners should be given the opportunity to support the reconstruction program based on their strengths and capacities but in conformity with the overall reconstruction needs, policies and strategies. While required to follow government policy and encouraged to adopt government delivery and on-budget systems, external partners should be offered the possibility to provide reconstruction support through in-kind or direct implementation. A dedicated unit with NDMA should be the first point of contact for external off-budget donorssupported by the respective federal or provincial agency responsible for implementation, and to keep track of all external resources to ensure their efficient use within the overall reconstruction context.

Outline Institutional Structure

Based on the guiding principles and taking into account the federal level institutional set-up and the mandates of the various institutions to be involved, the following outline institutional structure may be considered for flood reconstruction.

The Council of Common Interest (CCI) may provide the highest level of policy guidance to the federal and provincial/regional governments. The CCI could ensure the equitable allocation of reconstruction resources among the provinces and the regions, and resolve interprovincial issues related to reconstruction policy and implementation.

The independent oversight body should be established for the reconstruction program with representation from partners organization, donors, civil society and academia, that accompanies the reconstruction process and reviews and reports regularly on the it progress, outcomes, and impacts to the general public, donors, parliament and CCI. A donor coordination group led by the government may also be established to review

reconstruction implementation, discuss overall reconstruction policy and strategy aspects, resolve common issues faced by off-budget partners and assist in mobilizing additional external resources, if needed.

At federal level

Existing or devolved approval forums can be responsible for review of all on-budget reconstruction programs. As a large number of such programs are expected to be submitted during the initial phase, additional dedicated capacity may need to be established within these institutions to fast-track the review process during this phase, as was done after the 2005 earthquake. The approval forums if it is not devolved to NDMA, would need to co-opt a member from the NDMA to ensure that disaster risk reduction (DRR) considerations are incorporated in the design of reconstruction programs, where appropriate. The Government may consider establishing a subcommittee exclusively for the reconstruction program which could have the delegated authority to approve reconstruction programs during the initial phase. The Government may also consider raising the approval authority of provincial/regional governments for reconstruction programs to fast-track the approval process, including simplification of the PC-I format for reconstruction and using umbrella PC-I's. The relevant ministries of the government will have to ensure that reconstruction is accorded high priority during the annual budget preparation process and the timely release of adequate counterpart funds during the course of the financial year in line with annual reconstruction work programs. Similarly additional resources may have to be provided in existing miniseries responsible for negotiating and concluding grant and loan agreements for reconstruction programs with external on-budget partners, to ensure timely availability of donor funding.

The overall coordination of reconstruction programs and projects should ideally be done through the NDMA at the federal level, based on current mandates. The NDMA should coordinate all off-budget and on-budget reconstruction programs and would be the first point of contact for all the external on- and off-budget partners. It would also act as the Secretariat for the CCI, the oversight body and the Donor Coordination Group. The NDMA would need to establish a database of all on- and off-budget programs. This will ensure synergy and complementarily between the two types of programs and the equitable allocation of overall reconstruction resources among provinces/ regions and among sectors. The NDMA would monitor overall reconstruction implementation (on- and off-budget) and provide regular progress overview reports to oversight agencies like the CCI, the oversight body, the Government's reconstruction partners and the public at large. For this purpose, the NDMA may need to establish a comprehensive M&E system in partnership with the respective counterpart agencies at provincial/regional level (provincial and regional disaster management authorities), complementing the existing M&E systems at federal/provincial/regional level.

The NDMA at the federal level could also assist in: (i) the formulation of reconstruction policies, strategies and standards, and (ii) the development/simplification of fast-track procedures for project approval, public sector financial management and procurement, in collaboration with the respective agencies mandated for approval of these activities by the Government (iii) supporting government and reconstruction partners in addressing challenges and bottlenecks. The NDMA may have to be strengthened for duration of the reconstruction program to undertake its reconstruction coordination, reporting, policy and M&E functions.

The Auditor General can be responsible for the audit of all on-budget programs as the external auditor in conformity with the International Standards of Auditing. Given the size of the reconstruction program and the number of agencies that are likely to be involved, the AG may need to engage reputable private auditors to carry out the external audits on its behalf and also establish a dedicated unit for this within.

A number of federal authorities may be responsible for the implementation of reconstruction programs that fall under their respective mandates. These authorities include, among others, the National Highway Authority (NHA) and the Water and Power Development Authority (WAPDA).

At provincial/ regional level

The institutional structure proposed here recognizes the lead role of the provincial and regional governments in reconstruction implementation based on the umbrella reconstruction policies and strategies issued by the federal government.

Each of the provincial/regional governments may establish a Reconstruction Committee to provide overall guidance and oversight at the provincial/regional level for the implementation of on-budget reconstruction programs. The Committee may include: (i) the Chief Minister (Chair), (ii) an opposition Member of the Provincial Assembly, and (iii) the Secretaries of the departments involved in reconstruction implementation.

A Provincial/Regional Government-Donor Coordination Group may also be established to serve as a forum to coordinate the implementation of on- and off-budget reconstruction programs. The group can include representatives of the Planning and Development Departments (P&DDs), Provincial/Regional Disaster Management Authorities and other relevant departments, NDMA and reconstruction partners with major programs in the province/region.

Considering their mandates, the respective P&DDs or provincial disaster management authorities (PDMA) can be, responsible for coordination of reconstruction implementation. It will ensure compliance with reconstruction policies and strategies across the various sectors. The P&DD or PDMA, as the case may be in a respective province, can also ensure that fast-track procedures will be operationalized for reconstruction implementation, synergies with ongoing development programs and policies and provide support in addressing challenges and bottlenecks.

As most provinces may not afforat to keep permanent staff on lon tern basis, this can be achieved by establishing a dedicated purpose built Reconstruction Unit within the coordinating agency at the provincial level that will be the focal point for reconstruction planning and coordination, and M&E, with co-opted representatives from NDMAs. The unit can act as the clearing house for reconstruction programs to be approved at Federal or the Provincial level. The Unit can also facilitate the participation of off-budget partners in reconstruction implementation provincially/regionally.

The existing provincial forums may also be used to approve the reconstruction projects submitted by the provincial departments or some function may be delegated to the coordination body to fast track approval.. A representative of the NDMA can be co-opted in the approval forum at the provincial level to increase coordination and improve synergies. With regard to federally transferred funds, the provinces may be delegated the authority to approve projects up to a threshold to be determined by the Government[1], including the possibility of unlimited delegated authority to approve sub-projects under umbrella PC-Is approved at the federal level.

Line Departments can then be responsible for the preparation of reconstruction projects in their respective sectors and implementation of these following their approval. Line Departments with a large reconstruction program may need to establish a dedicated reconstruction unit. Reconstruction implementation may need to be outsourced where departments lack the required resources.

[1] The PDWP has the authority to approve projects of unlimited amounts from the provincial funds.

The District Offices may also be involved in small-scale local level reconstruction programs. They could also facilitate the implementation of off-budget reconstruction programs through a district-level coordination forum if required.

Monitoring & Evaluation (M&E) System

The demand for urgency, transparency and the need to be able to respond to the dynamic situation on the ground, as the flood response develops, requires an effective M&E system in place at the outset. Monitoring is challenged by dispersed implementation across a range of sectors and the diverse information needs of multiple partner, donors, decision makers, general public, affected population and implementation agencies.

The Project Monitoring & Evaluation System (PMES) currently used at the federal Planning Commission captures the Public Sector Development Program (PSDP) funded projects by the federation only – its basic point of reference is the PC-I and the annual plans. It is mainly used to monitor physical progress and fund allocation and use. It does not currently offer adequate connectivity to the provincial PSDP or donor funding. It is a web based program for which access is being slowly extended to all federal line ministries. The provincial M&E systems independent of the PMES also use PC-I as a point of reference in their design. However the quality, extent and operation of these systems vary substantially between the two provinces. Almost all these systems are outside the public domain, and are not designed to capture any activity outside the PC-I. No qualitative data is being captured by these systems although some pilot work is ongoing under PMES. The only M&E system that has extended its boundaries to include multiple sources of funding, diverse information needs of multiple stakeholders and provides information to the general public has been designed by the Government of Punjab (GoPb).

M&E system for the flood reconstruction

Reconstruction activities have special M&E needs that are not necessarily aligned with PMES. The reconstruction programs are expected to be financed both on- and off-budget, by multiple sources of funds provided by multiple donors. There are reconstruction programs that are not PC-I based such as in housing and cash grants, and many others where in-kind support is being extended such as in agriculture and livestock. In addition an M&E system supported by a Management Information System (MIS) in reconstruction programs also needs to provide information to coordinate the reconstruction activities between multiple agencies and for efficient decision making. Similarly reconstruction information and reporting has to be efficient to facilitate delivery in short timeframes; this requires multiple access and control of the systems.

It is important that reconstruction requirements do not undermine but supplement and strengthen existing M&E systems, without overloading them with activities that may not go beyond the reconstruction phase. Based on these consideration the Government may consider a two-pronged strategy for M&E: a) strengthening PMES, by consolidating existing requirement and adding modules that are common to reconstruction and the future needs of the system; and b) develop an M&E/MIS capturing the reconstruction requirements not served by existing and future needs of the PMES, with a well developed interface in case of future disasters. has to take account of these limitations. The recommended approach is to start with a basic system, and build this up incrementally once it starts operating.

The M&E system for reconstruction may be developed at the NDMA in close coordination with the planning commission. Implementation would take place at different levels, for which additional capacities and training would have to be provided at the relevant levels of the provinces, districts and off-budget donors to operate such a system.

CHAPTER 6

Social Considerations

Social Impact (Sindh and Balochistan)

The UN[1] reported that 2.5 million children and 1.2 million women were affected by the floods in 2011, while 744,000 people were dislocated. With 46% of health facilities damaged, the vulnerabilities of women and children have increased in the affected areas. The children who are pushed out of schools are over 733,000 where 60% schools are damaged in Sindh alone. Acute Respiratory Infections (ARI) and skin infections represent major health risks in flood affected areas[2]. Women are at high risk due to disruption in the provision of pre and post natal care.

Migration has taken place largely due to unavailability of fodder in flood affected areas. Approximately, 10-15% of the affected population is engaged in non-farm livelihoods, including fisheries which are severely affected by the rains.

Loss of Assets and Livelihoods

Large-scale destruction of schools is affecting the education of more than 733,000 children with 60% children out of school due to damaged facilities and absence of teachers.

In Shaheed Benazirabad district 75% population depends on agriculture. Cotton is the major crop and cultivated in 60% land followed by sugar cane and banana. The first cotton crop, which was ready for picking, was not picked due to the month of fasting. The rain fall intensified on 26 August and the first harvest was lost. More than 70% of the cotton crop was damaged, 40 – 45% of the sugarcane crop was damaged, banana orchards were totally or partially damaged in 40% of the affected area and mango and lemon orchards were completely damaged (CD)[3]. Land degradation has intensified and production decreased. Crime is increasing in the affected area exacerbating the vulnerability of the women and children[4].

The social impact can be gauged by the decrease in income due to land degradation and temporary interruption in use of land, agricultural unemployment, and lack of alternatives outside agriculture. Field visits to Benazirabad indicated the crime rate increased. Some internal migration has been noticed e.g. most of the Sanghar populations were migrants from Tharparkar. Now due to heavy rains and less availability of dry land, many families have migrated back to Tharparkar. There are no implementing partners for nutritional intervention in Tharparkar[5]. Generally, the relief goods influx has created a dependency mindset and people have no guidance for the future.

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[1] UN, Pakistan Floods 2011 Early Recovery Framework,January 2012
[2] OCHA Situation Report No.7, October 2011
[3] DCO, Shahid Benazirabad, Verbal communication
[4] DNA team field visit, verbal communication local government and CSOs, November 2011
[5] UNOCHA Pakistan Monsoon 2011:Situation Report No. 8 14October 2011

Impact on Vulnerable Groups

Catastrophic events that impact on basic human needs disproportionately affect the most vulnerable groups; children, minority groups, the elderly, the landless tenants, people with special needs and women's vulnerability also increases. Existing vulnerabilities are exacerbated, and new vulnerabilities emerge as some who were previously economic secure are now unable to meet their daily needs. Flooding in summer means people face additional hardship as winter approaches. In Pakistan, 8 percent of households with children that were hit by income shocks took their children out of school and 10 percent of households had to put their child to work.[1] Sindh and Balochistan have low social development indicators, landlessness in Sindh is high, and people have few assets and limited ability to deal with shock. Research is essential to understand how households cope, track their progress and provide relevant support where needed.

The 2011 floods added to vulnerabilities of marginalized communities; Balochistan stands out as the province with the weakest social development[2]. The latest PSLM (2010) social indicators show that both Sindh and Balochistan are below national averages on Primary Net Enrollment Rate (NER) and Middle NER[3]. Sindh is somehow better than the national average for literacy whereas Balochistan stands below the national average. Health practices in Sindh and Balochistan in terms of full immunization and Tetanus Toxoid are below the national average. Both Sindh and Balochistan have low access to safe drinking water whereas less than 45% population is provided with piped drinking water.[4] Sanitation practices in terms of HHs using flush type toilet are somewhat more encouraging in the case of Sindh as compared to Balochistan. The 2011 floods are expected to add high pressure on almost 50.07%[5]affected HHs of Balochistan and on some 39.44% of Sindh, based on indicative figures in 2011 PSLM.

There is likely to be an acute shortage of onion, chilies, tomato and other vegetables during winter[6]. Rice, a key staple has also been badly damaged. It would seriously affect food security and availability of seeds in the next season. Small farmers will lose contracts to cultivate in the coming season due to loss of bulls. Many on-farm and off-farm jobs will be lost in cotton farms due to loss of cotton related subsidy. Loss of the cotton cropwould also lead to loss of jobs for women cotton pickers[7]. In Sindh, specifically in Benazirabad, land ownership pattern is self cultivation by small land holders, daily wagers, part and quarter time tenants. It is most likely that low crop productivity will severely affect both tenant groups. Moreover, the recent floods has increased land salinity and added to land degradation. This not only turns out to be long term assets loss but also affects crop productivity. The small farmers are already under heavy debt and are unable to get new loans due to the absence of collateral.

Guidelines for public private partnership under new institutional, legal and regulatory framework require that all public project proposals should assess impact on women and explore employment opportunities for them and deliver benefits to both men and women[8]. However, the UN flood response report mentioned increased

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[1] ibid
[2] Balochistan Economic Report; From Periphery to Core (Volume II): Full Report, May 2008, (World Bank Report No. 40345-PK)
[3] Pakistan Social and Living Standards Measurement Survey (PSLM), 2010-11 Statistics Division, Government of Pakistan,
Islamabad, September, 2011
[4] ibid
[5] ibid
[6] FAO, SUPARCO PAKISTAN RAIN/FLOOD 2011 September 24)
[7] FAO Preliminary Flood Damage: An Inside View September 2011
[8] ADB Fact sheet 31 December 2010

risk of possible sexual and physical abuse, child abuse, child labor, bonded labor, trafficking, honor killing and forced marriages among the affected population[1].

Impact on Food Security

FAO[2] damage assessment highlights possible acute shortage of onion, chilies, tomato and other vegetables during winter. The long term storable food including rice has been badly damaged and will lead to seeds and grains shortage adding concerns for food security. In Balochistan the populations living in hilly areas of affected districts had been able to secure some stocks for a few months but as soon as the stocks deplete, these HHs will be badly affected. Farming households are directly affected by floods whereas non-agriculture based households will be badly affected by price increase and low supplies from local producers. The long lasting drought in Balochistan (1998-2005) had already stressed food security, the 2011 flood is expected to create short-term insecurities but over the long term, land fertility is expected to increase as the water recedes. However, even with this opportunistic note the livestock (major source of meat and milk) is at risk due to the acute shortage of fodder. Food insecurity is emerging as a critical issue, caused by many aligned social and economic damages.

Impact on Assets Ownership

In many cases whole livestock assets have been lost. The productivity of remaining livestock has been reduced to 50%[3]. Discussions with local relief organizations confirmed that generally savings are kept in the form of cash and livestock. The affected population has lost savings, including both livestock and cash which could provide a cushion against inflation. Now people are very uncertain and tend to grab as many relief goods as they can. They tend to accumulate enough resources for next six months and are showing low interest in work.

Impact on Access to Services

The UN Report on flood response 2011, noted lack of access and discrimination in distribution of relief and early recovery assistance to minorities, women, children, landless, non ID-card holders, Afghan refugees, older persons and persons with disabilities. The report also pointed out inter-communal tension and violence, land and property disputes, lack of access to legal redress mechanisms and cases of family separation and unaccompanied children[4]. In some areas of lower Sindh where people did not move out of houses after the floods, delivery of assistance was hampered due to the large amount of stagnant water surrounding the villages. Lack of pipeline information from other humanitarian organizations engaged in flood response limits the ability to accurately forecast assistance needs[5].

Sanitation and water supply are among the most critical problems requiring the attention of aid providers to alleviate poverty and reduce the suffering of flood affected families[6].The main source of water in many affected districts is open rain water ponds and biologically and chemically contaminated canal water[7]. Out of

[1] United Nations Pakistan Floods: One year On Islamabad, 2011
[2] FAO Preliminary Flood Damage: An Inside View September 2011
[3] FAO Preliminary Flood Damage: An Inside View September 2011
[4] United Nations Pakistan Floods: One year On, Islamabad, 2011
[5] UNOCHA Pakistan Monsoon 2011: Situation Report No. 8 14October 2011
[6] Oxfam 2011
[7] UNOCHA, Pakistan Humanitarian Bulletin 29 September 2011

326 water sources tested by WHO in Sindh, 86% were found contaminated and 80% of all the diseases were found to be water borne diseases[1].

Loss of livestock, crop lands, and extensive damage to the country's infrastructure, are projected to have long-term negative effects on Pakistan's food security and economic performance. It is estimated that the cost of rehabilitation of the flood-affected population (relief and recovery) and reconstruction of damaged infrastructure in different parts of the country could be in the range of $4billion. According to a former Finance Minister and Ex-Senior Vice President of the World Bank, "The government's prediction that GDP in 2011-12 would increase by 4.1 percent now seems extremely optimistic. Given some of the shocks the economy has received in the last few days, it appears that the national product will not increase by more than 2.5 to 2.8 percent this year"[2].

It is essential that Government adopts a rights-based development approach to reconstruction. Sind has been hit twice, although not all districts were affected twice, the overall impact on the people should not be addressed through limited relief and recovery support.

The challenge lies in looking beyond relief, beyond restoration to improving lives and providing opportunities for safe and secure lives. Failure to redress existing structural inequalities means many affected people risk falling into chronic poverty and will not have an opportunity to lead a dignified life.

Gender Impact

Disasters are not gender neutral. However, gender-differentiated outcomes of a disaster seldom occupy critical and central spaces in public policy. Men and women have different priorities and should be differentially engaged in the reconstruction process. However, recognition of the effects and outcomes of flood 2011 on the lives of female-headed households, ethnic minorities and women and girls in general would remain a challenge, as gender is not a priority in actual practice. Additionally, lack of data precludes a comparative analysis of borrowing and debt amongst women and men separately, and it is impossible to discern in a sectoral approach how the destruction of irrigation canals, environment, or railway links, causes losses to men and women separately. There was no gender and income based disaggregated data available to target the most vulnerable groups for assistance. Data provided by the Multi Cluster Risk Analysis (MCRA) is based on sample survey and cannot be used in identifying and reaching out to most vulnerable groups[3].

Lack of availability of female hygiene kits, undergarments, emergency lights and separate toilet and bathing facilities for women and girls exacerbate their vulnerability.[4]Women are more vulnerable to food insecurity especially in terms of nutritional needs. While standing water and flooding posed health risks for all but specifically for pregnant and lactating women. The field visit reports of various NGOs reveal that women's workload and responsibilities have increased many folds, women and the elderly face difficulties in acquisition of relief goods.

While looking at the institutional arrangements within public and donor sectors, NDMA has established a "Gender and Child Cell" which has begun a consultative process at the federal and provincial levels to

[1] World Health Organization Environmental Health Response to Sindh Floods 16 October, 2011
[2] Shakil Ahmad, The Nation, September 20, 2011
[3] UN Women , ADB, World Bank, CSO , Workshop, November 1, 2011
[4] UNOCHA Pakistan Monsoon 2011:Situation Report No. 8 14October 2011

policy making, public spending and project implementation. Gender is officially included in the vision and mandated objectives of all UN agencies, INGOs and key NGOs that are participating in disaster risk reduction and reconstruction for flood 2011. However, it has been observed that gender analysis is not prioritized or a sustained practice. Each sector has its own dynamics and integration of gender in an individual sector demands a deeper understanding of the issues through a gender lens.

The aftermath of the floods 2011, similar to the 2010 floods, provides an opportunity to transform the basic inequalities, poor governance and social injustices, which laid the groundwork for such destruction. The scale of the disaster creates an opportunity to revisit the policy tools and institutional arrangements. The disaster highlighted the profile of specific vulnerabilities, such as gender and social exclusion, which provide government and civil society with a unique opportunity to address the root causes of gender inequity and social exclusion.

Aid Effectiveness, Governance, Social Accountability and Grievance Redressal

While immediate support and humanitarian relief is essential, equally important is the GoP's stated commitment to development. Pakistan's continuing exposure to disaster with poor development indicators demands a longer term commitment by the state: to deliver basic human needs and development and not a return to pre-flood or pre-recovery standards.

The effective delivery of support and services requires sound baseline information. Disaggregated information on households and at the individual level should be available from the *tehsil* to the province. Information crucial to provide targeted support and to enable speedy identification of people requiring special attention should be known before the disaster hits.

The destruction caused by the recent floods created and exacerbated serious governance issues both within the public sector and for the affected population at large. It is evident that direct damages while substantial are not a major impediment for sector recovery and reconstruction. The indirect losses and strains on systems are more important and need to be addressed. Broadly speaking: (a) capacity to govern reconstruction has diminished and been exacerbated by the floods; (b) flood affected population's entitlements are at risk and (c) the provinces are also strained due to worsening law and order[1]. Social unrest is already on the increase and will complicate the reconstruction efforts. Support for law enforcement will be vital.

Aid must be better coordinated, focused and systematic. Information shared with the DNA team indicates overlapping tasks by different agencies working in isolation and gaps in adequately address needs. A supply driven approach fails to respond to local needs and coverage.

Humanitarian relief, recovery and reconstruction are a continuum toward development. While agency funding requirements are separated and bound by policy and financing decisions, suffering and deprivation resulting from disasters and exacerbated by pre-existing inequalities, do not fit neatly into compartmentalized boxes. Post-flood reconstruction will require assessment of households requiring longer term support to return to improved, secure lives. Vulnerable groups require special attention. Shelter linked to property rights, nutrition, food security and livelihoods require urgent, long term support. The provision of basic human needs with opportunities for improved and secure lives must be ensured. It is essential that reconstruction

[1] DNA , Governance Report, 2010

efforts are designed with sensitivity to household needs. Government must lead efforts to immediately establish dedicated, trained personnel at village level and DDMAs to identify and support households, manage grievance, monitor and report on reconstruction efforts. NDMA and PDMAs play a critical role in establishing standards, oversight, transparency and securing support for focused, longer-term development efforts.

CHAPTER 7

Environmental Considerations

The floods have caused wide-ranging damage to different sectors of the national economy. The reconstruction and recovery needs are diverse and multi-faceted as elaborated in this DNA, and work has to be undertaken on an urgent basis. However, these reconstruction and recovery interventions, particularly those related to irrigation, agriculture, transport, health, education, housing, and WATSAN are likely to cause negative environmental and social impacts. In order to ensure the sustainability of the reconstruction and recovery process, redressal of these negative environmental and social impacts has to be made an integral part of all sectoral plans.

The national environmental legislation (PEPA 1997), as well as the International Financial Institutions' (IFIs) safeguards require that environmental and social assessments are carried out and management plans/frameworks are prepared prior to undertaking the interventions such as those recommended in the floods DNA. However, details of the specific activities associated with the individual reconstruction and recovery plans in the majority of sectors are not currently known, hence the potentially adverse environmental and social impacts of these activities cannot be identified. Instead, it is proposed that a broad Environmental and Social Screening and Assessment Framework (ESSAF) be prepared for the overall reconstruction and recovery needs.

The ESSAF will define the environmental and social screening and assessment requirements of individual projects or interventions, and will guide the implementing agencies in identifying the appropriate type and level of environmental and social assessment to be carried out prior to undertaking each project or intervention - in compliance with national as well as IFIs' safeguard requirements. The ESSAF will also define the requirements for preparing appropriate environmental and social documents, and obtaining approvals/clearances of these documents from the relevant agencies.

To ensure implementation of ESSAF, it is further proposed that each line agency appoints an environmental and social focal person within the department.

CHAPTER 8

Disaster Risk Management

Pakistan Disaster Risk Profile

Pakistan is increasingly facing hydro-meteorological and seismic disasters. After the massive earthquake that hit the northern parts of the country resulting in the death of more than 73,000 people, it has been affected by cyclones, floods and earthquakes of varying intensities. The flood of 2010 affected more than 20 million people across the country. Heavy monsoon rains from August 10 to September 14, 2011 triggered heavy flooding in Sindh and Balochistan resulting in inundation of vast areas, causing widespread damages to the lives and livelihoods of the affected as well as infrastructure. Sindh and Balochistan, due to their geographic location and diverse topography continue to be at risk from various disasters such as earthquakes and floods, which may occur with greater frequency due to shifting climatic patterns.

Lessons Learnt From Flood Response 2011

Lessons learnt include: (a) Contingency planning exercises at the provincial level need to be multi-hazard and multiple-scenario based to allow flexibility in preparing for a wide range of disaster situations; (b) There is a need for an integrated early warning communication and response system to enable the PDMAs to receive information and take timely actions; (c) There is a need to study the role of infrastructure such as reservoirs and water channels in mitigating the impacts of future disasters and assimilate the findings and related mitigation actions in existing response plans.

Shift in Climatic Patterns

Pakistan is experiencing a shift in the climatic weather patterns that caused monsoon rains to shift more towards the western parts of the country in 2010 and to the southern half of the country in 2011. This year, southern parts of the country including some desert areas received heavy rains over a prolonged period of time resulting in inundation and floods. There is a need to study the longer term implications and assess the trends in these shifts for predicting future events allowing for better planning in such eventualities.

Evolution of DRM at the Provincial Level:

System evolution and description

Before the establishment of the NDMA in 2006, DRM in the country mainly revolved around disaster response. The Emergency Relief Cell used to function under the Cabinet Division at the Federal Level while at the Provincial Level, the Senior Member of the Board of Revenue used to act as the Relief Commissioner for the province. The application of the NDM Act 2010 envisages the replication of the DRM institutional structure from the federal to the provincial level. The Provincial Disaster Management Commission (PDMC) is chaired by the Chief Minister while the Provincial Disaster Management Authority (PDMA) is the main executive arm of the PDMC. PDMAs have been established in all provinces of the country.

Forecasting and climate change research

PDMA Balochistan was initially an attached department to the Board of Revenue, Government of Balochistan. However at a later stage PDMA Balochistan was notified as an independent organization with administrative and financial autonomy. PDMA Sindh was established, and continues to function, as an authority under the Rehabilitation Department, Government of Sindh. Furthermore, the Secretary Rehabilitation is the ex-officio Director General of PDMA Sindh. In addition to the PDMAs, there are a number of entities responsible for disaster management including the Revenue Department, Civil Defence, Provincial Irrigation Departments, etc. The entrustment of DRM responsibility to the provinces has exacerbated the challenges faced by the PDMA's in terms of capacity, preparedness and effective response.

District level DRM mechanisms existing and their capacities

District level DRM responsibilities rest with the District Disaster Management Authority (DDMA) which is headed by the District Coordination Officer (DCO) as per the NDM Act 2010. Although DDMAs have been notified in almost all of the districts in Sindh and Balochistan, they lack the capacity in terms of trained manpower and equipment to assist the DCO in fulfilling his responsibilities as the head of the DDMA.

DRM Strategy and Recommendations

Policy and institutional

There is a need to update the existing DRM Strategy / Policy in order to reflect the inter-departmental and Federal-Provincial relationship especially in the context of the 18th Amendment. PDMAs require support in establishing their structures in line the global best practices, to strengthen the provincial emergency operations centers and to prepare SOPs for dealing with various situations. PDMAs also need to be provided with an integrated GIS based MIS and Early Warning and Incident Response System (EWIRS) with linkages to all the concerned departments to enable better preparedness and coordinating response to disasters and emergency situations. The capacity to undertake Needs Assessments for future disasters also needs to be strengthened.

Risk identification and mitigation measures

It is important to identify the overall risk environment for Sindh and Balochistan through collation of existing information, identification of gaps and additional mapping exercises. While conducting multi-hazard mapping activities, the Government should ensure that a common platform is utilizedso that all information can easily be integrated possibly using GIS enabled MIS. Mitigation measures including assessment, improvement in existing multi-hazard early warning systems, contingency planning and the role of major infrastructure in mitigating the impacts of disasters, need to be studied and put into place.

Risk transfer and sharing

There is a need for developing a country catastrophe risk financing strategy that could allow for risk sharing with the private sector to avoid heavy reliance on donor funding as well as reallocation of public development funds towards response. The government should initiate a dialogue, especially with the Ministry of Finance and the Securities and Exchange Commission of Pakistan, on the development of a catastrophe insurance market through catastrophe insurance pools.

Forecasting and climate change research

The capacity of the PMD to predict extreme weather events which result in disasters should be enhanced. There is a need to study the impacts of climate change on the weather patterns in Pakistan in order to be included in long term DRM planning and be better prepared for future anomalies. The Government commissioned National Task Force Report on Climate Change and its recommendations need to be translated into action with the Provinces taking the lead in implementation and follow up actions / feasibility studies.

CHAPTER 9

Guiding Principles

The experience of implementing the reconstruction program following the devastating 2005 earthquake in Pakistan holds important lessons on how to implement a large-scale reconstruction program. Experiences of recent large-scale post-disaster reconstruction programs in other countries also offer several relevant lessons. Though the institutional arrangements for implementation of reconstruction programs inevitably vary across countries, a core set of guiding principles has emerged from these experiences which should be considered for the post-2011 flood reconstruction program. The following principles are the most relevant:

Coordinate centrally, implement locally

Central coordination with local implementation should be one of the key features of the institutional framework to implement the reconstruction program. The majority of successful large-scale reconstruction programs have carried out central coordination through a dedicated agency, like NDMA in the case of Paksitan. In past reconstruction programs this has been considered critical for setting overall policies, strategies and standards, especially in areas such as cash transfers, asset compensation, and housing entitlements. In addition, a centrally coordinated mechanism is essential for effective coordination between government agencies as well as engagement with international donors. In cases where many international NGOs are implementing programs a central agency can ensure their efforts are consistent, coordinated and targeted to meet needs and gaps in the program. It will allow the Government to set common standards for all involved including the donor agencies. A central agency can also play a key role in helping to troubleshoot and overcome obstacles in the reconstruction program and maintain a sense of urgency.

Within the broader context of central coordination, reconstruction should preferably be implemented at the lowest competent tier of government to ensure that it is tailored to the local conditions. This also encourages more rapid feedback loops from local communities to implementing agencies. Through this "subsidiarity" principle, local ownership is strengthened and sustainability of reconstructed assets is better ensured.

Focus on poverty reduction and sustainable livelihoods

Ensure that the rehabilitation and reconstruction efforts are socially equitable with support targeted mainly to those in greatest need. Special measures should be put in place to ensure that vulnerable groups living in the flood affected areas, such as landless farmers, tenants, and those in riverine areas where property rights are poorly defined, fully benefit from the support measures to be provided, through targeted outreach and monitoring.

Support Government Institutions

Prior to the 2011 flood event, most government institutions were already struggling to fulfill their mandated responsibilities. Many government institutions will therefore need support, in the form of additional capacity or specific expertise, to implement their part of the reconstruction program. Support is also needed to deal

with the increased demand for interaction with local communities and for public information. This support can be provided by mobilizing and redistributing expertise with the government or it can be provided in the form of technical assistance from international and private sector partners.

Match greater flexibility and speed in Public Financial Management and Accountability (PFMA) processes

The urgency of the reconstruction program calls for fast-track operations with streamlined, flexible procedures and systems while increasing controls to address equally important concerns on anticorruption, transparency and accountability. Although core fiduciary principles need to be applied, management, planning, budgeting and project implementation need to follow a different sequence and modalities to be effective, especially in the early phase of reconstruction implementation.

The influx of additional resources from multiple donors will require additional controls, not only to meet enhanced stakeholder expectations but also to compensate for the additional strain on the PFMA systems. This can best be achieved through independent oversight bodies, comprehensive M&E systems, enhanced audit procedures, specialized complaints and grievance redressal mechanisms, and effective anti-corruption penalties. To balance speed and accountability, some services such as procurement, accounting and auditing could be outsourced. This would also address capacity constraints of the government institutions.

Many large-scale reconstruction programs have expedited ex-ante audit processes in favor of emphasis on ex-post audit. This approach has been shown to increase the speed at which reconstruction can be delivered.

Channel funds into the hands of those with the strongest incentives to use them for the intended purposes

In post-disaster contexts, this has generally translated into a strong preference, where appropriate, for Community-Driven Development (CDD) implementation arrangements and transfer programs directly to beneficiaries. Such arrangements not only help to disburse benefits to communities and individuals quickly, but also make best use of individual incentives to ensure that funds are used for their intended purpose. However, support mechanisms, preferably in collaboration with civil society organizations, may be required to make this approach fully effective. Such support could focus on ensuring equitable distribution of assistance at community level, integration of gender considerations in community decision-making, and adherence to proper standards and processes.

Communicate, consult and manage expectations

Continuous communication and consultation with all stakeholders is essential for identifying needs and managing expectations. Dedicated mechanisms need to be put in place for beneficiary feedback and grievance redress. Regular consultations with the donor community will assist in addressing donor concerns, channeling resources to address gaps, highlighting common issues and lessons, and seeking solutions to problems. Regular communication with beneficiaries and donors is essential to manage expectations and to maintain popular support.

Maximize credibility through an independent oversight board, third party monitoring and a grievance redressal mechanism

An independent oversight board representing the interests of stakeholders is one of the most effective ways to ensure accountability and transparency over reconstruction implementation. Independent systems for third party monitoring, where possible in collaboration with civil society, will further enhance credibility. Considering the scale of its program, a dedicated grievance redressal system is needed that complements the existing mechanisms. Such a system would need to be operationalized at local (union, tehsil or at least district) level. Cases that cannot be resolved through this mechanism can then be referred to the existing systems such as the Ombudsman or to the courts. To overcome the difficulties in accessing and resolving issues through these systems, in particular for vulnerable people, legal aid centers may need to be established.

Institutionalize urgency in Government and donor institutions

A constant theme spanning across the principles laid out above is the need for speed, flexibility, pro-activism, responsiveness and openness. Maintaining the sense of urgency during the entire frame of reconstruction implementation will be a challenge. Over time, the sense of urgency will tend to wane with the risk that a business-as -usual attitude will take over. Hence the challenge of the recovery is to institutionalize urgency, i.e. to embed the drive for extraordinary results into government and donor systems and practices. Setting a clear time frame during which the institutional framework for reconstruction and its associated implementation arrangements and fast-track procedures will be applied is important in this context, not only for the Government but also the donors.

Annex 1: Disaster Risk Management

Introduction

Pakistan Disaster Risk Profile

Pakistan is increasingly facing hydro-meteorological and seismic disasters in the past few years. After the massive earthquake that hit the northern parts of the country resulting in the death of more than 73,000 people, it has been affected by cyclones, floods and earthquakes of varying intensities. The flood of 2010 affected roughly one fifth of the country and more than 20 million people, and was termed as a disaster greater than the 2004 tsunami, the 2005 Pakistan earthquake and the Haiti earthquake combined, by the United Nations. As the provinces of Sindh and Balochistan were recovering from the impacts of the 2010 floods, heavy monsoon rains from August 10 to September 14, 2011 triggered heavy flooding resulting in inundation of vast areas, causing widespread damages to the lives and livelihoods of the affectees as well as the infrastructure. Sindh and Balochistan provinces, due to their geographic location and diverse topography continue to be at risk from various disasters such as earthquakes, floods, cyclones and tsunamis some of which may occur with greater frequency due to the shifting climatic patterns.

Event Description

While the floods of 2010 were due to excessive flows in the rivers due to more than normal monsoon rains in the catchment areas, the occurrence this year is attributed to extraordinary monsoon rains in the Southern parts of the country especially Sindh and Balochistan provinces which overwhelmed the absorption capacity of the soil resulting in inundation of substantial areas in the affected districts.

Before the start of the monsoon season, the meteorological department had forecast 10% below normal monsoon rains for Sindh and southern parts of the country. Even during the month of July, the monsoon rains in Sindh and Balochistan were 72% and 36% less than normal respectively. However, Sindh received heavy rains during the month of August which were 270% above normal and affected the entire Sindh province. While the authorities had prepared flood contingency plans based on past experiences, particularly based on floods in 2010, the sheer volume of the precipitation overwhelmed the provincial capacity. The excessive amount of rains even exceeded the drainage capacity of the infrastructure such as the Left Bank Outfall Drain (LBOD) which facilitated the drainage of the water to some extent but is not designed to channel flood water.

Lessons Learnt From Flood Response 2011

- Contingency planning exercises at the provincial level need to be multi-hazard and multiple-scenario based to allow the authorities flexibility to prepare for a wide range of disaster situations.
- There is a need for an integrated early warning communication and response system to enable the PDMAs to receive information as well as to take timely implementable actions all along the early warning chain down to the vulnerable communities.
- There is a need to study the role of infrastructure such as reservoirs and water channels in mitigating the impacts of future disasters and assimilate the findings and related mitigation actions in existing response plans.

Shift in climatic patterns

Pakistan is experiencing a shift in the climatic weather patterns that caused monsoon rains to shift more towards the western parts of the country in 2010 and to the southern half of the country in 2011. As mentioned by Pakistan Meteorological Department (PMD), the 2010 floods were caused by a phenomenon termed as cloudburst in the northern parts of the country in which very heavy rainfalls are experienced in a short time. However, this year, southern parts of the country including some desert areas received heavy rains over a prolonged period of time resulting in inundation and floods. Thar Desert on an average receives hardly 70 mm rains in the period July-September, however, during this year's monsoon, more than 500 mm rains were recorded in the area during the same months. Similarly, Mithi an area on the outskirts of Thar Desert received 1100 mm of rains during August-September which is almost ten times its average yearly rainfall.

This anomaly is attributed to a shift in the weather patterns mainly due to climate change. There is a need to study the longer term implications and assess the trends in these shifts for predicting future events allowing for better planning in such eventualities.

Existing Capacities

Brief overview of the institutions, legislation and policies relating to DRM at the national level

To provide the necessary policy, legal and institutional guidelines on Disaster Risk Management in Pakistan, the National Disaster Management Ordinance (NDMO) was promulgated on December 21, 2006 which required creation of the National Disaster Management Commission (NDMC) and establishment of the National Disaster Management Authority (NDMA) as the lead agency at the federal level to coordinate disaster response. The National Disaster Management (NDM) Act, 2010 succeeded the NDMO and provided the necessary legislative cover to the DRM institutions as envisaged under the NDMO.

The National Disaster Risk Management Framework (NDRMF) was launched in March 2007 to provide strategic guidance for DRR activities in the country. It also highlights priorities for a five-year period. It also identifies roles and responsibilities of various stakeholders including Ministries, Departments, Technical Agencies, Donors, NGOs and the UN Agencies. At the time of preparation of this report, formation of the Ministry of Disaster Management has been announced which covers National Disaster Management Authority, Pakistan Environmental Protection Council, Pakistan Environmental Protection Agency, Pakistan Environmental Planning and Architectural Consultants Limited, Global Environmental Impact Study Centre etc. However, the working arrangement at both the national and provincial levels is still not clear. This has the potential to cause friction in inter-department functions if clear guidelines and policies on mandates and roles of various stakeholders are not soon issued.

In spite of the NDM Act 2010 and NDRMF which serve as legal and strategic guidance documents as well as provincial DRR plans in some provinces, the country lacks Disaster Risk Management policy that provides a way forward for the government to bring together all the stakeholders involved in DRM.

Evolution of DRM at the provincial level in Sindh and Balochistan and current status, legal standing and capacities

Before the establishment of the NDMA in 2006, DRM in the country mainly revolved around disaster response. For this purpose, an Emergency Relief Cell used to function under the Cabinet Division at the Federal Level while at the Provincial Level, the Senior Member of the Board of Revenue used to act as the

Relief Commissioner of the provincial government who would coordinate and direct relief activities in response to disaster and emergency situations.

The NDM Act 2010 envisages the replication of the DRM institutional structure from the federal to the provincial level. The Provincial Disaster Management Commission (PDMC) is chaired by the Chief Minister while the Provincial Disaster Management Authority (PDMA) is the main executive arm of the PDMC. PDMAs have been established in Punjab, Sindh, Khyber Pakhtunkhwa (KP), Balochistan, Federally Administered Tribal Areas (FATA), the State of Azad Jammu and Kashmir (AJK) and Gilgit-Baltistan.

PDMA Balochistan was initially an attached department to the Board of Revenue, Government of Balochistan. However at a later stage PDMA Balochistan was notified as an independent organization with administrative and financial autonomy. PDMA Sindh was established, and continues to function, as an authority under the Rehabilitation Department, Government of Sindh. Furthermore, the Secretary Rehabilitation is the ex-officio Director General of PDMA Sindh.

In addition to the PDMAs, there are a number of entities responsible for disaster management which include the Revenue Department, Civil Defence, Provincial Irrigation Departments, etc.

As a result of the enactment of the 18th constitutional amendment by Pakistan's Parliament, the provinces have been entrusted with DRM responsibility. The increased responsibility has exacerbated the existing challenges faced by both PDMA Balochistan and Sindh in terms of capacity, preparedness and availability of resources for effective response.

District level DRM mechanisms existing in the affected districts and their capacities

District level DRM responsibilities rest with the District Disaster Management Authority (DDMA) which is headed by the District Coordination Officer (DCO) as per the NDM Act 2010. Although DDMAs have been notified in almost all of the districts in Sindh and Balochistan, they lack the capacity in terms of trained manpower and equipment to assist the DCO in fulfilling his responsibilities as the head of the DDMA.

Gaps and Challenges

Need for preparedness focus

In a country having suffered losses of more than US$ 14 billion over the last few years from natural and manmade calamities, disaster risk management remains among the low priority issues both for the government as well as the donors. Disaster situations in many countries have shown that low cost investments in preparedness and mitigation yield significant dividends by reducing loss of lives and livelihoods in time of disasters. Since 2005, Pakistan has been facing disasters at an increasing frequency because of which the recovery phase of one disaster overlaps with the relief phase of the proceeding disaster. This has contributed to the adoption of a "firefighting" approach by the authorities resulting in lack of focus on the longer term aspects of DRM.

This is also true for PDMAs in Sindh and Balochistan that are relatively recently established and do not have the capacity or the resources for undertaking preparedness and mitigation interventions in the provinces. Similarly, district authorities are under an obligation to dedicate 1% of the total district budget towards DRM; however there is little action in this regard.

Institutional/Legal

The existence of multiple legal frameworks including the National Calamities Act 1958 and Civil Defence Act 1952, NDM Act 2010 and Earthquake Reconstruction and Rehabilitation Authority Act 2011, Punjab Emergency Services Act 2010, create ambiguity regarding DRM roles and responsibilities. There are a number of entities dealing with DRM at the federal and provincial levels. At the federal level, NDMA has been mandated to manage DRM under the NDM Act 2010. However, the Earthquake Reconstruction and Rehabilitation Authority (ERRA) is also entrusted with some aspects of DRM having overlaps with the mandate of NDMA. Similarly, other actors such as Pakistan Meteorological Department, Federal Flood Commission, National Crisis Management Cell, Civil Defence Department to name a few are all working in DRM. Similarly, there are a number of departments at the provincial level involved in different aspects of DRM including the Revenue Department, Irrigation, Civil Defence etc. There is a level of coordination between these entities but it usually is on "as required" basis. There is a need to institutionalize the coordination mechanism with a single entity mandated and capacitated for overall coordination on DRM interventions to avoid duplication and/or gaps.

Similarly, at the provincial level, PDMAs have been formed and their responsibilities highlighted in the NDM Act. However, their relationship with NDMA as well as with other departments at the provincial levels needs to be clearly defined to enable them to effectively perform their responsibilities both in preparedness as well as response to disaster and emergency situations. Furthermore, in the aftermath of the passage of the 18th amendment, the PDMAs would need to play a much more active role in DRM which requires elaboration of their responsibilities as well as authorities in the rules of business to empower them to perform these functions.

Capacity of PDMAs

Under the NDM Act, the PDMA have been given the mandate of DRM in the province. However, there are some overlaps as well as gaps due to a number of entities working on different aspects of DRM. Additionally, the relationship between the PDMAs and NDMA is also not clear resulting in coordination and implementation shortfalls. There needs to be an overarching policy to outline all these issues and to streamline the Federal-Provincial relationship especially in the context of the 18th Amendment.

The PDMAs lack an integrated GIS based MIS and incidence response system with linkages to all the concerned departments to enable better preparedness as well as support in coordinating response to disasters and emergency situations. The Emergency Operations Centers also are in need of strengthening to support PDMAs in better coordination and information sharing in times of disasters.

Risk assessment

Although it has been more than five years since the establishment of NDMA, a comprehensive Hazard and Vulnerability Risk Assessment is yet to be undertaken for the country. This means that there is an absence of any baseline or risk profile for different areas of the country which is a major impediment to DRM planning and identifying interventions. NDMA lacks the capacity to prepare multi hazard guidelines for various areas and locations in line with the prevailing risks and does not have the authority to enforce these guidelines.

Similarly, for Sindh and Balochistan provinces, the respective PDMAs have yet to lead the process of identification of the vulnerable areas through hazard and risk mapping, inundation profiles and digital elevation models to inform future planning for similar disasters.

MER and R&D Capacity

The PDMAs lack the capacity to monitor DRM related activities being implemented in the provinces and do not have the means of evaluating the impact of various interventions. They also lack dedicated Research and Development capacity to learn from the experiences of other countries and to pilot innovative approaches tailored to the disaster context of the province.

Catastrophe risk financing

Despite the frequency of natural disasters and manmade catastrophes affecting the country, little or no work has been done in creating a catastrophe risk financing strategy or developing a catastrophe insurance market in the private sector. The PDMAs need to lead identification of opportunities for investment in this important area.

DRM Strategy and Recommendations

During the course of the assessment the DRM Sector team held consultations with a number of stakeholders at the Federal and Provincial levels, which helped in informing policy recommendations by the team, as well as with the identification of issues in the sector which need attention and intervention. The recommendations on DRM policy and institutional development are based on an assessment of the state of current DRM structures especially at the provincial and district levels in Sindh and Balochistan. Secondly, the lessons learnt on disaster response and preparedness from the current flood event form the basis of improvements suggested in respect of the existing disaster response and preparedness apparatus and dispensation.

Policy and institutional

- There is a need to update the existing DRM Strategy / Policy in order to reflect the inter-departmental and Federal-Provincial relationship especially in the context of the 18th Amendment.
- There is a need to support the PDMAs in establishing their structures in line with the global best practices, to strengthen the provincial emergency operations centers and to prepare SOPs for dealing with various situations.
- PDMAs need to be provided with an integrated GIS based MIS and Early Warning and Incident Response System (EWIRS) with linkages to all the concerned departments to enable better preparedness as well as support in coordinating response to disasters and emergency situations.
- Capacity of the PDMAs to undertake Needs Assessment exercise in the aftermath of future disasters needs to be strengthened.

Risk identification and mitigation measures

- There is a need to undertake a risk assessment exercise in the vulnerable districts of Sindh and Balochistan to identify the areas under risk of flash floods, inundation etc. For this purpose, inundation profiles need to be prepared for the high risk areas along with digital elevation models to enable the authorities to highlight the areas at risk and to prepare for future disasters of this kind. The mapping obtained from this exercise needs to feed into the integrated MIS.
- Existing early warning systems at the provincial level need to be strengthened and improved to enable timely warning and response. The system needs to be integrated with effective communications and response capabilities in order to ensure completion of the early warning chain down to the last mile i.e. communities at risk.
- Contingency plans at the provincial level needs to be strengthened and tested through drills and simulations considering a wide range of disasters prevalent in the province.
- There is a need to study the role that major infrastructure can play in mitigating the impacts of disasters in vulnerable areas of Sindh and Balochistan including reservoir management techniques and water overflow drains / channels, particularly where risk of recurring floods are high and communities are situated in such hazard prone locations.

Risk transfer and sharing

- There is a need for developing a country catastrophe risk financing strategy that could allow for risk sharing with the private sector to avoid heavy reliance on donor funding as well as reallocation of public development funds towards response.
- The government should initiate a dialogue on the development of a catastrophe insurance market through catastrophe insurance pools. The Ministry of Finance and the Security Exchange Commission of Pakistan would be key stakeholders in this dialogue with the Insurance Industry.

Forecasting and climate change research

- There is a need to enhance the capacity of the PMD to predict extreme weather events which result in disasters such as floods. This is important as the contingency planning is primarily based on the forecasts received from the PMD.
- There is a need to study the impacts of climate change on the weather patterns in Pakistan in order to be better prepared for future anomalies. The findings and recommendations of these studies need to be included in long term DRM planning to enable the country to be better prepared for future disaster events.
- The Government commissioned National Task Force Report on Climate Change and its recommendations need to be translated into action with the Provinces taking the lead in implementation and follow up actions / feasibility studies

Needs Estimation of Recovery and Reconstruction

The DRM sector assessment is a qualitative analysis of the disaster event and the response function at the Federal and Provincial levels (Sindh and Balochistan only). The appended table is a costing exercise of the various priority actions which have been identified through the assessment and are based on consultations with the PDMAs and other relevant stakeholders.

Annex-Table 1.1:Needs Assessment for DRM at the Federal and Provincial Levels

Sr. No.	Prioritized Action	Resource requirements (US$ million)
Short-term		
1	Capacity and gaps assessment of PDMAs to identify critical areas of support	0.3
2	Technical assistance and capacity building of PDMAs and DDMAs	5.0
3	Strengthening of provincial emergency operations centers in Sindh and Balochistan	4.0
Medium to long term		
4	Hazard mapping and inundation profiling of vulnerable districts in Sindh and Balochistan	3.0
5	Development of in-house capacity PDMAs to undertake DNAs	0.2
6	Strengthening and enhancement of integrated Early Warning and Incident Response System (EWIRS) at the provincial, district and local levels	6.0
7	Identification of areas susceptible to recurring flash floods in Balochistan and prioritized mitigation measures / Identification of areas susceptible to floods in	2.0
8	Comprehensive study of the impact of climate change in Pakistan and implications for DRM	0.5
	Total	**21.0**

Annex 2: Economic Assessment

Introduction

Over the last six years, Pakistan endured a series of natural disasters. In October 2005, the northern part of the country was devastated by a huge earthquake which took hundreds of thousands of lives and destroyed the local economy. In September 2007, the southern two provinces of Sindh and Balochistan had to bear the brunt of unseasonal cyclones. The damage was rather limited, however. In July-August 2010, the country experienced the worst flooding of its sixty-three year old history with direct and indirect damages estimated at US$ 10 billion (4.7 percent of GDP). Sindh was the worst affected province.[1] While the international community mobilized itself to assist the government in its reconstruction endeavors, the actual flow of donor assistance was reduced as the government opted to seek mainly budgetary support to compensate the affected households by providing grant financing.[2] On the other hand, efforts by the federal, provincial and local governments were largely successful in reducing the adverse impact of floods on the economy.

In August 2011, Sindh and Balochistan were severely affected by unseasonably heavy rains and flooding again. While only five districts of Balochistan were affected, almost the entire rural economy of Sindh was once again hit by floods. In economic terms, damages in Sindh from the 2011 floods are expected to be only marginally lower than the 2010 disaster. The is attributed to the fact that the 2011 floods affected the agricultural heartland of Sindh situated on the left bank of river Indus, causing extensive damage to cotton, rice, sugarcane and chilies crops. Nationwide, however, the overall impact of the floods appear lower (1.6 percent of GDP) than in 2010.

Pre-Floods Economic Profile of Affected Districts

Balochistan

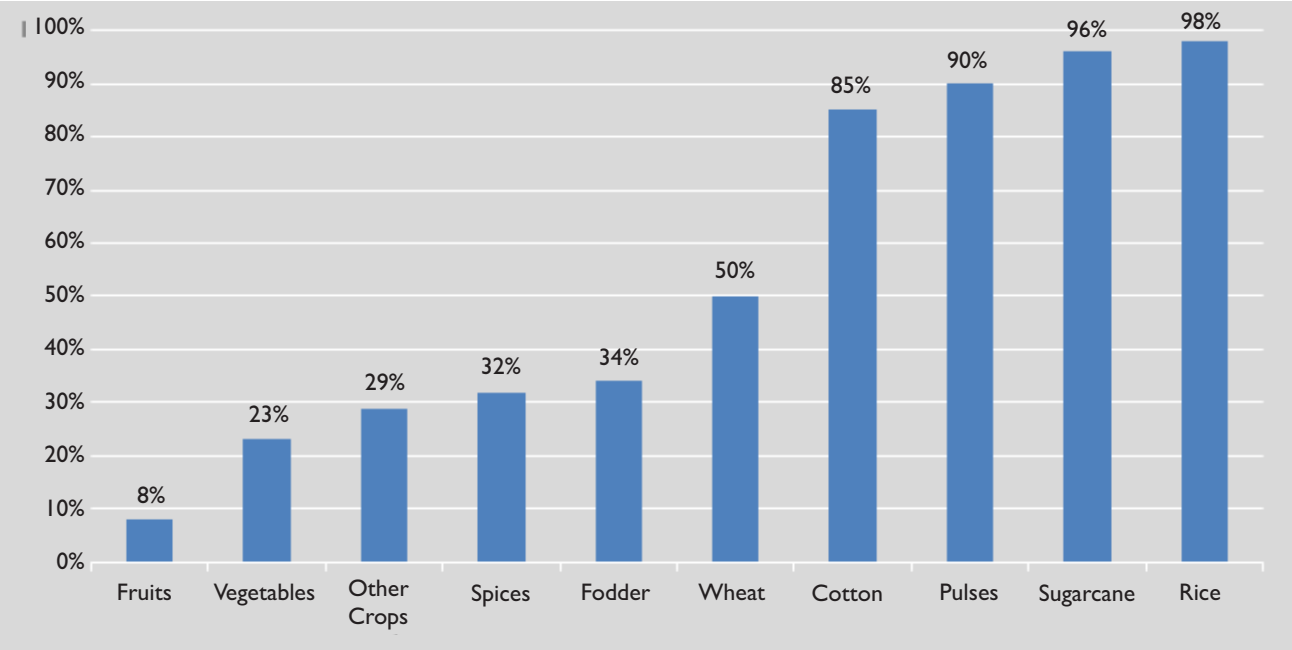
As mentioned above, in Balochistan, five districts were affected.[3] These comprise only 9 percent of the geographical area of the province. However, as three of the five districts affected by floods have the highest population density after Quetta, total population of the flood affected districtsis home to almost one quarter of the population of the province. Moreover, the affected districts contain Jaffarabad and Nasirabad, the two biggest agricultural districts of the province. As such, the flood affected districts have 46 percent of the total cropped area of the province and economic activity in the flood impacted districts is dominated by agriculture. These districts provide a very large percentage of the province's total production of some of the major crops (Figure 2.1). In addition, these districts also produce about 20 percent of livestock products of the province. It is therefore no surprise that bulk of the income produced in the flood-affected districts is generated from agriculture, which contributes 40 percent to the total income of these districts. Social and community services (26 percent) and commerce (18 percent) are other major contributors to income. Whereas, industry contributes only 6 percent to the income of these districts (Figure 2.2).

[1] By some estimates (State Bank of Pakistan, Annual Report 2011), these floods caused about 6.6 million of Pakistan's labor force to be out of work for 2 to 3 months, and capital stock worth US$ 2.6 billion (1.2 percent of GDP) was lost.

[2] Nonetheless, IMF provided budgetary support of US$ 453 million under its Emergency National Disaster Assistance.

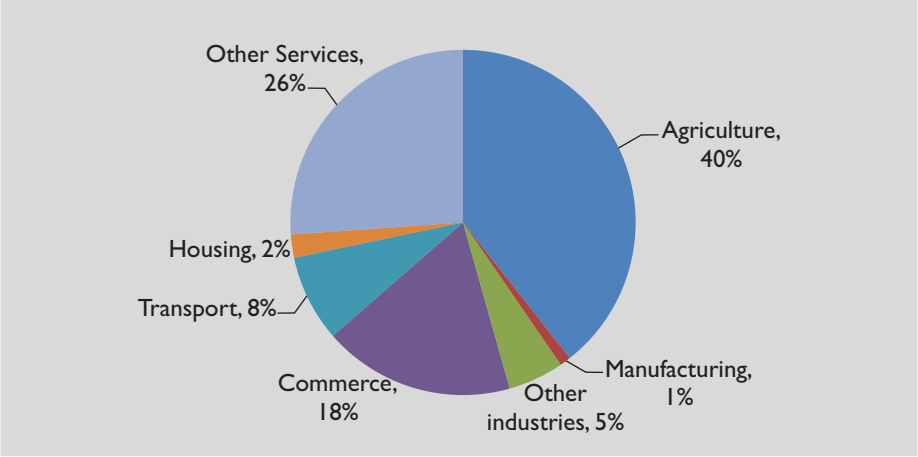
[3] These include:Jaffarabad, Kalat, Killa Abdullah, Lasbela, and Nasirabad

Figure-Annex 2.1: Balochistan: Share of Affected Districts in Provincial Outputs of Various Crops



Source: Development Statistics of Balochistan 2007.

Figure-Annex 2.2: Sources of Income Generation in Flood Affected Districts of Balochistan



Source: World Bank estimates of Gross Domestic Product (GDP) of the province and affected districts, 2011.

The affected districts of Balochistan generate a little less than one quarter (23 percent) of the total income produced in the province. These districts contribute 38 percent of the total agricultural income of the province; 31 percent on income generated in social and community services; 28 percent of income in commerce and almost one quarter of Balochistan's housing income. However, as Balochistan's own contribution towards national GDP is only about 5 percent, the income generated in affected districts

constitutes only about 1 percent of national income (Figure 2.3). The methodology to estimate these shares is summarized in Box 1.

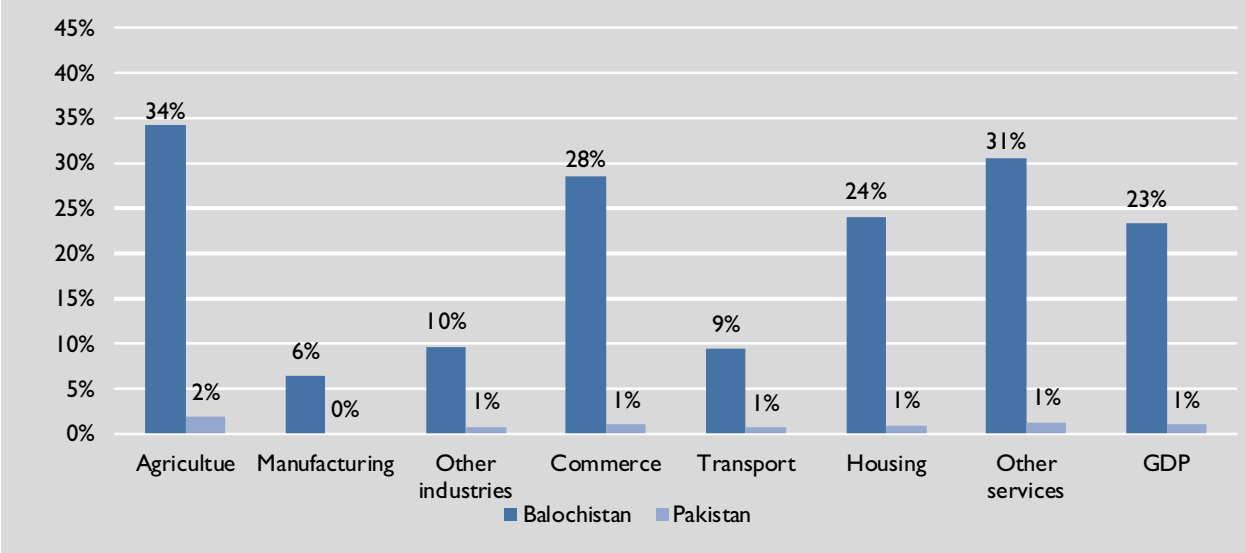
Box 1: Assumptions Underlying the Output Estimates of Affected Districts

The estimation of output at the district level is not a simple exercise since National Income Accounts are not prepared at provincial and district levels in Pakistan. However, the World Bank in consultation with the provincial Governments has estimated GDP for all four provinces. It may however be noted that estimation of GDP at the sub-national is even more complicated than the National Income Accounts. This is because some income identities close only at the national level and not at the sub-national level. This is specifically true of income derived from mobile factors, which can freely move across the provincial boundaries, providing services (and generating income) in more than one province.

Hence, to the extent possible, the United Nation's System of National Accounts (SNA methodology (which is also adopted by the Federal Bureau of Statistics (FBS) in estimating nation accounts) was adopted to calculate sectoral value addition. However, in a number of sectors this was not possible due to the lack of data. For these sectors, informed "allocators", based on past data, were used to derive sub-national value-added from the national data.

The same methodology, albeit with stronger assumptions and greater approximations was used to estimate district-wise GDP. For each sub-sector, multiple indicators are used to estimate the share of individual districts in the province and a geometric mean of various shares of these indicators is used to compute an informed composite "allocator" for each district and for each sector. The district GDP (DGDP) for a sub-sector is then derived by assuming that the share of the district in national/provincial GDP would be equal to the value of this composite "allocator".

Figure-Annex 2.3: Balochistan: Contribution of Affected Districts to the Provincial and National Economies

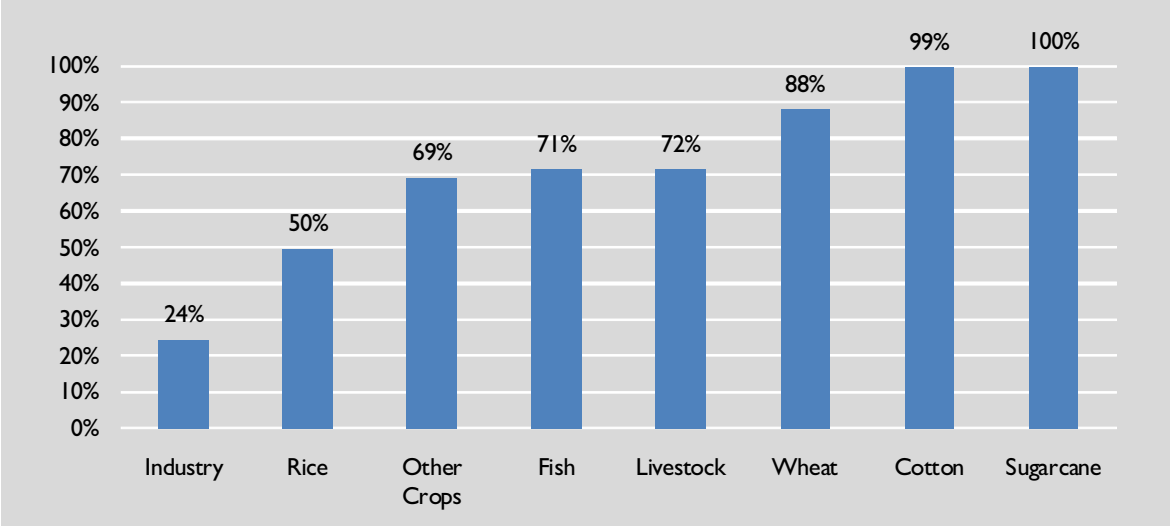


Source: World Bank estimates 2011.

Sindh

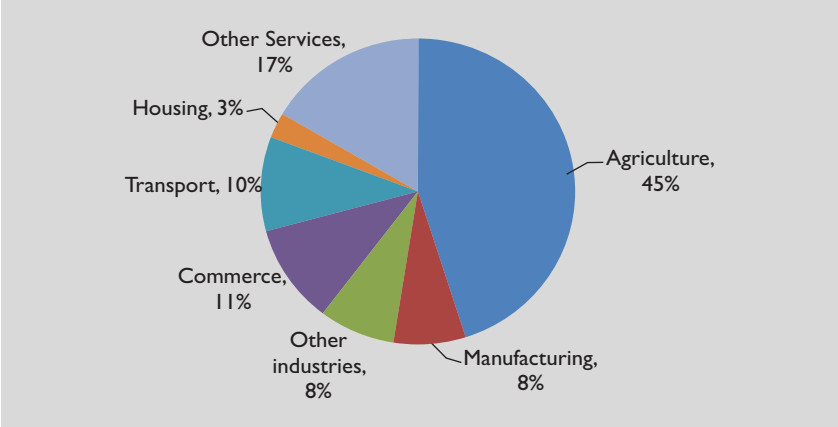
Unlike Balochistan, the floods had a much greater impact on Sindh, where almost all districts were affected. However, the Sindh government has listed seventeen districts which by its estimation were severely affected.[1] These affected districts constitute 86 percent of geographical area of the province. However, as Karachi, the most populated district of the province was not one of the districts affected by floods; the actual affected districts comprise only 54% of the total population of the province. Moreover, like Balochistan, agriculture is the main economic activity in the affected districts of Sindh. These districts provide over 70 percent of province's fishery and livestock products and an even larger proportion for wheat, cotton and sugarcane outputs (Figure 2.4). Overall, 45 percent of the total income of these districts is generated in the agriculture sector (Figure 2.5).

Figure-Annex 2.4: Sindh: Share of Affected Districts in Provincial Output



Source: Development Statistics of Sindh, 2009

Figure-Annex 2.5: Sources of Income Generation in Rural Sindh



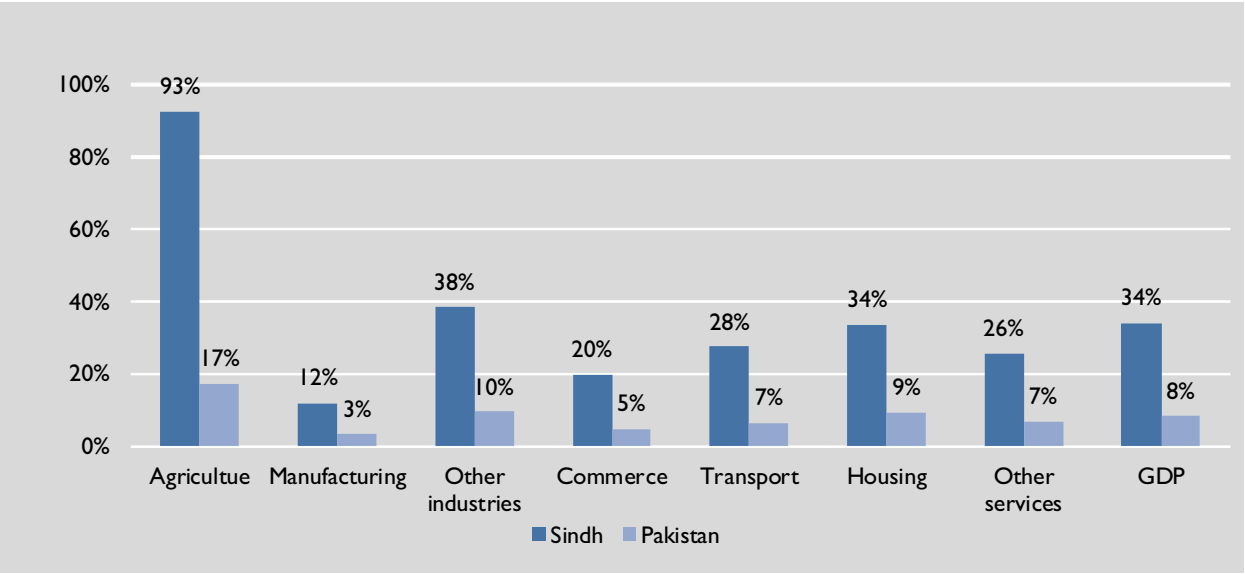
Source: World Bank estimates of Gross Domestic Product of Sindh and affected districts 2011.

[1] These districts include: Badin, Dadu, Ghotki, Hyderabad, Jamshoro, Khairpur, Matiari, Larkana, Mirpur Khas, Naushero Feroze, Sanghar, Shaheed Benazirabad, Tando AllahYar, Tando Mohammad Khan, Tharparkar, Thatta, Umerkot

In 2010, the flooding occurred mostly on the right bank of river Indus. The districts in Sindh situated on the right bank of river Indus are generally poor with relatively less agricultural and economic activity than the districts on the left bank. However, in 2011, the rains and flooding affected the districts on the left bank of Indus. As such, while the 2010 floods are considered to be the worst that hit the province in many decades, the economic impact of the 2011 floods on the province may only be marginally less than 2010. As illustrated in Figure 2.4, the affected districts have a sizable share in agricultural produce of the province, including all the major crops, inland fishing and livestock. It is therefore natural to expect that the floods must have caused a considerable damage to the agriculture sector of the province. In the affected districts, Social and Community Services contribute 17 percent of income; while commerce (11 percent) and transport (10 percent) are other major sources of income in these districts. Manufacturing and other industries provide 8 percent each to income.

From the provincial and national perspective, the economies of all affected districts comprise about 34% of all income produced in Sindh but only 8 percent of income generated in the country (Figure 2.6). This may imply that while the flood damage to the local and to the provincial economy of Balochistan was substantial, the impact to the national economy wasrelatively small.

Figure-Annex 2.6: Sindh: Contribution of Affected Districts to Provincial and National Economies



Source: World Bank estimates, 2011.

Damage Assessment - Preliminary Estimates

Concepts and Methodology

Damage due to floods depends on a number of factors. These include:

- the magnitude of flooding;
- depth and velocity of flowing water;
- rate of floodwater rise;
- duration of flooding;
- evacuation problems;
- effective flood access;
- size of population at risk;
- land use;
- flood awareness/readiness;
- effectiveness of flood warning system; etc.

Flood damages can be classified as tangible or intangible, reflecting the ability to assign monetary values. Intangible damages arise from adverse social and environmental effects caused by flooding, including factors such as loss of life and limb, stress and anxiety.

While it is important to be cognizant of the intangible losses, and is important to cater for them when designing and implementing recovery and rehabilitation efforts, tangible damages, which form the bulk of flood losses, remain the focus of attention for any damage assessment exercise. In order to assess the tangible damages of the recent floods in Balochistan and Sindh, both direct and indirect losses were estimated.This is done by using the **UN ECLAC Macro-Economic Assessment Methodology.**

Tangible damages are monetary losses directly attributable to flooding. They may occur as a result of direct or indirect flood damages. *Direct damages* result from the actions of floodwaters, inundation and flow, on property and structures. These refer to the monetary value of the completely or partially destroyed assets, such as social, physical and economic infrastructure (including final goods, goods in transit or process, raw materials, materials and spare parts), immediately following the floods. Wherever possible, the direct damage of assets is assessed in "as was" condition, i.e. at their book values.

As is often the case, the bulk of direct damage occurred to the housing and agriculture sectors.Loss of, and damage to, housing units presents losses of physical assets and can lead to considerable human suffering due to dislocation and shelter related issues. Losses in the agricultural sector are equally extensive, as these imply loss to standing or harvested crops; losses of farm livestock, agricultural structure and implements, seeds, fertilizers and other inputs; etc. However, these damages are not limited to the agricultural and housing sector, as significant damages also occur to businesses and public infrastructure, particularly in the case of larger floods.

Indirect damages arise from the disruptions to physical and economic activities caused by flooding. These comprise both the change of flow of goods and services and other economic flows such as increased expenses, curtailed production and diminished revenue, which arise from the direct damage to production capacity and social and economic infrastructure. Examples are the loss of sales, reduced productivity and the cost of alternative travel if road and rail links are broken.

Finally, *Reconstruction Costs* need to be measured as these constitute the cost of rebuilding the lost assets and restoring the lost services. It is generally assessed at the replacement cost, and in the case of this report, it is defined to include the additional costs incurred to ensure flood-resistance construction.

The economic losses are calculated according to the methodology summarized in Box 2. For many sectors, the methodology was applied assuming constant return to scale production function with capital and labor as two factors of production. The loss in capital (and labor, if any) for each sector was obtained from the sectoral annexes. Assuming some values for factor elasticities (α and β),[1] the economic loss, i.e. change in production (or values added), was estimated.

Additional information was sought, and, wherever available, this information was used to enhance the robustness of these estimates. For example, for sectors dominated by public sector utilities, e.g. power, gas, water supply and sanitation, the annualized revenue loss of these utilities attributable to the floods was used to estimate indirect losses. Table 2.1 summarizes the direct damage, indirect losses and reconstruction costs for each sector.

[1] Generally the capital elasticity (α) is assumed to be 0.35 and of labor (β) is taken to be 0.65.

Box 2: Methodology for Estimating the Economic Losses

In order to estimate the indirect losses due to flood, a simple production function approach was adopted. To illustrate the process, assume a Cobb-Douglas type of production function which relates the pre-floods sectoral capital stock and labor to sectoral output (value-added in our case).

$$Y_i = A_i K_i^{\alpha} L_i^{\beta}$$

Where: Y_i = Output (i.e. value added) in the ith sector of a given district
K_i is stock of capital in sector i.
L_i is labor employed in sector i.
α and β are the output elasticities of capital and labor, respectively.

A similar relationship exists after the floods, i.e.

$Y_i^* = A_i K_i^{*\alpha} L_i^{*\beta}$

Hence, $Yi^*/Yi = (Ki^*/Ki)^{\alpha}(Li^*/Li)^{\beta}$

Under the assumption of constant returns to scale, i.e. $\alpha + \beta = 1$, the last relationship states that the ratio of post- to pre-floods output is simply the geometric mean of the ratios or post- to pre-floods capital and labor. Given some estimate (or assumed value) of elasticity (i.e. coefficients α or β), the impact of losses in output could be determined from damages to sectoral capital and/or labor.

Overall Damage

From the perspective of Sindh – the most affected province in 2010 and 2011 - the damage in 2011 was as severe and economically devastating as in 2010. For example, in 2010, the total damage in Sindh was estimated at Rs 370 billion, whereas the 2011 floods have caused an estimated damage of Rs 311 billion in the province. This is mainly for the reason that last year, floods devastated the areas on right bank of river Indus, which contains relatively poorer districts of Sindh with low economic activity. In 2011, the floods impacted the richer left bank districts. These districts constitute the agricultural heartland of the province. As such, the damage to agriculture is estimated to be Rs 151 billion as compared to Rs 194 billion last year. The overall damage in Sindh is estimated to be about 6 percent of provincial GDP. On the other hand, in Balochistan, damages in 2011, at Rs 12 billion, (or 1.4 percent of provincial GDP) were only about one-quarter of damages occurred in 2010.

This methodology, however, required some alterations in terms of direct damage to the output. In cropped agriculture, for example, the biggest loss emanates from damage to the standing *kharif* crop. It is estimated that a large proportion of the crop in the affected districts had been destroyed. However, a disproportionately large amount of inputs (seeds, fertilizers, pesticides, water, etc.) have already been utilized in the production process, thus the loss to the value-added is even larger than the loss in output, which is derived from the above described methodology.

The overall, direct and indirect, damage caused by the floods is estimated at Rs 324.5 billion (US$ 3.7 billion or 1.5 percent of estimated GDP), with exactly half of these losses occurring in the agriculture sector. Damage in the housing sectors is responsible for another 27 percent of these losses, with a significant

proportion of the damage caused by standing waters. Given the nature of floods, damages in 2011 were somewhat different; damage to physical infrastructure comprises only about 10 percent of total damage, which is considerably less than 2010, when this ration was about 23 percent.

Regionally, the losses are estimated at Rs 12.3 billion (US$ 141 million) in Balochistan and Rs 311billion in Sindh (US$ 3.6 billion). The reason why damages in Balochistan are assed to be only 4 percent of the estimated total losses is that compared to Sindh, damage to the housing sector in Balochistan was only nominal (Table 2.2). As a proportion of GDP of all the affected districts the damage measures at 19 percent, i.e. 21 percent for the affected districts of Sindh and 7 percent for affected districts of Balochistan. As part of the provincial GDP, however, the damage is significantly less (6.1 percent for Sindh and 1.4 percent for Balochistan). As a percentage of GDP, the damage is only 1.6 percent, almost entirely in Sindh (Figure 2.7).

Table-Annex 2.1: Estimate of Total Damages and Reconstruction Costs

Sector	Direct Damages	Indirect Losses	Total Damage		Reconstruction Cost	
	(Rs million)	(Rs million)	(Rs million)	(US$ million)	(Rs Million)	(US$ million)
1. Social Infrastructure						
1.1 Housing	77,420	8,046	85,466	982	91,510	1,052
1.2 Health	432	826	1,258	14	864	10
1.3 Education	10,157	1,856	12,014	138	22,589	260
Sub-total	**88,009**	**10,728**	**98,738**	**1,135**	**114,963**	**1,321**
2. Physical Infrastructure						
2.1 Irrigation & Flood Management	4,763	0	4,763	55	9,526	110
2.2 Transport & Communications	16,386	10,082	26,468	304	33,902	390
2.3 Water Supply & Sanitation	500	704	1,204	14	1,900	22
2.4 Energy	457	783	1,240	14	292	3
Sub-total	**22,106**	**11,569**	**33,674**	**387**	**45,620**	**524**
3. Economic Sectors						
3.1Agriculture, Livestock & Fisheries	22,694	4,560	27,254	313	8,178	94
3.2 Private Sector /1	88,009	10,728	98,738	1,135	114,963	1,321

3.3 Social & Gender	39	5	44	1	65	1
3.4 Social Protection	0	0	0	0	34,126	392
Sub-total	165,091	22,314	187,405	2,154	68,959	793
4. Cross Cutting Sectors						
4.1 GovernanceManagement	4,763	0	4,763	55	9,526	110
4.2 Disaster and Risk	16,386	10,082	26,468	304	33,902	390
4.2 Environment	500	704	1,204	14	1,900	22
Sub-total	4,334	382	4,716	54	9,470	109
Total	279,540	44,992	324,533	3,730	239,011	2,747
(percent of **GDP**)	1.3%	0.2%	1.6%	1.6%	1.1%	1.1%

Table-Annex 2.2: Distribution of Total Damages across Sectors and Provinces

Sector	Balochistan	Sindh	Federal	***Total***	Balochistan	Sindh	**Total**	% Share of
					(Percent)	(Percent)	**(Percent)**	in Total
Agriculture	9,028	151,079	0	***160,107***	73.1%	48.6%	**49.3%**	94.4%
Crops	8,302	138,188	0	***146,490***	67.1%	44.5%	**45.1%**	94.3%
Livestock	726	12,599	0	***13,325***	5.9%	4.1%	**4.1%**	94.5%
Others	0	292	0	***292***	0.0%	0.1%	**0.1%**	100.0%
Private Sector/1	360	26,894	0	***27,254***	2.9%	8.7%	**8.4%**	98.7%
Transport &	1,203	25,101	165	***26,468***	9.8%	8.1%	**8.2%**	94.8%
Energy	0	0	1,240	***1,240***	0.0%	0.0%	**8.2%**	0.0%
Housing	414	85,051	0	***85,465***	3.4%	27.4%	**26.3%**	99.5%
Irrigation	827	3,936	0	***4,763***	6.7%	1.3%	**1.5%**	82.6%
Education	262	11,752	0	***12,014***	2.1%	3.8%	**3.7%**	97.8%
Health	185	1,073	0	***1,258***	1.5%	0.3%	**0.4%**	85.3%

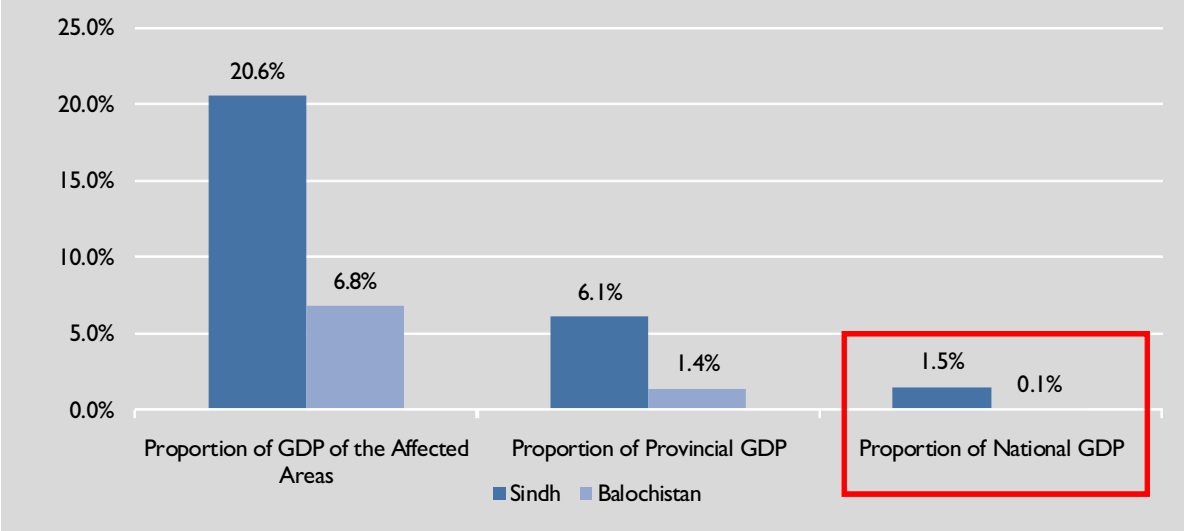
Governance	28	1,925	0	***1,953***	0.2%	0.6%	**0.6%**	98.6%
Environment/2	1	2,762	0	***2,763***	0.0%	0.9%	**0.9%**	100.0%
Social & Gender	5	39	0	***44***	0.0%	0.0%	**0.0%**	89.4%
Total	12,356	310,778	1,405	***324,533***	100.0%	100.0%	**100.0%**	95.8%
(percent of PGDP)/3	1.4%	6.1%	0.01%	***1.6%***				

/1 The damages were calculated as aggregate for both provinces. The provincial disaggregation is made by assuming that 5 percent of total damages occurred in Balochistan and the rest in Sindh.

/2 The damage is distributed between two provinces on the assumption of 10 percent and 90 percent for Balochistan and

/3 While losses of each province are expressed as a percentage of their own respective GDPs, the federal and overall damages are shown as percent of national GDP.

Figure-Annex 2.7: Estimated Total Losses



Direct Damages

The direct damage is calculated as Rs 280 billion (or US$ 3.2 billion), with more than half (51 percent) of the damage occurring assessed in the agricultural sector. Damage to private housing, furniture and household effects (28 percent); irrigation (1.7 percent) and transport (5.9 percent) infrastructure also shows significant direct losses.[1] A very large proportion (about 96 percent) of direct damage was in Sindh, with almost 80 percent of it occurring in agriculture and housing sectors. A large majority of direct damage in Balochistan is

attributed to losses in agriculture, irrigation and transport sectors, with agriculture alone accounting for almost two-thirds of the direct damages in the province.

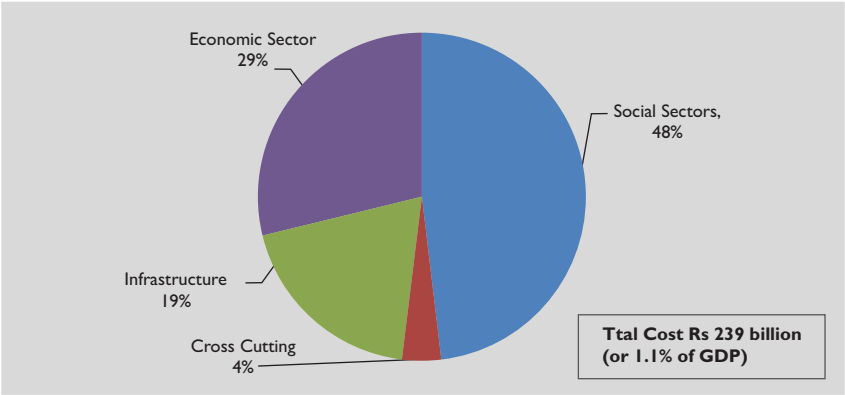
Indirect Losses

Like the direct damages, almost 40 percent of indirect losses of floods are in agricultural sector, as flooding has impacted productive capacity of land for the next cropping season. As agriculture is the main sector affected by floods in Balochistan, the losses in the agriculture sector are as high as 73 percent of overall damage in the province. This is almost twice the proportion of losses in agriculture sector of Sindh. Damage to housing units caused losses in (actual and imputed value) rental income of the house owners. These losses comprise 27 percent of all indirect losses. Similarly, disruption of economic activities caused significant income losses to transport and communication sector (23 percent). The other noteworthy indirect loss of about 4 percent of indirect losses is because of suspension of education services, both due damage to school infrastructure and the use of schools as shelters for flood-affected communities.

Reconstruction Costs

The cost of reconstruction of public and private assets and the restoration of public services is estimated to be Rs 239 billion (or 1.1 percent of GDP). As of a bulk of reconstruction efforts are likely to involve repairing and rebuilding of damaged houses, the estimated reconstruction cost for social infrastructure (at 0.6 percent of GDP) is almost half of the total cost (Figure 2.8). On the other hand, physical infrastructure, economic sectors and cross-cutting sectors would entail 19 percent, 29 percent and 4 percent of the reconstruction cost, respectively. Although, from the perspective of the local, and the provincial economies of Sindh and Balochistan, the reconstruction cost is high, yet viewed from the national perspective, the reconstruction cost is only about 1.1 percent of GDP (Figure 2.9).

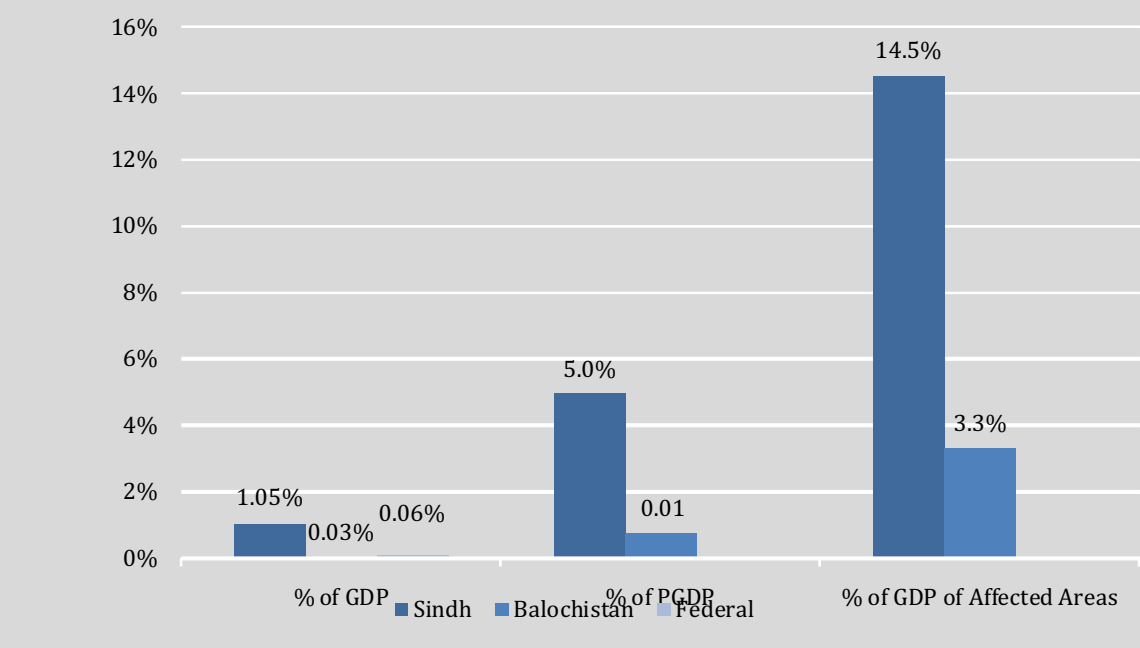
Figure-Annex 2.8: Sectoral Distribution of Reconstruction Costs



Source: World Bank estimates of Gross Domestic Product (GDP) of the province and affected districts, 2011.

The affected districts of Balochistan generate a little less than one quarter (23 percent) of the total income produced in the province. These districts contribute 38 percent of the total agricultural income of the province; 31 percent on income generated in social and community services; 28 percent of income in commerce and almost one quarter of Balochistan's housing income. However, as Balochistan's own contribution towards national GDP is only about 5 percent, the income generated in affected districts

Figure-Annex 2.9: Area-Wise Distribution of Reconstuction Costs



Macroeconomic Effects

Overall Effects

During the past four years, Pakistan's economy has slowed down considerably. Besides structural and policy-related problems, adverse security conditions, energy shortages and political uncertainty played and significant role in this sharp deceleration of the economy, with all key economic indicators showing marked deterioration. Economic growth dropped from 3.8 percent in 2009/10 to 2.4 percent in 2010/11. Inflation during these two years increased from 10.1 percent to 13.7 percent; fiscal deficit increased from an average of 6.3 percent of GDP to 6.6 percent. Although current account balance improved from a deficit of 2.2 percent of GDP in 2009/10 to a surplus of 0.2 percent of GDP in 2010/11, confidence declined, and investment fell from 15.4 percent of GDP to 13.4 percent during these two periods. Unemployment rate increased and all indicators point to a sharp increase in poverty. The devastating floods contributed towards this economic decline.

Looking forward, the Pakistani economy faces some daunting challenges. High inflation continues to have a devastating impact on the standard of living of the population, especially of fixed income groups and the poor. The floods in 2010 and 2011 have caused extensive physical damage to personal property and public infrastructure. Millions of people have been affected. Although relatively few lives were lost, a large number of people have lost their livelihoods due to temporary disruption in economic activity. In addition to relief costs, this preliminary assessment places the cost of reconstruction of the damagescaused by the 2011 floods to be US$ 2.7 billion (or nearly 1.1 percent of Pakistan's estimated 2011/12 GDP). While a bulk of these costs will fall on the private sector and households, there would be a sizeable fiscal impact, as not only has there been significant damage to public, social and economic infrastructure which would require repairs and restoration, but also because households, especially the poorer ones, in the affected areas will require government assistance to rebuild their houses and livelihoods. Although, in comparison to the number of houses

damaged or destroyed, the estimated book value of these assets is small, yet the replacement cost of these assets would be much higher, not only because of cost escalation overtime, but also because of a need to reconstruct these assets with improved standards in order to minimize the impact of similar disasters in the future. As such, the government has to assess the level of assistance for less affluent households against fiscal affordability and consistency with overall macroeconomic stability. Moreover, with the increased frequency of natural disasters faced by the country, the government has to devise sound policies, establish and strengthen institutions and invest in disaster control and damage mitigation measures at local, provincial and national levels.

Effects on Economic Growth

In order to estimate the impact of floods on the macro-economy, two set of projections are made for selected macroeconomic indicators in light of all the latest information available both prior to the floods and what is compiled as part of DNA to estimate direct and indirect losses. The first set of projections attempts to determine the level of macroeconomic indicators if there had been no floods this year, while the second set estimates the value of the same indicators after the floods.

The impact of the floods on Pakistan's economic growth is expected to be quite significant - in the order of 0.4 percent (i.e. 40 bps). In June 2011, the government of Pakistan projected the 2011/12 GDP growth at 4.1%, with value added in major crop sector expected to rebound from its flood-stricken negative growth (of - 4 percent) in 2010/11 to post a positive growth of 3 percent in 2011/12. However, it was clear that these estimates were based on partial information and could therefore be incorrect. Most importantly, with the 18th amendment leading to devolution of some key federal ministries to the provinces, the federal government lost its handle on some key information required to make robust projections. This includes, area sown under various crops and the expected output from these crops, livestock, fishery and forestry information. On the basis of partial information, the federal government set some arbitrary targets for agricultural crops, and correspondingly for growth in the agriculture sector. Some of these targets appeared quite strange. For example, in 2010/11 the government set a target of 14 million bales of cotton. However, due to large scale damage in southern Punjab and Sindh, the realized output of cotton that year was only 11.8 million bales. For 2011/12, the target that was set was of 12.8 million bales – one million bales higher than the output in 2010/11, but 1.2 million bales lower than the 2010/11 target. However, the provincial authorities consider the target to be on the low side. Factoring in all the relevant information, and including a minor adjustment related to agriculture productions, it is projected that the Pakistani economy would have grown at 4.2 percent in 2011/12 if there had been no floods.

As mentioned earlier, a bulk of the growth impact of floods would be through the agriculture sector and through its forward linkages with other sectors (e.g. large and small scale manufacturing, transport, whole and retail trade, etc.). However, Pakistan's agriculture has two cropping seasons, summer or *rabi* and winter or *kharif*. The overall impact on the sector, and correspondingly on macro-economy, would depend on the actions taken by the government, communities, farmers,entrepreneurs and households to mitigate the impact on these floods. While it is clear that the floods have caused extensive damage to standing *kharif* crops in all the affected districts of Sindh and Balochistan, further damages could be minimized by ensuring that *rabi* crops are sown on time by ensuring timely supply of seeds and fertilizers, and in cases where that is made impossible by standing flood waters, to convince famers to sow crops that could be sown late (e.g. sunflower instead of wheat). Similarly, early repair of houses can ensure that actual and imputed income from these housing units is not unduly affected by floods. Table 2.3 shows the impact of floods on some key

macroeconomic indicators under the behavioral assumptions that all players will behave to minimize the impact of floods on the macro-economy.

On the assumption that the projections only account for the flood shock, it is projected that the 2011/12 GDP growth will decline from 4.2 percent to 3.8 percent due to floods (Table 2.3)[1], with post-floods growth in agriculture sector falling from an estimated 3.8 percent prior to 2.7 percent. Whereas, the impact on industry and services sector, both on account of direct damage to sectoral infrastructure and their backward linkages to agriculture is expected to be marginal. It is projected that the growth in the industrial sector will drop from its pre-flood projection of 3.2 percent to 3.0 percent; whereas that of services sector will fall from 5 percent to 4.7 percent.

Table-Annex2.3: Pre- and Post Flood Projections of Selected Economic Indicators

	2009/10	2010/11	2011/12	
	Actual	Actual	Pre-Flood	Post-Flood
Economic growth and inflation	Annual Percentage Change			
Real GDP growth (at factor cost)	3.8	2.4	4.2	3.8
Nominal GDP growth (at market prices)	16.6	21.7	15.5	15.4
Consumer prices (period average)	10.1	13.7	11.3	11.6
Investment and savings	**Percent of GDP**			
Percent of GDP	15.4	13.4	14.2	14.6
Private sector 1/	11.8	10.1	10.6	10.8
Public sector plus government	3.6	3.3	3.6	3.8
Gross national savings	13.1	13.6	14.0	13.8
Consolidated fiscal accounts				
Revenue	14.0	12.5	13.2	13.1
Tax revenue	10.1	9.4	10.0	9.9
Non-tax revenue	3.9	3.1	3.2	3.2
Total expenditures (incl. net lending)	20.3	19.1	19.2	19.5

[1] While the growth impact on the national economy is projected to be rather small, the impact on the provincial and some local economies has been sizeable. This would also have severe implications for income distribution and poverty in the flood-affected areas.

Current expenditure (incl. interest payments)	15.9	16.1	16.1	16.3
Interest payments	4.3	3.9	3.7	3.7
Development expenditure and net lending	4.4	2.8	3.1	3.2
Overall balance (excl. grants)	-6.3	-6.6	-6.0	-6.4
Total public debt	60.8	59.7	56.5	56.9
Foreign currency public debt 2/	29.5	26.4	23.0	23.1
Domestic currency public debt	31.4	33.3	33.5	33.8
Balance of payments				
Balance on Goods & Services	-7.5	-5.9	-6.6	-6.7
Exports of goods & services	14.1	14.6	14.0	13.8
Imports of goods & services	21.6	20.5	20.6	20.8
Transfers	7.1	7.5	6.8	6.9
Private	6.8	7.4	6.7	6.8
Current account balance (incl. transfers)	-2.2	0.2	-0.8	-1.3
Gross official reserves (in months of imports of G&S)	3.6	3.9	3.9	3.5
Memorandum items:				
Nominal GDP at market prices (in Rs Billion)	14,836	18,063	20,862	20,844
Rupees per U.S. dollar (period average)	83.9	85.5	89.1	89.6
1/ Includes changes in inventories.				
2/ This includes medium and long term PPG debt, IMF debt as well as short-term external debt.				

Source: World Bank Staff estimates

Over the medium-term, growth patterns are unlikely to be significantly influenced by these floods, not only because the affected areas account for a relatively small portion of the country's GDP,[1] but also as per its performance during the 2010 floods, the government is expected to take all necessary measures to restrict the impact of floods on the economy beyond 2011/12. Moreover, a positive second-round effect can be expected as soon as reconstruction activities start, which will translate into a stimulus to economic growth.

Fiscal impact

The floods have had a sizeable adverse impact on the fiscal situation of the local, provincial and federal governments. Firstly, there could be decline in government revenue both as a result of curtailment of economic activity and because a number of districts have been declared "calamity hit" areas implying that no tax could be collected from these districts. As such, it is projected that there will be a revenue loss of Rs 20 billion (or 0.1 percent of GDP). On the other hand, government expenditures, especially those of provincial governments of Sindh and Balochistan, will increase as a result of relief and rehabilitation services. Unlike last year when the provincial and federal government jointly provided grant compensation of about of Rs 60,000 to each of the select number of families,[2] to-date the federal and Balochistan governments have not announced any support for the flood affected families. However, the Sindh government is likely to announce a compensation grant of Rs 10,000 for each of the 1.35 million affected families. Similarly, provision of agricultural inputs for *rabi* crops may lead to an additional recurrent expenditure of about Rs 15 billion. Thus overall the recurrent expenditure of the two provincial governments will increase by Rs 35 billion (or 0.2 percent of GDP). Repairs and reconstruction of damaged public infrastructure is projected to add about Rs 25 billion to the provincial government development expenditure. Overall, the consolidated fiscal deficit of the federal and provincial governments will increase by 0.4 percent of GDP, from 6.0 percent prior to the floods to 6.4 percent after the floods; with bulk of the increase coming through higher fiscal deficits (lower surpluses) of Sindh and Balochistan governments. As for financing the additional deficit is concerned, due to the favorable changes in revenue transfers brought about by the Seventh NFC Award, the provincial governments of Sindh and Balochistan are quite capable of meeting these additional expenditures, provided of course that the revenue transfers are made as per the projections of the federal budget. Overall, the higher consolidated fiscal deficit has to be financed through additional borrowing. Hence, there is a need to mobilize additional donor financing, which requires preparation and efficient implantation of bankable projects both at federal and provincial levels.

Effects on the External Sector

After a lag of many years, 2010/11 was the first year when Pakistan external trade sector showed a small surplus in its current account. This was mainly an outcome of favorable terms of trade that Pakistan faced during the year, mainly as a result of exceptionally high cotton and textile prices. However, right from the start of 2011/12 it was clear that Pakistan cannot rely on favorable international prices of its exports nor can

[1] As mentioned earlier, the affected districts of Sindh and Balochistan account for 8 and 1 percent of nations output, respectively.

[2] The first tranche of Rs 20,000 was provided to each of the affected family through geographical targeting. The cost of this grant (estimated to be Rs 12 billion in Sindh and Rs 1.7 billion in Balochistan) was equally shared between the federal and provincial governments. The remaining amount of Rs 40,000 per family (to be provided in 2011/12 in two equal tranches) is to be distributed to affected families on the basis of estimated housing damage. The number of families qualifying for this grant is estimated to be 249,000 in Sindh and 47,000 in Balochistan. As such, the overall compensation to families affected by the 2010 floods is estimated to be Rs 22 billion in Sindh and Rs 3.6 billion in Balochistan.

it bank on falling petroleum prices. During the first five months of 2011/12, the exports continued to grow at a healthy rate of 11.5 percent. However, higher petroleum prices led to a surge in imports of 21 percent. The current account deficit for 2011/12 was therefore projected at -0.8 percent of GDP. The recent damage caused by floods, especially to the cotton crop, and with greater use of cement in the domestic construction sector, the exports are expected todecrease by US$ 750 million, whereas imports are likely to be higher (by US$ 420 million) as Pakistan would have to import some additional agricultural inputs and outputs (e.g. chili powder, molasses, seeds, pesticides, fertilizers, construction material, etc.). As a result, trade deficit is likely to worsen by US$ 1.2 billion. On the other hand, private transfers (remittances) are expected to be somewhat higher than their pre-flood level as workers abroad send additional funds back home to help families cope with flood damages. The post-flood current account deficit is likely to increase by 0.8 percent of GDP to 1.3 percent.

Effect on Inflation

Pakistan has been witnessing high inflation rates, with increases in food prices outpacing the non-food prices. The monetary authorities have pursued a tight monetary policy for the last four years, with intent to lower the inflation rate to single digits. However, with significant damages to both food and non-food crops, the impact on CPI-based inflation would be the magnitude of 0.3 percent, i.e. inflation will increase from 11.3 percent in the pre-flood to 11.6 percent in the post-flood scenario. At the local level there were some short-term spikes in prices – not solely because of the loss in output and disruption in production but also because it would havebeen difficult to transport commodities to the affected areas due to standing water and damage infrastructure. Furthermore, reconstruction of houses and other infrastructure may lead to temporary shortages of construction material and certain other commodities, which can lead to another small round of price increases.

Summary and Conclusion

Overall, given the magnitude of natural disasters that Pakistan, and especially the provinces of Sindh and Balochistan faced over the last two years, the broad macroeconomic impact of 2010/11 floods is estimated to be significant but compared to the devastation of floods is relatively small. This is also partly because the macroeconomic impact of the 2011 floods is based on the prudence and exemplary managerial ability shown by the government and communities. Nonetheless, the government has been struggling to reestablish the macroeconomic stability and the natural disasters have not helped the government's cause. While the short-run costs of these disasters would have to be borne to the extent that they are fiscally affordable, for the medium-run, the government has to devise sound policies, establish and strengthen institutions and invest in systems to minimize the cost of future natural disasters, including those at the provincial level.

Table-Annex2.4: Estimates of Total Damages in 2010 and 2011 (PKR millions)

Sector	2010			2011		
	Direct	Indirect	Total	Direct	Indirect	Total
1. Social Infrastructure						
1.1 Housing	91,843	43,171	135,014	77,420	8,046	85,466
1.2 Health	1,562	2,661	4,222	432	826	1,258
1.3 Education	22,047	4,418	26,464	10,157	1,856	12,014
Subtotal	**115,450.6**	**50,249.3**	**165,699.9**	**88,009**	**10,728**	**98,738**
1. Physical Infrastructure						
2.1 Irrigation & Flood Management	23,600	0	23,600	4,763	0	4,763
2.2 Transport & Communications	62,491	50,420	112,911	16,386	10,082	26,468
2.3 Water Supply & Sanitation	3,194	6,112	9,306	500	704	1,204
2.4 Energy	13,184	13,116	26,300	457	783	1,240
Subtotal	**102,469.0**	**69,648.0**	**172,117.0**	**22,106**	**11,569**	**33,674**
2. Economic Sectors						
3.1 Agriculture, Livestock & Fisheries	315,547	113,257	428,805	142,358	17,749	160,107
3.2 Private Sector (Commerce, Industry and Finance)	14,573	66,609	81,182	22,694	4,560	27,254
3.3 Social & Gender	0	0	0	39	5	44
3.4 Social Protection	0	0	0	0	0	0
Subtotal	**330,120.2**	**179,866.4**	**509,986.6**	**165,091**	**22,314**	**187,405**
3. 4. Cross Cutting Sectors						
4.1 Governance	3,141	2,835	5,976	1,571	382	1,953
4.2 Disaster and Risk Management	0	0	0	0	0	0
4.2 Environment	992	0	992	2,763	0	2,763
Subtotal	**4,133.0**	**2,834.9**	**6,968.0**	**4,334**	**382**	**4,716**
Total	**552,172.8**	**302,598.6**	**854,771.5**	**279,540**	**44,992**	**324,533**
(percent of GDP)	**3.1**	**1.7**	**4.8**	**1.3%**	**0.2%**	**1.6%**

Table-Annex 2.5: Province Wise Comparison of Total Damage in 2010 and 2011 (PKR millions)

Sector	2010		2011	
	Balochistan	Sindh	Balochistan	Sindh
Agriculture	*35,148*	*193,912*	*9,028*	*151,079*
Crops	21,021	177,848	8,302	138,188
Livestock	14,127	16,016	726	12,599
Others	0	48	0	292
Private Sector	943	11,747	360	26,894
Transport & Communication	4,246	53,164	1,203	25,101
Energy	0	0	0	0
Housing	8,228	78,667	414	85,051
Irrigation	2,516	9,168	827	3,936
Education	776	13,355	262	11,752
Health	185	1,921	185	1,073
Water supply & Sanitation	497	4,890	44	1,160
Governance	112	3,046	28	1,925
Environment & Others	25	1	6	2,801
Total	**52,676**	**369,870**	**12,356**	**310,772**

Annex 3: Environment

Introduction

This section estimates the environmental damages and needs associated with the flooding during 2011 in the provinces of Sindh and Balochistan. The flood caused environmental damages and losses to the population, affected badly the environmental services rendered by natural resources like wetlands, mangroves, and protected areas, and heightened environmental health risks. Environmental degradation and its effects on human health were already a significant development in Pakistan, which has some of the highest prevalence rates in all of South Asia for child mortality, diarrhea and acute respiratory illnesses associated with environmental factors. Pakistan suffers a loss of 8.84% of its GDP each year from environmentally-related disease. Almost half of this cost is caused by mortality (4.13% of GDP) while the rest stems from the malnutrition caused by environmentally-related disease (4.71% of GDP). The conditions created by the floods could result in a significant increase of these and other illnesses.

The environmental damages caused by the 2011 floods included: i) contamination of resources for drinking water; ii) contamination of water resources that are used for other domestic usage; iii) stagnant water ponds resulting in proliferation of disease vectors such as mosquitoes; iv) solid waste and debris accumulation; v) agricultural lands affected by pollution and salt; vi) damage to soil through erosion; vii) damages to wetlands and mangroves; and viii) damages to protected areas and cultural assets.

Other cross cutting environmental aspects such as damages and needs connected to water supply facilities, sewerage networks and latrines have been covered under the WATSAN sector, loss of agricultural land and crops covered under the Agriculture, Livestock and Fisheries sector, damages to the irrigation network covered under the Irrigation and Flood Management sector, while damages to dwellings have been covered under the Housing sector.

The quality, inconsistencies and gaps of data that was collected for the purpose of this assessment, highlights the need for environmental monitoring system in the regions, as well as the need to strengthen the institutional framework in the government agencies in charge of environmental protection.

Environment Baseline of the Affected Areas

This section provides the environmental baseline for the area affected by the 2011 floods. The section contains three parts: the first part describes the environmental health problems in Pakistan; the second part describes the waste management practices in the affected area; while the third part describes the general conditions of the natural systems including wetlands and mangroves.

Status of environmental health

Pakistan suffers a loss of 8.84% of its GDP each year from environmentally-related disease. Almost half of this cost is caused by mortality (4.13% of GDP) while the rest stems from the malnutrition caused by environmentally-related disease (4.71% of GDP). [1, 2]

[1] Malnutrition and child mortality are strongly interlinked. Malnourished children are particularly vulnerable to environmentally-related diseases and therefore at higher risk of death. Conversely, children that contract environmentally-caused infections have a high likelihood of becoming malnourished, regardless of their socio-economic level, although lower income children with limited access to treatment are at higher risk.

[2] The World Bank (2008). Environmental Health and Child Survival, Epidemiology, Economics, Experiences

Approximately 90 percent of typhoid and diarrheal illness in Pakistan is attributable to inadequate drinking water, sanitation and hygiene. Up to 83,500 deaths a year are linked to these causes. Morbidity linked with waterborne diseases amounts to 74.5 million cases per year.

Children under five constitute the population group most vulnerable to these diseases. In fact, infant child mortality rates in Pakistan are the highest in South Asia and the prevalence of childhood diarrhea and acute respiratory infections are the second highest. By 2008, roughly one third of all child mortality in Pakistan (or approximately 132,000 children per year) was caused by environmentally related factors (35% of which originate from acute lower respiratory illnesses and 64% due to diarrhea). When malnutrition is taken into account in the calculations, mortality from environmental factors increased to 187,000 children per year (47% of all child mortality).

Stagnant water pools breed vectors such as mosquitoes, which can cause malaria, dengue fever, and other similar diseases in the nearby communities. Malaria is the second most prevalent and devastating disease in the country[1]. A total of 4.3 million were treated as malaria cases in 2004. The Health Management Information System (HMIS) reported 4.5 million clinical cases of malaria for 2004 and 3.5 million for 2006[2].

Waste management issues

In the flood-affected areas the generation of municipal solid waste can be estimated to 1.5 kg per capita per day, regardless of people staying in their houses or having moved to relief shelters or other temporary camps. Most of this waste is biodegradable and in the long run not harmful at all. In the short perspective, however, it poses a certain risk for the environmental health, as it may attract rodents and other animals. On the other hand this waste may be a resource for the future when it can be used for biogas production and as such can contribute to the energy supply for domestic use.

In the affected areas, most of the domestic solid waste used to be disposed off at local dumpsites or, too often, just thrown out and/or burned in the streets or along the roads. During floods many small dumpsites tend to wash away and spread over a large area carrying plastics, non-degraded organics, small metal objects and, frequently, different kind of hazardous substances like hospital/medical waste, pesticides, heavy metals from batteries, oil and other chemicals.

The open burning of solid waste in the streets or at dumpsites under poor conditions creates air pollutants, many of them quite toxic such as chlorinated hydrocarbons and dioxins. In addition to the solid wastes, large quantities of waste effluents are also generated in the affected areas, most of which is released to environment without adequate treatment, thus polluting soil and water.

The quantity and composition of industrial wastes in the flood-affected areas is still unknown but the presence of warehouses for fertilizers and pesticides poses a potential risk of soil/water contamination by these substances. Several sugar mills are located in the affected areas, but these mills are not operational during the monsoon season, hence release of any significant quantities of pollutants from these mills is quite unlikely.

[1] National Health Management Information System (HMIS) 2006. Islamabad, Pakistan.
[2] Ibid.

Environmental sensitivity of natural systems

Wetlands

The lower Indus basin includes more than 200 major wetlands or wetland complexes[1]. Wetlands are important sites of biodiversity in Sindh; nine protected wetlands under the RAMSAR Convention are located here (the Indus Dolphin Reserve, Kalri Lake, Drigh Lake, Haleji Lake, Jubho Lagoon, Nurruri Lagoon, Deh Akro, Rann of Kutch, and the Indus Delta). These wetlands serve as critical breeding, rearing, staging, and wintering grounds for migrating birds and house a number of globally important fish and shellfish species. Freshwater wetlands too host a vast array of flora and fauna endemic to Sindh.

In addition to providing livelihood to the communities and valuable ecological services, most of these wetlands also act as flood barriers and buffers; hence their degradation increases the vulnerability of nearby populations to floods.

The lower Indus basin also includes some of the richest biodiversity areas in Pakistan. The ecological and environmental stability of the ecological system of the Indus basin depends on the conservation of the natural interaction between floods and natural habitats. Floods play an important role in the dispersion of species along the floodplain corridor. Some species of the floodplains are considered to be threatened or subject to some conservation risk.

Mangroves

Pakistan's forest land decreased from over 4.24 million hectares in 1992 to 3.44 million hectares by 2001[2]. The highest rate of deforestation has been found in the Indus delta mangroves. In the Indus delta, in the last decades, less than 50 percent of the mangrove forest area is inundated even in high floods. As a result, the mangrove forest area is shrinking alarmingly while less salt tolerant species have almost disappeared.[3] Mangrove forests are the mainstay of forestry in Southern Sindh. Besides providing a source of livelihood for thousands of people, these forests provide fuel wood, timber, fodder, honey and tannin. Moreover, they protect the surrounding areas from the severity of floods.

Estimates of Damages and Losses

The floods increased the environmental health risks for the affected population and also caused environmental damages and losses to forests, wetlands and other natural systems. These risks and damages are discussed below.

Contamination of drinking water

In Sindh province, surface water is the main source of drinking water though, near and around irrigation canals, people do use hand-pumps for drinking purposes. The floods contaminated the surface water, and possible the shallow groundwater as well, in the affected areas since it came in contact with sewage water, latrine wastes and waste water from households, pesticides, fuels and oil storages that might be present and waste water from industries and other commercial activities. All these sources, that might have been present

[1] The information about wetlands in the Sindh watershed is patchy and has not been compiled and updated systematically. The Asian Directory of Wetlands identified 48 major wetlands in 1989.
[2] World Wildlife Fund (2009)
[3] Source: Website of Indus Ecoregion Programme (http://foreverindus.org/ie_ecosystem.php).

when the flooding occurred, contributed to the contamination of the water. It is not clear to what extent the water has been polluted and therefore there is a need to identify the sources and extent of water contamination in the affected areas. However, it is impossible to estimate the amount and the associated cost of drinking water that was polluted during the floods.

Affects of contaminated water and soil on human health

The floods also posed health risk for the people when they came in contact with contaminated water and soil in the daily life, for example washing, bathing and children playing in water ponds and with soil.

As understood from the situation in the relief camps and unofficial temporary camps, open defecation has been a common behavior. This directly exposes people, especially children, to health risks especially diarrhea infections among others. Furthermore the open defecation pollutes water, which transfers and spreads infection agents to wider areas and also to freshwater sources. Where latrines are constructed this risk is reduced. No cost has however been estimated for the contaminated water and the associated health hazards, because of the subjectivity of such estimation.

Agricultural land affected by pollution and salt

The contaminated water also pollutes and degrades the soils particularly in the cultivated areas. In the inundated areas, when the water recedes after flooding some of the pollutants in the water are left in the soil. Another impact on the soils is that the high water level brings the saline groundwater up to the surface and leaves salt on the surface level once the water recedes or evaporates. This could have a significant impact upon agriculture. No cost has however been estimated for the contaminated land because of the subjectivity of such estimation.

On the other hand the floodwater also nourishes the soil, due to the sediment load if it is coming from river and or canals. Rainwater may also help in reducing the soil salinity.

Disease vectors from stagnant water

The receding flood water has left behind a large number of stagnant water ponds. These ponds are the main source of disease vectors such as mosquitoes. If such ponds are located near communities, they will contribute towards further increase of diseases such as malaria and dengue fever. The estimated number of ponds in the affected areas is around 15,356 (Table 3.1). Detailed studies are however needed to determine the exact number and location of such ponds. No cost has however been estimated for the health hazards associated with this water stagnation because of the subjectivity of such estimation.

Table-Annex 3.1:Stagnant Water Ponds

Province	Affected Households	Number of Ponds [a]
Balochistan	5,832	58
Sindh	1,529,799	15,298
Total	**1,535,631**	**15,356**

[a] Basis. Average size of village: 100 households; one pond per village. The number of affected households has been estimated based upon the number of affected people reported by NDMA/PDMA and average household size of six persons.

Solid waste accumulation

Lack of appropriate disposal of solid waste increases the risks of water pollution, which in turn contributes to the increased health risks to the affected population. Affected households are estimated to generate about 2,300 tons of municipal solid waste (MSW) per day spread over a huge area (Table 3.2). Most of this waste has never been a subject to proper collection or treatment in the affected areas. No cost has however been estimated for this waste accumulation because of the subjectivity of such estimation.

Table-Annex 3.2: Municipal Solid Waste

Province	Affected Households	Tons of Solid Waste per Day
Balochistan	5,832	9
Sindh	1,529,799	2,295
Total	**1,535,631**	**2,304**

[a] Basis. MSW quantity per household: 1.5 kg per day. See footnote of Table 3.1 for the criteria used to determine the number of affected households.

Debris accumulation

Inappropriate disposal of debris from damaged/demolished buildings and structures can potentially cause environmental problems such as water contamination, siltation resulting into shortening of water reservoir lives, affects on aquatic flora and fauna, loss of biodiversity, decrease in the services provided and functions performed by wetlands, and decreased aesthetic value of the area. No firm estimates are available for the amount of debris associated with the damaged buildings and infrastructure, therefore a follow-up study is proposed to assess these damages. The UNDP has estimated the quantity of the debris to be 550,000 m^3.[1]

Damage to forests and plantation

The provincial governments of Sindh and Balochistan have provided the estimates of the damages to the forests, plantation, and the Department infrastructure as given in the Table below. Cost of these damages has been estimated to be PKR 2,762.66 m (US$ 31.75 m).[2]

[1] Early Environmental Recovery-Sindh Floods. Early Environmental Needs and Proposed Response. First Draft. NDMA/UNDP

[2] The loss of ecological and environmental services provided by the trees has not been included in the damage estimates.

Table-Annex 3.3: Damages to Forests and Plantation

	Loss of Trees	Cost [a] (m PKR)	Damaged Saplings	Cost [b] (m PKR)	Damaged Nurseries	Cost [c] (m PKR)	Destroyed Offices	Cost [d] (m PKR)	Damaged Offices	Cost [e] (m PKR)
Sindh	689,478	2,757.9	35,000	0.7	6	0.6	8	1.6	22	1.1
Balochistan	-		-		1	0.1	1	0.2	9	0.5
Total Cost		**2,757.9**		**0.7**		**0.7**		**1.8**		**1.6**

[a]Salvage value of 20% of trees lost; PKR 20,000 per tree. [b] PKR 20 per sapling. [c] PKR 100,000 per nursery. [d] PKR 200,000 per office destroyed. [e] PKR 50,000 per office damaged.

Damage to wetlands and mangroves

In many cases, the wetlands are already more contaminated than the receiving runoff, therefore net effect of floods and heavy rains at times, is the improvement in the quality of water in the wetlands thereby improving the service of this natural resource. However, wetlands near the settlements and/or industries can potentially be damaged during the floods by the ingress of contaminated runoff in them. However, no estimates of such damages are available through the government sources. Detailed studies are needed to determine the exact nature and extent of these damages in the flood-affected areas.

Estimates of damages to the mangroves in Indus delta are also yet to be determined. The water salinity in mangrove areas would be significantly altered due to the influx of large quantities of fresh water. However, to determine its consequences on the mangroves, separate in-depth studies would be needed.[1]

Damage to cultural heritage

There are some reports of damages to the Sama Dynasty site situated west of Nindo town in Badin.[2] Field investigations are needed to assess the extent and nature of the damages as well as the restoration costs.

Estimates of Needs

Disinfection of water

The cost of meeting basic needs of water with in-situ disinfection for the flood-affected population over a period of six month has been estimated to be PKR 5,549 m (US$ 63.78 m), as shown in the Table 3.4 below. However, this estimate has not been included in the final cost table in view of the overlap with the WATSAN Sector.

Table-Annex3.4: Drinking Water Damages and Needs

Province	Quantity of water to be disinfected per day [a] (m^3)	Cost of in-situ disinfection [b] (m PKR)
Balochistan	350	21.07
Sindh	91,788	5,527.93
Total	**594,946**	**5,549.00**

[a] Drinking water needs: 10 liters per person per day. [b] Basis. Cost of in-situ disinfection of water: PKR 0.33 per liter; water to be provided for six month.

[1] A study has been conducted to assess the effects of the 2010 floods on these mangroves however its report is not available yet.

[2] NDMA/UNDP, Early Environmental Recovery-Sindh Floods, Early Environmental Needs and Proposed Response, First Draft.

Hygiene promotion

Awareness-raising campaigns will need to be carried out in the affected area to control practices such as open defecation, and also to promote hygiene practices like how to avoid contact with contaminated water in daily life, and the importance of hand washing. The estimated cost of these campaigns is PKR 723 million (US$ 8.3 m), which includes PKR 425 million for the campaign to control open defecation, and PKR 298 million for the campaign to promote hygiene practices. However, this estimate has not been included in the final cost table in view of the overlap with the WATSAN Sector.

Agricultural land affected by pollution and salt

No information are available for the nature and extent of contamination of the agricultural lands, hence no estimation can be made for their treatment/rehabilitation. Field investigations will need to be carried out to determine the nature and extent of this damage. The estimated cost of this study is PKR 20 million (US$ 0.23 m).

Pumping out stagnant water from ponds

The receding flood water will leave behind a large number of stagnant water ponds. To avoid proliferation of insects, the cost of pumping out the stagnant water from the ponds has been estimated to be PKR 1,535.63 m (US$ 17.65 m) (see Table3.1 for the number of stagnant water ponds; cost of emptying one pond: PKR 100,000). However, this estimate has not been included in the final cost table in view of the overlap with the Early Recovery Needs Assessment carried out by One UN.

Safe waste disposal

In the flood-affected areas the generation of municipal solid waste has been estimated to be about 2,300 tons per day.To avoid increased risks of water pollution and other associated health problems, solid wastes from affected communities will need to be disposed in marginal landfills over a period of six months. The cost of disposal of this waste over a period of six months has been estimated to be PKR 1,050.95 m (US$ 12.08 m).[1]In addition, gross estimates for the disposal of hazardous and medical wastes spilled as a result of the flood are PKR 1,000 m (US$11.49 m) and PKR 20 m (US$ 0.23 m), respectively. However, these estimates have not been included in the final cost table in view of the overlap with the Early Recovery Needs Assessment carried out by One UN.

In addition to the above-described short-term solution to safely dispose solid waste, there is a need of controlled/engineered dumpsites for all towns, villages and settlements the flood-prone areas of the country. These dumpsites should be located in a manner that they cannot be affected by the flooding. These dumpsites should receive all wastes that is non-toxic and cannot be recycled.

Domestic waste is a resource since it can be used for biogas production and as such can contribute towards the supply of energy for domestic use, especially in case other wastes can also be added to it. However,

[1] Basis: solid waste disposal cost: PKR 2,500 per ton.

widespread adaptation of this technique requires extensive planning, community mobilization and awareness raising, capacity building, and technical support.

Debris disposal

A follow-up study is recommended to carefully assess the quantity of debris to be disposed and to identify feasible and cost-effective the disposal arrangements. The estimated cost of this study is PKR 5 m (US$ 0.06 m). The UNDP has estimated the cost of the debris disposal to be US$ 1.5 m.[1]

Rehabilitation of forests, plantation, and department infrastructure

The uprooted trees will need to be replanted, the damaged nurseries will need to be reestablished, and the destroyed/damaged buildings will need to be reconstructed/repaired. The rehabilitation and reconstruction needs of the forest resources have been estimated to be about PKR 2,676.84 m (US$ 30.77 m) as shown below.

Table-Annex 3.5: Rehabilitation and Reconstruction of Forests and Plantation

	Re-plantation of trees [a] (m PKR)	Re-plantation of saplings [b] (m PKR)	Re-establishment of nurseries [c] (m PKR)	Reconstruction of offices [d] (m PKR)	Repair of offices[e] (m PKR)	**Total (m PKR)**
Sindh	551.58	7.00	3.00	21.00	2.20	**584.78**
Balochistan	-	-	0.50	3.00	0.90	**4.40**
Total	**551.58**	**7.00**	**3.50**	**24.00**	**3.10**	**589.18**

[a] PKR 800 per tree with two years' maintenance:. [b] PKR 200 per sapling. [c] PKR 0.5 m per nursery. [d] PKR 3 m per office reconstruction. [e] PKR 0.1 m per office repair.

Rehabilitation of wetlands and mangroves

There is a need for an in-depth study to determine the nature and extent of damages to the wetlands and mangroves caused by the floods. World Wildlife Fund (WWF) is conducting a similar study to assess the damages to the mangroves caused by the 2010 floods, and its results are likely to be useful for the proposed study. The estimated cost of this study is PKR 5 m (US$ 0.06 m).

Rehabilitation of cultural heritage sites

The Government of Sindh has estimated the damage to the cultural sites to be about PKR 16.41 m (US$ 0.19 m). Further field investigations would be needed to determine the exact nature and extent of the damages to the cultural heritage sites and also to identify the restoration needs. The estimated cost of this study is PKR 2.0 m (US$ 0.02 m).

[1] NDMA/UNDP, Early Environmental Recovery-Sindh Floods, Early Environmental Needs and Proposed Response, First Draft

Adapting to Climate Change and Reducing the Vulnerability to Extreme Weather Events

As evidenced by the recent floods in 2010 and 2011, Pakistan is highly vulnerable to extreme weather events. Climate change, which is likely to result in increased intensity and frequency of these events, threatens to revert Pakistan's achievements in reducing poverty and stimulating economic growth. Developing the institutional capacity to facilitate climate change adaptation is a key development challenge. Building capacity for climate change adaptation in Pakistan involves: (i) improving the knowledge base for decision-making, (ii) emphasizing the needs of poor and vulnerable groups, (iii) maintaining the integrity of environmental services, and (iv) adopting a "no-regrets" approach that yields immediate development benefits while simultaneously enhancing climate change resilience.

Strengthening the resilience of the Indus watershed involves an approach that combines non-structural and structural measures that are strategic, feasible, and affordable to minimize vulnerability to extreme weather events. Such an approach calls for an improved management of the Indus Basin's major natural resources through strengthened coordination of flood-related actions within and among the provinces, as well as "non structural measures" consisting of a combination of actions for "living-with-floods," including flood warning and civil defense measures in lesser priority areas. The sustainability of outcomes depends mainly on designing and implementing non-structural interventions. Systems that integrate naturally with existing cultural or social institutions are likely to be relatively low cost (in terms of capital outlay and maintenance) while providing improved security.[1]

Adopting a river basin management approach for this process will provide for coordinated policies and actions by provinces most affected by floods. Furthermore, a basin-wide approach is needed to overcome the dispersion of local institutions and inconsistent policy frameworks. There is also a need to strengthen local rules and their administration in such a way as to overcome current deficiencies in flood protection of the Basin and related environmental concerns. The provincial governments have the authority for flood protection. However, current provincial legislation does not adequately provide clear regulations on land and water resources use, which has led to development of areas highly vulnerable to flood damage.

The "living-with-floods" approach stems from the growing recognition in Pakistan that vulnerability to flood damage is largely the consequence of human actions and choices instead of acts of nature. Attention under this approach focuses on decisions such as where people live, where industry and commerce settles, acts of cutting forests, and development of marginal lands. On this basis, the non-structural approach is a strategy that encourages residents of rural areas and small communities to adapt to floods, and even to capture their benefits when possible. It seeks to offset the negative effects of floods, and also to mitigate any negative effects that flood control measures may cause, while at the same time complementing lands use restrictions.

The interventions described below were proposed in the 2010 floods DNA however none of them were implemented. Therefore these interventions have been included in the present DNA as well.

[1] Examples of this include: (i) design of multi-purpose schools or clinics that can also serve as emergency shelters or supply storage for storms or floods; or, (ii) use of public address systems in village mosques as part of early warning systems.

Technical assistance in environmental non-structural interventions for flood protection

Given below are some of the recommended technical assistance interventions on non-structural environmental measures.

Flood protection master plan

A review and updation of the flood protection master plan, based on the outcomes of detailed hydrological, hydraulic, geological, and environmental studies, is critically needed for the Indus watershed. The updated master plan would: recommend key flood protection infrastructure for vulnerable areas in the Indus (wetlands restoration, afforestation, riparian re-vegetation, land use plans, and others); identify areas that are flood-prone or vulnerable to other risks and which should be protected and where development should not be permitted; and identify areas that are safe from hazard risks and which could serve for (re)settlement purposes. The estimated cost for such a study is PKR 595 m (US$ 6.84 m).[1]

Storm water drainage master plan

A storm water drainage master plan is critically needed in the Indus watershed, particularly the southern parts of Sindh (a rapid assessment would determine priority areas). The master plan would mainly: (i) recommend key storm water drainage and flood protection structural and non-structural interventions to minimize vulnerability to floods and channel flood and storm water away from the heavily populated areas; and (ii) identify, at the city level, areas that are vulnerable to flood where development should not be permitted. The cost for studies in 14 priority urban areas would be an estimated PKR 714 m (US$ 8.2 m).

Land use plans and building regulations in urban areas

Detailed land use plans and building regulations should be prepared or, where they exist, updated in accordance with the findings of the storm water drainage plans. These detailed land use plans and building regulations would demarcate areas where development is permissible and regulate the characteristics of such development. The preparation of detailed land use plans is the timely step that follows the master plan, whereas the building regulations would need to be updated. The estimated cost for the preparation of these detailed plans and regulations for the priority urban areas is estimated at PKR 366 m (US$ 4.2 m). Support for the enforcement entities in the form of human resources, equipment and training would require an additional PKR 238 m (US$ 2.73 m).

Monitoring and evaluation and information databases

The estimated needs to establish these databases are PKR 442 m (US$ 5.08 m) and would require at least three phases (short, medium and long term) to help improving the effectiveness of interventions.

Strengthening the legal and institutional framework

The floods highlighted the lack of institutional and legal frameworks for natural resources management and environmental control for reducing the vulnerability to manager extreme weather events or flood emergencies. In general, the institutions in charge of implementing environmental regulations are understaffed and have no enforcement capacity. There are no systematic environmental procedures for flood protection. In addition, there is no coordination between the institutions in charge of promoting flood protection infrastructure and natural resources and environmental agencies.The programs include detailed activities for: (i) strengthening the environmental regulatory framework; (ii) strengthening environmental management capacity of the implementing agencies of structural interventions (such as WAPDA and the Irrigation Departments), as well as environmental protection agencies; (iii) improving local urban environmental management and monitoring, especially regarding the sound disposal of wastes; (iv) improving baseline knowledge of the ecology and dynamics of the riparian and floodplain ecosystem and improving protection and management of wetlands within the project region, especially near

[1] This estimate has not been included in the final cost table in view of the overlap with the Irrigation Sector.

urban areas; and (v) environmental education and public awareness in communities with non-structural interventions for flood protection.

The legal and institutional frameworks need to be strengthened to restore and protect natural systems such as forests, wetlands and mangroves. The legal frameworks exist in the country to protect forests and critical wetlands, but are not very effective in protecting these precious resources. Thus, there is a need to review and strengthen these frameworks. Furthermore, the associated institutional arrangements also need to be reviewed and made more effective. The estimated needs to strengthen the legal and regulatory framework for non-structural interventions for flood protection are estimated in PKR 476 m (US$ 5.47 m).

Summary and Conclusions

The floods that recently affected Sindh and Balochistan have already impacted millions of people and are likely to have economic, social and environmental consequences for years to come. This section has outlined the priority actions needed to help Sindh and Balochistan to manage the environmental aspects of the recent crisis, while also laying the foundations for a comprehensive strategy of structural and non-structural measures that reduce the country's vulnerability to floods.

The 2011 floods have caused damages to the forests, plantation, nurseries, department infrastructure, and cultural heritage sites. These damages have been estimated to be PKR 2,762.66 m (US$ 31.75 m). The reconstruction and restoration costs of the damages discussed in this report amount to PKR 2,873.59 m (US$ 32.79 m), as shown in Table 3.6 below.

Table-Annex 3.6: Total Costs to Address Environmental Needs Associated with the Floods

	Description	PKR million	US$ million
1.	Field investigations to determine damage to agriculture land caused by pollution and salts	20.00	0.23
2.	Study to estimate debris quantity and disposal arrangements	5.00	0.06
3.	Rehabilitation of forests and plantation	589.18	6.77
4.	Study to estimate damage to wetlands and mangroves	5.00	0.06
5.	Rehabilitation of cultural sites	16.41	0.19
6.	Study to estimate damage to cultural heritage sites	2.00	0.02
7.	Storm water drainage master plan	714.00	8.20
8.	Land use plans and building regulations in urban areas	604.00	6.94
9.	Monitoring and evaluation, and information databases	442.00	4.85
10.	Strengthening the Legal and Institutional Framework	476.00	5.47
	Total	**2,873.59**	**32.79**

Annex 4: Social and Gender Impact

Introduction

This section highlights the social impact of the flood, particularly focusing on the socio-economic effect on groups disproportionately affected by loss due to pre-existing poverty levels and social inequalities.

One of the major causes for flooding as reported by PDMA Sindh was the loss of natural drainage as these lands had been taken over for cultivation or otherwise encroached upon or 'legitimately' given over through local bodies. According to the PDMA, current proposals are to pass a 'Pre-emption law' to enable the provincial government to repossess the lands. While the rains cannot be stopped, considerable human suffering and loss of life could have been avoided if Government ensured maintenance and operation of the drainage system.

Barely one year has passed since the floods of 2010 devastated the lives of an estimated 20 million people nationwide. The flooding in 2011 is relatively localized, the impact on people and livelihoods is severe, infrastructure damages less so. In Sindh, 19 social welfare infrastructure units[1] serving a population of 37006 people are partially or fully damaged. In Balochistan[2], 18,403 people were reported affected with no damage to social welfare infrastructure.

Table-Annex 4.1:Sindh: Damage to Social Welfare Institutions

Orphanages		Women Shelters		Community Centres		Multiple Purpose Child Care Centre		Dar-ul-Iman		Other Item	
*CD	**PD	CD	PD	CD	PD	CD	PD	CD	PD	CD	PD
2	1	5	1	2	5	1	0	0	1	1	0

Source: Social Welfare Department, Sindh
*CP =Complete Damage, **PD= Partially Damage

Social Welfare Infrastructure

Table-Annex 4.2: Social Welfare Infrastructure: Damage and Loss Figures

Provinces	Direct Damage[3] (PKR millions)		Indirect Losses[4] (PKR millions)		**Total (PKR millions)**
	Public Sector	*Private Sector	Public Sector	Private Sector	
Sindh	39	NA	4.6	NA	**43.6**

[1] Social Welfare Department, Sindh Province. Social infrastructure is defined as centers such as orphanages, Dar-ul-uman
women shelters child care and rehabilitation centers
[2] NDMA, September 2011
[3] Including structural damage and loss of assets/equipment, etc.
[4] Indirect losses cost include three women and child shelters which have been completely damaged in flood 2011

**Balochistan	NA	NA	NA	NA	**NA**
Total (PKR millions)	**39**	**NA**	**4.6**	**NA**	**43.6**

*NA= Not Applicable as this includes damages to only Public sector damages, **NA=Not Applicable as no damage in Balochistan has been reported

According to UNOCHA[1], the situation remains alarming with poor coverage of all essential sectors. Failure to meet Rabi cultivation will have severe consequences on farm dependent households. The report further documents increasing insecurity and violence against women, boys and girls. 70% of households are reported to not having received any shelter. As of January 2012, only 48% of funding has been received from the Rapid Response Plan.[2] The lack of data disaggregated by gender and social groups both pre and flood affected is stark.

Vulnerable communities, most with no assets or safety nets to fall back on bear the brunt of disaster. It is the landless rural poor, and vulnerable social groups such as ethnic minorities, elderly, children and female headed households, the disabled that are hardest hit. The impact on households and the speed of recovery varies, influenced by a number of factors, such as: asset ownership and resources; community and households' ability to cope; institutional capacity and resources available at the local level; and, crucially, the extent of civil society and peoples' involvement and support for proposed rehabilitation and reconstruction measures. There is no 'one size fits all' solution – each intervention has to be tailored.

Flash Back 2010

According to the 2010 DNA, almost 90-100% livelihoods were affected in Sindh. Approximately 77 billion rupees of the annual development plan was reallocated due 2010 floods; the education and health sectors were affected by the cuts. Government of Sindh (GoS) plans to increase the current budget to adjust forreallocation in 2010[3]. Recovery efforts from the 2010 floods are ongoing.

Sindh was the worst hit, with 7.2 million of its people affected (40% of all those affected in Pakistan) in 17 of its 23 districts. Damages in Sindh amounted to around US$ 4.4 billion (44% ofthe total for the country), more than half of this was in the agriculture sector. Medium-term recovery and reconstruction is estimated to cost US$ 2.7 billion[4].

Given the restricted mobility and less exposure, women had a difficulty in obtaining funds through WATAN cards Disasters and crisis situation adds to the vulnerabilities of poor communities who may face difficulties in accessing transportation and other relief facilities. Government and NGOs therefore should take extra care and prepare inclusive relief and rehabilitation programs to avoid discrimination and social and gender exclusion

[1] OCHA, Situation Report No.11, 4 November 2011
[2] UN, Pakistan Floods 2011 Early Recovery Framework,January 2012
[3] Verbal Communication, Planning and Development Department, GoS
[4] Rebuilding Towards progress in the province of Sindh, May 2011, UNDP (draft)

All the while, incomes continue falling and vulnerability increasing. According to the GoS[1], the province was hit by the 2011 floods before an assessment of the impact of support on 2010 floods could be undertaken. This resulted in gender considerations becoming an even less of an issue.

Patchy information exists in reports prepared by individual agencies, both national and international. The absence of information on the impact of assistance on rehabilitation of peoples' lives by NDMA, PDMAs and GoS, leaves a major gap in understanding. According to the UN,[2] following the government's decision to end the relief phase, the government with UN and other partners developed a strategy plan. However, the report notes that as of July 2011, the gaps for early recovery are still very significant.

Socio-economic Baseline

For many years, Pakistan has been struggling not only with natural disasters but also issues related to security, conflict, political and economic turmoil. It has low social development indicators, the Legatum Prosperity Index 2011 ranks Pakistan 86th for entrepreneurship and opportunity, 96th for economy and health, 100th for Social Capital, 104th for personal freedom, 105th for education and 109th for safety and security out of 110 countries. Human Development Index 2011 ranks Pakistan 145 out of 187 countries[3]. Pakistan has a[4] Gender Inequality Index (GII) value of 0.573, ranking it 115 out of 146 countries in 2011. More than 50 percent of Pakistan's people suffer from multiple deprivations[5]. According to a 2008 UN joint assessment it is estimated that 45 million are severely food-insecure[6] and almost 40% of children are underweight. The literacy rate for over ten years is 57%,[7] being much higher in urban than rural areas and higher for men than for women.

Unlike the 2010 floods, it is mostly the poor and vulnerable who are hit this time including the poor coastal communities in Thatta (second least developed district in Sindh) and Badin. Sindh has the largest number of rural poor in the country, the highest absolute number of landlessness (62%) and the lowest (26%) share of land ownership in Pakistan.[8] Sindh and Balochistan face child malnutrition, posing a major challenge to achieving both the millennium development goals and economic growth.[9]

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[1] Verbal Communication, Planning and Development Department, GoS
[2] One Year On 2011, Pakistan Floods , United Nations Flood Response
[3] The 2011 Legatum Prosperity Index™ Rankings, Legatum Institute, London UK www.prosperity.com
[4] The Gender Inequality Index (GII) reflects gender-based inequalities in three dimensions – reproductive health, empowerment and economic activity. Reproductive health is measured by maternal mortality and adolescent fertility rates; empowerment is measured by the share of parliamentary seats held by each gender and attainment at secondary and higher education by each gender; and economic activity is measured by the labour market participation rate for each gender. The GII replaced the previous Gender related Development Index and Gender Empowerment Index. The GII shows the loss in human development due to inequality between female and male achievements in the three GII dimensions. Source: UNDP HDR 2011.
[5] Government of Pakistan, Economic Survey, Ministry of Finance, 2010-11
[6] World Food Program at http://www.wfp.org/countries/pakistan
[7] Pakistan Social and Living Standards measurement survey (PSLM 2008-2009)
[8] Government of Pakistan, 2003. Pakistan Agricultural Census 2000. Islamabad: Agricultural Census organization
[9] Nutritional Survey 2011 Ministry of Health (MOH) and Agha Khan University (AKU)

Table-Annex 4.3: Selected Social Indicators

Social Indicators	Sindh	Balochistan	Pakistan
Primary NER	53	47	56
Middle NER	19	13	20
Literacy 10 years or older	59	41	58
Full immunization (12-23 months)	75	53	81
Tetanus Toxoid (% of Married Women aged 15 49years)	60	31	69
Piped Water as Main Source of Drinking Water	43	35	
Flush type Toilet Used by HHs	62	31	
Perceptions			
Economic Situation of HHs (Worse & Much Worse)	39.44	50.07	42.79
Economic Situation of Community (Worse & Much Worse)	33.25	44.97	28.73
Satisfaction with Public Services			
Basic Health Units	30.21	42.48	30.70
Family Planning Services	9.98	7.81	11.52
Schools	55.90	52.99	60.92
Veterinary Hospitals	10.93	11.69	14.83
Agriculture Extension Services	20.06	10.57	14.78

Data Source Note[1]

Institutional Linkages

The 2007 National Disaster Risk Management Framework sets out a comprehensive structure for response, and several detailed contingency plans for flood disasters were in place prior to 2010. Pakistan has not, however, agreed upon a national framework, which covers population displacement brought about by natural disasters, conflict and other causes.

[1] Pakistan Social and Living Standards Measurement Survey (PSLM), 2010-11 Statistics Division, Government of Pakistan, Islamabad, September, 2011

Policy development in this area remains ad hoc, and the above-mentioned framework does not address the phenomenon as defined by the Guiding Principles on Internal Displacement. The principles provide a useful framework for efforts to recognize and fulfill the rights of people displaced by disasters.[1]Provincial Disaster Management Authorities (PDMAs) and District Disaster Management Authorities (DDMAs) have also been set up, as is the case for Sindh province. Frequent transfer of staff, lack of technical capacity, coordination and clearly defined roles and responsibilities hamper effective response. The operations focal was of the view that costing for damages is the responsibility of the planning and development department.[2]

The gaps and loopholes in the availability of the data within the public departments, the process of collection of data and capacity of NDMA, PDMAs and DDMAs were found to be the hardest areas of queries[3].At the district and provincial levels, particularly the line agencies, the capacity to collect relevant baseline data including the absence of reliable pre-flood data is telling.

In Sindh, the Women Development Department has no presence in the districts and limited technical capacity and resources to respond to disaster. The Social Welfare Department notified a Rain Relief Cell in September, which is similarly hampered by lack of resources for rapid response. The provincial social welfare departments hampered by lack of resources and technical capacity are ill equipped to respond to the welfare needs in non-emergency situations let alone in emergencies. The Balochistan social welfare department confirmed that they had no transport at the provincial level, and at the district level, the officers did not even have a bicycle. Information flow critically important from the village, district to provincial level is limited or non-existent. Relief committees formed by the Sindh government, has politicized the distribution of relief goods. Such actions negatively impact the role of local administration

In most cases, providing safety was not a priority of line departments. They were in need of learning new skills, training in the use of new technology e.g. mapping through GIS, and guidance in motivating the people. Uncoordinated work resulted in too much attention to easily accessible areas and complete neglect of difficult areas[4]

Social Impact (Sindh and Balochistan)

The UN[5] reported that 2.5 million children and 1.2 million women were affected by the floods in 2011, while 744,000 people were dislocated. With 46% of health facilities damaged, the vulnerabilities of women and children have increased in the affected areas. The children who are pushed out of schools are over 733,000 where 60% schools are damaged in Sindh alone. Acute Respiratory Infections (ARI) and skin infections

[1] Source: Briefing paper on flood-displaced women in Sindh Province, Pakistan. Flood-displaced families in Shahdadkot district, Sindh. (IDMC, April 2011).June 2011,Presented at the Nansen Conference on Climate Change
[2] Source DNA Mission Report: The household level related data is kept and maintained by the census department and DC office has no information. The DC office keeps and maintains the land record. The land record is collected by the patwari and sent to mukhtiarkar who shares this with the DDO and he shares it with the DC office. All land records are computerized now in compliance with the court order and no record was damaged during the floods. No information was available about any possible tampering of records at the patwari level. The land ownership of women if any was very little and no substantial information could be gathered.
[3] DNA, field team visits and discussions
[4] UN habitat, partners meeting, 3 November, 2011 Islamabad
[5] UN, Pakistan Floods 2011 Early Recovery Framework,January 2012

represent major health risks in flood affected areas[1]. Women are at high risk due to disruption in the provision of pre and post natal care.

Migration has taken place largely due to unavailability of fodder in flood affected areas. Approximately, 10-15% of the affected population is engaged in non-farm livelihoods, including fisheries which are severely affected by the rains.

Loss of Assets and Livelihoods

Large-scale destruction of schools is affecting the education of more than 733,000 children with 60% children out of school due to damaged facilities and absence of teachers.

In Shaheed Benazirabad district 75% population depends on agriculture. Cotton is the major crop and cultivated in 60% land followed by sugar cane and banana. The first cotton crop, which was ready for picking, was not picked due to the month of fasting. The rain fall intensified on 26 August and the first harvest was lost. More than 70% of the cotton crop was damaged, 40 – 45% of the sugarcane crop was damaged, banana orchards were totally or partially damaged in 40% of the affected area and mango and lemon orchards were completely damaged (CD)[2]. Land degradation has intensified and production decreased. Crime is increasingin the affected areasexacerbating the vulnerability of the women and children[3].

The social impact can be gauged by the decrease in income due to land degradation and temporary interruption in use of land, agricultural unemployment, and lack of alternatives outside agriculture. Field visits to Benazirabad indicated the crime rate increased. Some internal migration has been noticed e.g. most of the Sanghar populations were migrants from Tharparkar. Now due to heavy rains and less availability of dry land, many families have migrated back to Tharparkar.

As per NDMA's daily emergency and response situational information report (as of 5 Nov 2011), total 346,709 tents and 3,368,144 ration packs were distributed to the affected families of Sindh.[4]

Impact on Vulnerable Groups

Catastrophic events that impact on basic human needs disproportionately affect the most vulnerable groups; children, minority groups, the elderly, the landless tenants, people with special needs and women's vulnerability also increases. Existing vulnerabilities are exacerbated, and new vulnerabilities emerge as some who were previously economic secure are now unable to meet their daily needs. Flooding in summer means people face additional hardship as winter approaches. In Pakistan, 8 percent of households with children that were hit by income shocks took their children out of school and 10 percent of households had to put their child to work.[5] Sindh and Balochistan have low social development indicators, landlessness in Sindh is high, and people have few assets and limited ability to deal with shock. Research is essential to understand how households cope, track their progress and provide relevant support where needed.

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[1] OCHA Situation Report No.7, October 2011
[2] DCO, Shahid Benazirabad, Verbal communication
[3] DNA team field visit, verbal communication local government and CSOs, November 2011
[4] NDMA – Information Management Unit Daily Emergency & Response Situational Information Report 5th November 2011
[5] ibid

The 2011 floods added to vulnerabilities of marginalized communities; Balochistan stands out as the province with the weakest social development[1]. The latest PSLM (2010) social indicators show that both Sindh and Balochistan are below national averages on Primary Net Enrollment Rate (NER) and Middle NER[2]. Sindh is somehow better than the national average for literacy whereas Balochistan stands below the national average. Health practices in Sindh and Balochistan in terms of full immunization and Tetanus Toxoid are below the national average. Both Sindh and Balochistan have low access to safe drinking water whereas less than 45% population is provided with piped drinking water.[3] Sanitation practices in terms of HHs using flush type toilet are somewhat more encouraging in the case of Sindh as compared to Balochistan. The 2011 floods are expected to add high pressure on almost 50.07%[4]affected HHs of Balochistan and on some 39.44% of Sindh, based on indicative figures in 2011 PSLM.

There is likely to be an acute shortage of onion, chilies, tomato and other vegetables during winter[5]. Rice, a key staple has also been badly damaged. It would seriously affect food security and availability of seeds in the next season. Small farmers will lose contracts to cultivate in the coming season due to loss of bulls. Many on-farm and off-farm jobs will be lost in cotton farms due to loss of cotton related subsidy. Loss of the cotton cropwould also lead to loss of jobs for women cotton pickers[6]. In Sindh, specifically in Benazirabad, land ownership pattern is self cultivation by small land holders, daily wagers, part and quarter time tenants. It is most likely that low crop productivity will severely affect both tenant groups. Moreover, the recent floods has increased land salinity and added to land degradation. This not only turns out to be long term assets loss but also affects crop productivity. The small farmers are already under heavy debt and are unable to get new loans due to the absence of collateral.

Guidelines for public private partnership under new institutional, legal and regulatory framework require that all public project proposals should assess impact on women and explore employment opportunities for them and deliver benefits to both men and women[7]. However, the UN flood response report mentioned increased risk of possible sexual and physical abuse, child abuse, child labor, bonded labor, trafficking, honor killing and forced marriages among the affected population[8].

Impact on Food Security

FAO[9] damage assessment highlights possible acute shortage of onion, chilies, tomato and other vegetables during winter. The long term storable food including rice has been badly damaged and will lead to seeds and grains shortage adding concerns for food security. In Balochistan the populations living in hilly areas of affected districts had been able to secure some stocks for a few months but as soon as the stocks deplete, these HHs will be badly affected. Farming households are directly affected by floods whereas non-agriculture

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1 Balochistan Economic Report; From Periphery to Core (Volume II): Full Report, May 2008, (World Bank Report No. 40345-PK)

2 Pakistan Social and Living Standards Measurement Survey (PSLM), 2010-11 Statistics Division, Government of Pakistan,
Islamabad, September, 2011

3 ibid

4 ibid

5 FAO, SUPARCO PAKISTAN RAIN/FLOOD 2011 September 24)

6 FAO Preliminary Flood Damage: An Inside View September 2011

7 ADB Fact sheet 31 December 2010

8 United Nations Pakistan Floods: One year On Islamabad, 2011

9 FAO Preliminary Flood Damage: An Inside View September 2011

create short-term insecurities but over the long term, land fertility is expected to increase as the water recedes. However, even with this opportunistic note the livestock (major source of meat and milk) is at risk due to the acute shortage of fodder. Food insecurity is emerging as a critical issue, caused by many aligned social and economic damages.

Impact on Assets Ownership

In many cases whole livestock assets have been lost. The productivity of remaining livestock has been reduced to 50%[1]. Discussions with local relief organizations confirmed that generally savings are kept in the form of cash and livestock. The affected population has lost savings, including both livestock and cash which could provide a cushion against inflation. Now people are very uncertain and tend to grab as many relief goods as they can. They tend to accumulate enough resources for next six months and are showing low interest in work.

Impact on Access to Services

The UN Report on flood response 2011, noted lack of access and discrimination in distribution of relief and early recovery assistance to minorities, women, children, landless, non ID-card holders, Afghan refugees, older persons and persons with disabilities. The report also pointed out inter-communal tension and violence, land and property disputes, lack of access to legal redress mechanisms and cases of family separation and unaccompanied children[2]. In some areas of lower Sindh where people did not move out of houses after the floods, delivery of assistance was hampered due to the large amount of stagnant water surrounding the villages. Lack of pipeline information from other humanitarian organizations engaged in flood response limits the ability to accurately forecast assistance needs[3].

Sanitation and water supply are among the most critical problems requiring the attention of aid providers to alleviate poverty and reduce the suffering of flood affected families[4].The main source of water in many affected districts is open rain water ponds and biologically and chemically contaminated canal water[5]. Out of 326 water sources tested by WHO in Sindh, 86% were found contaminated and 80% of all the diseases were found to be water borne diseases[6].

Loss of livestock, crop lands, and extensive damage to the country's infrastructure, are projected to have long-term negative effects on Pakistan's food security and economic performance. It is estimated that the cost of rehabilitation of the flood-affected population (relief and recovery) and reconstruction of damaged infrastructure in different parts of the country could be in the range of $4billion. According to a former Finance Minister and Ex-Senior Vice President of the World Bank, "The government's prediction that GDP in 2011-12 would increase by 4.1 percent now seems extremely optimistic. Given some of the shocks the economy has received in the last few days, it appears that the national product will not increase by more than 2.5 to 2.8 percent this year"[7].

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1 FAO Preliminary Flood Damage: An Inside View September 2011
2 United Nations Pakistan Floods: One year On, Islamabad, 2011
3 UNOCHA Pakistan Monsoon 2011: Situation Report No. 8 14October 2011
4 Oxfam 2011
5 UNOCHA, Pakistan Humanitarian Bulletin 29 September 2011
6 World Health Organization Environmental Health Response to Sindh Floods 16 October, 2011
7 Shakil Ahmad, The Nation, September 20, 2011

It is essential that Government adopts a rights-based development approach to reconstruction. Sind has been hit twice, although not all districts were affected twice, the overall impact on the people should not be addressed through limited relief and recovery support.

The challenge lies in looking beyond relief, beyond restoration to improving lives and providing opportunities for safe and secure lives. Failure to redress existing structural inequalities means many affected people risk falling into chronic poverty and will not have an opportunity to lead a dignified life.

Gender Impact

Disasters are not gender neutral. However, gender-differentiated outcomes of a disaster seldom occupy critical and central spaces in public policy. Men and women have different priorities and should be differentially engaged in the reconstruction process. However, recognition of the effects and outcomes of flood 2011 on the lives of female-headed households, ethnic minorities and women and girls in general would remain a challenge, as gender is not a priority in actual practice. Additionally, lack of data precludes a comparative analysis of borrowing and debt amongst women and men separately, and it is impossible to discern in a sectoral approach how the destruction of irrigation canals, environment, or railway links, causes losses to men and women separately. There was no gender and income based disaggregated data available to target the most vulnerable groups for assistance. Data provided by the Multi Cluster Risk Analysis (MCRA) is based on sample survey and cannot be used in identifying and reaching out to most vulnerable groups[1].

Lack of availability of female hygiene kits, undergarments, emergency lights and separate toilet and bathing facilities for women and girls exacerbate their vulnerability.[2]Women are more vulnerable to food insecurity especially in terms of nutritional needs. While standing water and flooding posed health risks for all but specifically for pregnant and lactating women. The field visit reports of various NGOs reveal that women's workload and responsibilities have increased many folds, women and the elderly face difficulties in acquisition of relief goods.

While looking at the institutional arrangements within public and donor sectors, NDMA has established a "Gender and Child Cell" which has begun a consultative process at the federal and provincial levels to develop a draft policy on Gender Priority in Disaster Management[3]. GoS has deputed a Women Development Secretary for Provincial Development Working Party (PDWP) to ensure gender inputs into policy making, public spending and project implementation. Gender is officially included in the vision and mandated objectives of all UN agencies, INGOs and key NGOs that are participating in disaster risk reduction and reconstruction for flood 2011. However, it has been observed that gender analysis is not prioritized or a sustained practice. Each sector has its own dynamics and integration of gender in an individual sector demands a deeper understanding of the issues through a gender lens.

The aftermath of the floods 2011, similar to the 2010 floods, provides an opportunity to transform the basic inequalities, poor governance and social injustices, which laid the groundwork for such destruction. The scale of the disaster creates an opportunity to revisit the policy tools and institutional arrangements. The disaster highlighted the profile of specific vulnerabilities, such as gender and social exclusion, which provide

[1] UN Women , ADB, World Bank, CSO , Workshop, November 1, 2011
[2] UNOCHA Pakistan Monsoon 2011:Situation Report No. 8 14October 2011
[3] Source: http;//www.pakistantoday.com.pk/2011/10/ndma-starts-series-of-workshops-on-gender-issues/

government and civil society with a unique opportunity to address the root causes of gender inequity and social exclusion.

Aid Effectiveness, Governance, Social Accountability and Grievance Redress

While the Government has yet to release a report that documents the impact of assistance for the 2010 flood; discussions with several agencies indicated an absence of a coordination and coherent approach for disaster management. While immediate support and humanitarian relief is essential, equally important is the GoP's stated commitment to development. Pakistan's continuing exposure to disaster with poor development indicators demands a longer term commitment by the state: to deliver basic human needs and development and not a return to pre-flood or pre-recovery standards.

The effective delivery of support and services requires sound baseline information. Disaggregated information on households and at the individual level should be available from the *tehsil* to the province. Information crucial to provide targeted support and to enable speedy identification of people requiring special attention should be known before the disaster hits.

The destruction caused by the recent floods created and exacerbated serious governance issues both within the public sector and for the affected population at large. It is evident that direct damages while substantial are not a major impediment for sector recovery and reconstruction. The indirect losses and strains on systems are more important and need to be addressed. Broadly speaking: (a) capacity to govern reconstruction has diminished and been exacerbated by the floods; (b) flood affected population's entitlements are at risk and (c) the provinces are also strained due to worsening law and order[1]. Social unrest is already on the increase and will complicate the reconstruction efforts. Support for law enforcement will be vital.

Aid must be better coordinated, focused and systematic. Information shared with the DNA team indicates overlapping tasks by different agencies working in isolation and failing to adequately address needs. A supply driven approach fails to respond to local needs and coverage.

Humanitarian relief, recovery and reconstruction are a continuum toward development. While agency funding requirements are separated and bound by policy and financing decisions, suffering and deprivation resulting from disasters and exacerbated by pre-existing inequalities, do not fit neatly into compartmentalized boxes. Post-flood reconstruction will require assessment of households requiring longer term support to return to improved, secure lives. Vulnerable groups require special attention. Shelter linked to property rights, nutrition, food security and livelihoods require urgent, long term support. The provision of basic human needs with opportunities for improved and secure lives must be ensured. It is essential that reconstruction efforts are designed with sensitivity to household needs. Government must lead efforts to immediately establish dedicated, trained personnel at village level and DDMAs to identify and support households, manage grievance, monitor and report on reconstruction efforts. NDMA and PDMAs play a critical role in establishing standards, oversight, transparency and securing support for focused, longer-term development efforts.

[1] DNA , Governance Report, 2010

Reconstruction: Recommendations

Table-Annex 4.4: Social Welfare Infrastructure: Recovery and Reconstruction Needs Assessment Summary

Provinces	Reconstruction and Rehabilitation/Repair Costs (PKR millions)	Capacity Building (PKR millions)	Others (PKR millions)	Others (PKR millions)
Sindh	64.7	-	-	-
Balochistan	NA	-	-	-
Total (PKR millions)	**64.7**	**-**	**-**	**-**
Total (US$ millions)	**0.7**	**-**	**-**	**-**

The social impact of the flood will not cease with the receding water or the completion of support phases whether they be humanitarian or recovery.Unfortunately, Pakistan is not a country new to natural disasters, and the lessons learnt should have by now been well integrated in prevention and response plans. It is the Government's responsibility to lead the efforts from recovery to development, to learn lessons, disseminate knowledge and establish the baselines for informing policy and action on disaster risk reduction and management. Instead, at the policy and implementation levels, institutional capacity and implementation readiness is inadequate. GoP must demonstrate greater commitment and leadership to risk reduction and better preparedness for response.

Recommendations for the GoP, 2011 and Beyond[1]:

1. *Institutional Mechanism*
   - Defining roles and responsibilities of different actors/stakeholders including all tiers of government, Donors, NGOs/INGOs and communities
   - Developing the norms and principles for action
   - Develop Standard Operating Practice (SOP) for coordination and collaboration among all actors
   - Core and qualified staff for disaster response and management at all levels
   - Establish a dedicated disaster management partnership involving civil society and communities
   - Establish a dedicated disaster management fund
   - Be informed by research and information sharing, continuously upgrade skills and knowledge

2. *Preparedness*
   - Systematic collection and updating baseline socio-economic (gender disaggregated) data including, information on vulnerable groups
   - Capacity building of communities to respond to disasters
   - Maintain a roster of qualified and trained human resources
   - Documentation and disseminate lessons learnt and scale up good practices
   - Land-use planning, resettlement guided by international standards for social safeguards, develop an Act for the resettlement and rehabilitation of affected population

[1]Based on Discussions, UN Women, ADB, World Bank, CSO Workshop, November 2011

3. *Transparency and Accountability*

- Transparency and equity in recovery assistance
- Establishment of localized Gender responsive grievance redress mechanisms
- Expand and strengthen ombudspersons functions at all levels
- Access to information
- Independent impact evaluation by third party and public disclosure by all stakeholders
- Establish mechanisms for governance effectiveness

Annex 5: Agriculture, Livestock and Fisheries

Sector background

Agriculture is a key sector of the Pakistan's economy and accounts for 21% of GDP, 45% of employment and 60% of exports. Sindh has 30% and Baluchistan 8% share in the national Agricultural GDP. The livelihood of more than 60% of the total population is directly or indirectly dependent on agriculture sector. Furthermore, agriculture sector has strong backward and forward linkages and as a result has a large impact on overall economic performance. The sector's performance has been weak over the last few years recording a growth of around 2% per year, mainly due to the crop subsector. The performance of the livestock subsector has remained healthy and its share in Agriculture GDP has surpassed the crop sector standing at around 55%. Due to limited rainfall, less than 240 mm in an average year, crop production is dependent on irrigation and more than 80% of land is irrigated. There are two main cropping seasons, namely, Kharif (summer) and Rabi (winter). The Kharif season starts in April and ends in October, and the main crops during this season are cotton, rice, sugarcane, maize, pulses, fruits and vegetables. The Rabi season, which starts in October and ends in April, is dominated by wheat production which is the main staple food in Pakistan. Other Rabi crops include fodder, vegetable, fruits. Commercial production of fruit and vegetable, particularly for the main urban markets has increased rapidly in recent years, particularly close to major cities or where agro-climatic conditions are favorable. Important fruits include mangoes, citrus, dates and banana in the tropical and subtropical areas like Sindh, as well as a range of semi-temperate fruits like grapes, peaches, apples in Baluchistan. Important vegetables include potato, tomato, chilies and onions.

Small farmers dominate the agriculture production system but have limited access to assets. Small farms with an average 1.4 ha land are 87% of total 6.6 million farms and their share in the total cultivated land is 38%. The majority of small farmers cultivate their own lands but a substantial proportion are share croppers, many of them "tenants at will" having no acquired rights and providing one third or half into the total cost of the inputs as well as all labor. In many areas, particularly in Sindh, a number of land holders are operating large commercial farms, particularly fruit orchards.

Livestock is an integral part of the farming system and is the main asset for many farmers. Buffalo and cattle are mainly kept for milk, with draft power, meat and hides being other important products. Most households also have sheep, goat and poultry for domestic consumption as well as for sale. Fodder, wheat straw, maize thinnings and stover are used for livestock. Animals are also grazed on rangelands (particularly in Balochistan), pastures and crop stubble. Concentrate feed is widely used in commercial poultry farms and for lactating cattle. In addition to the settled agricultural population, there are also a significant number of transhumants (Gujars) who move within the country as well as in the region and specialize in the rearing of sheep and goat. Their animals are mostly for sale to the large urban centers particularly during Eid times when it is traditional to sacrifice sheep or goats.

As in the case of crops, small farmers dominate the sector. More than 50% of the cattle and buffalo are maintained in a herd size of less than 6 animals and over 60% of the goat population is kept in flocks of less than 30 animals. However, in Balochistan there are often large flocks of animals that are grazed in the arid and semi-arid areas. Sixty percent of the sheep population however is kept in units of 50 to 350 animals, particularly in Baluchistan. In recent years, there has been a rapid growth of medium to large-scale commercial enterprises in dairy and poultry, mainly to supply the needs of urban areas.

On-farm irrigation system[1], which conveys water from the distributary canals to the crops, is an integral part of the overall irrigation network of the country. This system comprises a dense network of watercourses that are partially lined in most cases. To enhance the of water use efficiency, low pressure drip irrigation and laser land leveling technologies are being introduced in the country. There arearound 140,000 thousands of watercourses in the country with 50,000 in Sindh. In addition to the surface irrigation system there are some 0.9 million tubewells in the country. These tubewells provide irrigation in almost 4 million ha and supplementary water in another 8 million ha of canal irrigated areas especially during the Rabi season.

Pakistan has a significant fisheries sector producing about 1 million tons of fish products annually. About two thirds of this is from marine sources (70% from Sindh) and mostly comprise prawn and demersal species. The rest is from inland sources. Inland fisheries, was largely restricted to the main rivers and canals. However, in recent years there has been a rapid increase in aquaculture with many farmers using small ponds and other water bodies. Supplies of fingerlings come from a few large Government hatcheries but there has been a rapid increase in private sector activity in the areas particularly in Sindh.

Lessons from 2010 Flood Recovery Response

The Detailed Livelihood Assessment[2] carried out in June – July 2011 confirmed that livelihood recovery is happening in those areas affected by the 2010 floods, however, it is slower in Sindh than in other provinces and is certainly not complete. Amongst other things, there are some clear differences in recovery and needs between male and female headed households. Pertinent findings from the DLA include the following:

Agriculture

60% of households reported that their Rabi harvest for 2010-11 was significantly reduced from a normal year, and area planted for Kharif 2011 was between 10% and 20% lower than normal. On average households expected a Kharif harvest of about 25% below the usual level.

Livestock

For all types of livestock (large ruminants, small ruminants and poultry) the DLA data indicates that there has been no recovery in household ownership in the districts most affected by the 2010 floods. Only in Thatta there were some signs of recovery in large livestock numbers (and this will have been negatively affected by the 2011 flood), and in Qambar Shahdadkot for poultry.

Debt

The proportion of heavily indebted households appears to have risen since the immediate post-flooding period, as families still struggle to recover and meet their daily consumption needs. Indeed, meeting food consumption needs (as opposed to investment in productive assets) was by far the most common reason for increased household debt.

Outreach of external assistance

During the six months up until July 2011, a large majority of interviewed households did not receive any agricultural assistance (70% of households) or livestock assistance (90% of households). In contrast, about 50% of interviewed households received cash assistance through the government watan card system. Most of

[1] The DNA analysis of the irrigation system (which includes, barrages, main and branch canals, distributaries, and minors) has been done by another group. This report covers only the tertiary (i.e. on-farm) irrigation system.

[2] The DLA was conducted in the 28 severely affected districts of 2010 floods in Pakistan.

those households who did receive assistance felt that it was of some help, although sizeable minorities felt that it was no or little help. A key reason for this was quantity: households complained that there was not enough assistance.

Implications for response

Subsequent to the DLA, provincial consultations were undertaken to draw out some of the implications for response. The provincial deliberations tended to reinforce the conclusions from the DLA itself in terms of priorities for continued support to rural livelihood recovery in 2010 flood affected districts. In particular the need for:

- Continued support for agricultural inputs for the Rabi season
- Restocking of poultry and small ruminants
- Intensified veterinary assistance for large ruminants to improve animal health
- Continued rehabilitation of irrigation infrastructure – linked to cash for work schemes
- Continuation and expansion of *Watan* scheme and encouragement of other cash grant schemes for poor and vulnerable households.

Floods Damage - Overview of Agriculture Sector

Heavy monsoon rains caused renewed and devastating flooding in southern Sindh and northern parts of Balochistan provinces. The subsequent breaches in the drainage canal (LBOD) at several locations resulted in submerging of vast areas. While it was mostly the right side of the river Indus hit by floods last year, this time it was mostly the left side. In Sindh, the central and southern districts of Badin, Dadu, Hyderabad, Kamber Shahdadkot, Khaipur, Larkana, Matiari, Mirpurkas, Neushero Feroze, Sangar, Shahid Benazirabad, T. Allahyar, T.M. Khan, Thatta, Tharparker, Umerkot have been the worst affected1. The Provincial Disaster Management Authority (PDMA) and the Sindh Department of Agriculture Extension estimate that standing crops of cotton, rice, sugar cane, sorghum, vegetables and pulses have been destroyed on about 0.84 million hectares of land. Similarly the livestock sub sector also suffered heavy losses. The Directorate of Animal Husbandry, Sindh has reported that approximately 115,500 livestock have perished and about 5 million surviving livestock have been directly affected.

Direct Damages

Crops

Substantial damages were reported for crops due to the flood. The flowing water uprooted, or caused lodging, in standing crops. Short crops like cotton, tomato, chillies and rice mostly died because of drenching in water for several days. As shown in the Table below, a total of about 881thousand ha. (53%) of the planted areas was affected. The most affected crops are cotton with 74% damage, rice 33%, sugarcane 34%, vegetables 79% and fruits 32%.

[1]Pakistan Food Security Cluster, Guidance on Emergency and Recovery Interventions in Sindh: 2011 - 2012

Table-Annex 5.1: 2011 Kharif Area Affected by Flood

Province	Crop Area Damaged (000' ha)	Area Damaged (000 Ha)						
		Cotton	Rice	Sugarcane	Maize	Vegetables	Fruit	Other
Balochistan	21.42	1.29	14.30	-	-	1.78	0.17	3.88
Sindh	859.61	494.94	163.85	88.40	-	99.24	13.19	-
Total	**881.03**	**496.22**	**178.14**	**88.40**	**-**	**101.03**	**13.36**	**3.88**

Cotton

In the affected districts, the Kharif 2011 cotton crop was planted on some 669 thousands ha and expected output was 0.741 million tons (3.41 million bales). The crop was at the critical stage of boll formation when it was hit by rains and floods. Cotton plants that have not been washed away died by prolonged submersion or suffered premature shedding of cotton bolls. Total cotton area affected is 496 thousand ha, some 74% of the total area planted. Sanghar, Khairpur, Shaheed Benazirabad and Mirpurkhas were the most affected districts in Sindh. The salvaged produce is of inferior quality and is not fetching good prices. On top of that global cotton prices are also low this year. According to SUPARCO; damage to cotton production in Sindh was estimated at 2.23 million bales. In Sindh cotton arrivals up to end of October witnessed a decrease of about 34% to that of last year within same period.

Rice

Of total 545 thousand ha of rice areas, some 178 thousand ha have been affected by flood, mostly of which is IRRI rice. District Badin, Thatta and Dadu in Sindh and Jafferabad and Nasirabad in Balochistan suffered the most damages that varied between 30-80%.

Sugarcane

Of 260 thousand ha area sown, some 88 million ha has been affected by flood at the time of critical growth with sugar synthesis at its peak. The prolonged submergence has led to the development of adventitious roots at the nodes. This is going affect the sugar yield as plants reallocate some its plant reserves to develop these roots. Also, farmers fear 10% rejection in weight by the millers counting these roots as trash. Major areas affected were in Badin, Shaheed Benazirabad and Mirpurkhas Districts of Sindh.

Vegetables

Of 127 thousand ha, where vegetables was sown, some 101 thousand ha has been affected. Major vegetables affected were chilies and tomato. The Chilli Mandi in Kunri estimates 70% drop of the chilli supply with 175,000 bags (30kg) received this year against the normal of 600,000 bags in the season from 15 Aug to end Dec. No grade-1 was available that is mostly exported. In Badin tomato is a major crop where from during the peak marketing season of October to December some 60 trucks per day are supplied, were all lost.

Similarly, during the same period 10-15 trucks of onion used to come to the market but were all lost to the floods.

Fruits

Fruit orchards that sustained heavy economic losses due to the floods are mangoes, guava and banana in Sindh province. Relatively minor losses were reported in Balochistan. The damage to fruit subsector accounts for 20% loss in the total value.

Other Crops

Total Sorghum (irrigated) area planted in Balochistan was 17 thousand ha with an estimated output of 0.061 million tons. Out of which 3.88 thousand ha (23%) was affected. Significant losses have taken place also in Sindh. District Badin and surrounding area used to supply 25-50 trucks per day of melons to the country markets. This year, the flood wiped out the whole crop.

Livestock

The flood substantially affected the livestock population causing death and loss in productivity mainly in Sindh. The deaths were mainly in small ruminants and productivity losses were mainly in large ruminants. Animals standing in mud and stagnant water for extended periods contrived various diseases. The losses in productivity occurred due to acute fodder shortage, debilitation and emaciation. Sources of livestock feed were fully inundated and the availability of fodder in local markets was very low. Facing an acute shortage of feed, these livestock were left stranded. The productivity of milking animals dropped from 7 or above litres to 2-3 litres (50-70%), and many young calves died due to the reduction of the milk in their mothers. The loss in productivity accounts for more than 50% of the total loss. Luckily some 3.5 million animals from the neighboring districts could be moved to the higher grounds of District Tharparkar. The EDO Livestock Tharparkar found these to be testing times, where the district had to host such large number of animals besides his district's own population of 4.5 million. Only 30,000 animals died in his care. A number of farmers moving away from flooded areas found themselves without money to buy food and other essential, and with limited access to feed and fodder for their animals. These farmers sold their animals, often at very low prices. In addition, they missed the premium price time of Eidul Azha. This accounts for 10% of the total monitory loss to the subsector. The cumulative impact on the food security and asset base of households is likely to be severe.

Table-Annex 5.2: Livestock, Poultry and Fisheries Damages in Flooded Areas

Province	Large Animals (000 head)	Small Animals (incl. sheep, goat) 000	Poultry Perished (million Nos.)	Fishery/ ponds Damaged
Balochistan	0.1	0.2	0.0	n/a
Sindh	33.8	81.2	1.1	393
Total	**33.87**	**81.46**	**1.14**	**393**

Large animals (cattle, buffalo, horse, camel, and donkey)

Around 34,000 large animals may have either perished or had been subjected to distress sale. Jaffarabad and Nasirabad districts in Balochistan, and Badin, Mirpur Khas Shaheed Benazirabad, Sanghar, Tharparker and Umarkot, districts in Sindh had suffered most livestock losses, where it appears that sufficient advance warning was not possible.

Small animals (sheep, goat)

A total of 81.40 thousand sheep and goat have been perished or subjected to distress sales. The largest number was in Tharparkar (Sindh) (34 %) where floods carried away some of the large flocks that are grazed in the arid and semi arid areas. A total of 250 sheep and goat have been perished in Balochistan.

Poultry

Some 1.14 million heads of poultry have been lost during the flood, primarily in Sindh. Besides the household poultry, quite a few commercial poultry farms were also damaged.

Fisheries

Damages to fish farm have been reported only from Sindh where 393 ponds/farms have been damaged by the recent monsoon floods.

Other Damages

The table below presents other physical damages in the flooded area.

Table-Annex 5.3: Other Physical Damages

Province	Household Food, Seed, and Feed (PKR Million)	Agriculture Machinery, tools (PKR million)	Govt. buildings, Infrastructure facilities (PKR million)	No. of Watercourses Damaged
Balochistan	63.21	6.00	15.00	32
Sindh	15,081.55	-	4,228.45	819
Total	**15,144.76**	**6.00**	**4,243.45**	**851**

Food, Seed & Feed Stocks

The wheat crop was already harvested by the time the floods hit. However, stocks of wheat held by farmers for their own consumption, as well as stocks held by traders, millers and the Government have been affected by the flood as well as high rainfall and humidity. An estimated 0.150 million tons of household level stocks of food grains (mainly wheat stocks for food and seed) have been destroyed. In addition, a proportion of the public stocks, particularly stocks that are not properly protected, may have been damaged[1].

[1] The financial losses of wheat stock losses held in the government godowns have not been included in the calculation of direct damages.

On-farm water management infrastructure & tubewells

The floods have caused significant damages to the on-farm water management system many of which have been partially lined with concrete and brickwork with support from Government. Some 851 watercourses have been fully or partially damaged in Sindh, and Balochistan. The flood has damaged the concrete and brickwork structures associated with tubewells, as well as the machinery and boreholes. Some 376 tubewells, almost all in Sindh, have been damaged partially or fully.

Support Services

A total of 31 government veterinary hospitals / veterinary services centers, and 432 agriculture extension field offices have been completely damaged whereas 568 offices have been partially damaged by the floods in Sindh. The detailed estimation of damages to Govt. agriculture infrastructure needs detailed assessment.

Indirect Damages

Impact on 2011/12 Rabi and 2012 Kharif Crop

It is difficult to accurately predict the impact of the floods on the forthcoming two cropping seasons. Much depends on the early recovery effort and the ability of farmers and domestic supply chains to revive. However, based on consultations with provincial line departments, and crop experts, tentative estimates indicate that about 10% (142,434 ha) of the affected Kharif crop area will not be available for cultivation in Rabi and 5% in the next Kharif 2012. The main Rabi crop in Pakistan is wheat which is grown on some 8.5 million ha. In Sindh 95% of the land was allocated to wheat in Rabi 2010. Planting of the wheat crop starts in mid-September in the southern parts of the country and is completed by mid November in the northern parts of Pakistan. There is a high possibility that wheat planting in Sindh may face substantial constraints, mainly due to the fact that the flood waters have not fully receded. In contrast in Balochistan, waters have receded except for some low lying areas and, provided the necessary support system for land clearing and input supplies are put in place for the planting season, wheat planting may not be substantially affected. However, damage to watercourses and tubewells, which are a critical source of supplementary water, may affect yields. Irrigation department is allowing water into channels in a controlled manner so that flood water is cleared from the remaining fields. This water is not needed only for irrigation but also for draining salt deposits before crop can be sown e.g. in Badin. In some parts where lands cannot be vacated or water cannot be arranged before the end of December - the last month for sowing wheat, it will be mainly sunflower and other short duration vegetables before next year's Kharif season starts in April. Another factor that may contribute to decrease in the area under wheat will be the delayed start of sugarcane crushing but a recovery in the gap may be filled by the early clearing of the damaged cotton areas. SUPARCO estimates 0.5 million tons loss of wheat production in Sindh due to non availability of land.

Livestock

The loss of livestock, poultry and fisheries will result in temporary shortages in supplies of milk, meat, and eggs from local sources until the time the population has not been fully replenished. Since the production in the rest of the country will remain stable particularly in the neighboring Punjab, the shortages are likely to be covered from the country's own sources but with some increase in prices.

Estimation of Losses

Methodology, Data Sources, Validation

Based on the physical losses reported in the preceding section, direct damages, indirect losses, and reconstruction costs (in value terms) of agriculture sector have been calculated. The methodology for quantifying the damages in value terms is based on the standard approach of calculating direct damage, indirect losses and reconstruction costs. Most estimated damages and losses have been expressed in current market prices. However, in the case of livestock the damage estimates are based on prices prior to the flood. The direct damage, defined as the value of completely and partially destroyed assets include: (i) physical infrastructure, assets, and machinery and equipment losses (on-farm irrigation infrastructure, fish ponds, storage facilities, office buildings, tractors and other agricultural machinery); (ii) output losses of 2011 Kharif crops that were ready for harvesting; and (iii) losses of stock (livestock, inputs, and, harvested products including fodder stored in warehouses).

Indirect Losses defined as reduced production throughout the recovery period resulting from direct damages caused by flood include the annualized losses of future production. The indirect losses of crop production include the partial production losses of the 2010/11 Rabi and 2012 Kharif seasons. The indirect losses in livestock included the loss of milk production of survived animals, which suffered due to stress and lack of fodder. The linked crop-livestock production and loss model was developed for the whole country sub-aggregated into individual provinces. The model also calculates the district level crop-livestock losses.

Reconstruction Costs refer to the amount of resources required for priority programs to rehabilitate partially and fully destroyed assets, agricultural livelihoods of vulnerable groups and to bring normalcy to the farming community, and is derived by estimating the required amount of rehabilitation works costed either at recent Government schedule rates or at current market prices. The assessment is based on the primary damage data compiled by provincial governments, agricultural and livestock census data, and the information collected by the Assessment Team itself. The primary data on livestock and crop losses provided by the provincial governments were validated through several methods including process checking of government data collection system, SUPARCO crop report of October 2011, and making visits to farmers' fields, ginneries, rice mills, fruit and vegetable wholesale markets and input dealers' shops.

Quantification of Direct and Indirect Losses

The summaries of preliminary loss estimates are provided below. As shown in the Table below, total losses in crop and livestock subsectors expressed in dollars are estimated at $ 1840.3 million, of which 89 % is in the form of direct and 11 % is in the form of indirect losses. Sindh suffered most with 94 % of total losses and Balochistan with 6%. The losses were largest in the crops sector with 91.5%, which includes estimates of damages to Kharif crops; food and seed stocks; on-farm irrigation facilities; and support services for crops, as well as indirect damages to the forthcoming Rabi 2011/12 and Kharif 2012 crops. Livestock damages, which include loss of animals, distress sales, and destruction of animal health support services, as well as indirect damages due to reduced milk production, accounts for 8.3 % of total losses. Fisheries losses are estimated at around $ 3.36 million (0.2%).

Table-Annex 5.4: Estimated Direct and Indirect Losses (US$ million)

Province	Livestock			Crops			Fisheries/ Pond	**Total**
	Direct	Indirect	Sub-Total	Direct	Indirect	Sub Total		

Balochistan	0.41	7.94	8.35	87.84	7.58	95.42	n/a	**103.77**
Sindh	45.51	99.28	144.79	1,499.19	89.20	1,588.39	3.36	**1,736.54**
Total	**45.92**	**107.22**	**153.14**	**1,587.03**	**96.79**	**1,683.81**	**3.36**	**1,840.32**

Losses by Provinces

In order to have an idea of the major contributors to overall provincial losses, the figures for each province are compiled and shown in the Table 5.5 below. The damage figures are grouped together keeping in view the importance and to have minimal categories for quick comparison.

Table-Annex5.5: Losses by Provinces (US$ Million)

Description	Balochistan			Sindh			Total
	Livestock	Crops	Sub Total	Livestock	Crops	Sub Total	
Direct Losses	0.4	87.8	88.2	45.5	1,499.2	1,544.7	**1,632.9**
Indirect losses	7.9	7.6	15.5	99.3	89.2	188.5	**204.0**
Fisheries/Pond Loss	n/a	-	-	3.4	-	3.4	**3.4**
Total	**8.3**	**95.4**	**103.8**	**148.2**	**1,588.4**	**1,736.5**	**1,840.3**

Sindh

The total damages in this province are valued at $1,737 million out of which 89% ($1,545 million) are direct damages. Crop damages make 91% and livestock 9%. The damages are highest for cotton ($455 million). The other crops including rice, sugarcane and vegetables are the dominant contributors to damages. The damages are highest for small ruminants and the productivity loss of large animals.

Balochistan

Out of a total loss of $ 103.8 million, 85% ($88 million) are direct damages. The damages for crops are 92% and livestock 8%. The damages are highest for rice ($72.6 million). The other crops including cotton, vegetables and fruits are the dominant contributors to damages. The damages are highest for small ruminants and the productivity loss of large animals.

Impacts on Agricultural Supplies and Markets

The floods have had a large and direct impact on the Kharif cropping season. As this is the season when crops of higher value are grown and more cropped area matures for harvesting than Rabi season, this is likely

going to have effects on exports and domestic markets, food security, indebtedness and labour market. Expected reductions in national output of these crops are given below (Table 5.6).

Table-Annex5.6: Areas Affected by Flood as Proportion of National Aggregates

Crops	Cotton	Rice	Fruits	Sugarcane	Vegetables
Impacted Area '000 ha	496	178	13.36	88.40	3.88
Total Area Planted '000 ha	3,199	2,642	950	1047	478
Likely reduction in aggregate supplies (%)	15.5%	6.7%	1.4%	8.4%	0.8%

Impact on Exports

The impact of the reduced cotton crop will be largely on exports. Ginning, spinning and weaving mills may also be impacted due to short supply of domestic cotton. In the case of paddy, the major impact will be on IRRI rice production that mainly feeds the domestic, rather than the export, market. In case of chilies, this year no grade-1 quality was produced that is mainly exported. Mango, specially the *Chonsa* variety that has recently started gaining share in the international market also suffered losses.

Impact on Domestic Markets

Domestic supplies of rice, cotton, fruits, sugarcane and vegetables specially tomato and chilies have been reduced substantially and are being reflected in prices of commodities that have increased in many key markets. Recent reports talk of increases ranging from 10 to 60 % for key staples to over 60 % for fruit, vegetable and poultry in specific areas. It is likely that prices will continue to remain high for products such as vegetables which are not imported. However, in the case of rice, sugarcane and maize (particularly for use by the domestic feed and oil industries) impacts of national markets could be reduced in the medium term if the Government liberalizes imports of these crops. International markets for these crops have generally ample supplies and low prices. The impact on milk prices has also been significant. However, if feed and fodder production problems are solved and no disease outbreaks occur, milk production may recover in coming months.

Impact on Local Labour Market

During this time of the year, when a lot of harvesting, processing and trading takes place locally, large number of skilled and unskilled laborers get the opportunity to remain gainfully engaged for a while. This includes daily wage work in harvesting and threshing of rice, picking of cotton, chilies, and tomato, ginning of cotton, dehusking and polishing of rice, loading, unloading, re-grading and packing at the wholesale markets. Dalip Kumar, Abadgar Rice Mills, Badin tells that his mill used to operate for 8 months during the season with day and night shifts, this year it will operate hardly for 3 months and with only day time shifts.

Impact on Domestic Food Security

Two crops are important from the food security point of view i.e. wheat and rice as they provide some 40% and 15% calories respectively of the average Pakistani diet. The floods have direct substantial damage to the rice crop of Kharif 2011 and will have indirect damage to the wheat crop of Rabi 2011/12 as some lands will

not be free from the standing water, irrigation water may not become available or farmers will have problems to arrange inputs. Since there was a bumper crop of about 26 million tons of wheat in 2010, sufficient stocks should be available with the government and there will be a need for enhanced allocation of funds to the Food Department to make additional procurements for wheat from Punjab and for rice from the international markets.

Impact on Indebtedness

The high crop losses have left large number of small farmers and tenants unable to retire loans from the local input suppliers. New loans are difficult or more expensive to get. The market needs to be replenished with finances from outside sources. Last year, after the 2010 floods, the State Bank provided some 10 billion PKR soft loans to the commercial banks for onwards lending to farmers at10% interest rate. But large portion of it could not be disbursed due to the fear of the Banks that farmers will not return it within a year and thus will become liable to the penalty of the State bank. State Bank is thinking of relaxing the conditionalities this year that may help the situation ease out somewhat. Also last year the State Bank allocated PKR. 37 billion credit for Sindh, but the banks could not disburse PKR 7 billion. This year this allocation/target has been increased to PKR 40 billion, which is a good decision but needs to be matched with efforts from the partner banks. Under the crop maximization program, government provided revolving funds to groups of small farmers at 10% interest rate. Fifty percent of the principal had to be repaid in 10 installments after a grace period of 5 years. This scheme had a very good track record of recovery. Due to the devolution the scheme has come to a halt. A revival of the scheme, especially in the flood affected schemes will greatly help in ameliorating the indebtedness burden of the small farmers.

Proposed Sectoral Reconstruction Strategies

Existing Sectoral Policies and Priorities

The Medium Term Development Framework (MTDF) 2005-10 sets the main objectives of the agricultural development as the achievement of self-reliance in agricultural commodities, ensuring food security and productivity improvement of crops. During the period for the MTDF, an annual growth rate of 5.2% was projected. To achieve the objectives, the MTDF proposes several key strategies including: (i) strengthening of agricultural research and extension institutions; (ii) enhancement of crop productivity through introduction of new high yielding varieties and better on-farm practices; (iii) increased production and export promotion of high value crops, fruits and vegetables; (iv) enhanced production of oilseeds, horticulture and tea; and (v) development of additional water storage capacity and increased water use efficiency (through laser land leveling, water courses lining, and promotion of drip sprinkler and trickle irrigation systems).

In addition, a promotion of the use of improved seed, balanced fertilizers and herbicides/pesticides, ensuring the availability of institutional agricultural credit, specially for small and medium farmers, improvement of farm to market roads, and continuation of support price program for wheat with indication of prices for cotton, rice and sugarcane to protect farmers against market volatility have been proposed.

For livestock, the MTDF's strategy is to increase the productivity by giving emphasis on quality rather than number of animals to produce more healthy and well-nourished livestock. Availability of adequate feed will be given highest priority. The major thrust will be on breed improvement through crossbreeding, artificial insemination and embryo transfer technology. Emphasis will be given to fodder research particularly combinations of fodder that fit into existing farming systems and provide year-round supplies of green

matter. Research will be intensified on the utilization of agricultural wastes, industrial by-products, crop residues and molasses as animal feed. Specific strategies include: promotion of the private sector participation with the public sector roles focusing on creating enabling environments and capacity building; better extension system to upgrade farmers' knowledge on animal husbandry to raise productivity; and better animal health coverage.

Agriculture in Pakistan has not played its due role in the overall development of the economy. Actual growth of the agricultural sector has been lower than projected. After a jump of a 4.7% growth in 2008-2009/ 2009-2010, mostly due to strong wheat pricing policy of the Government after food crisis in the previous year, growth rate of the sector decreased to around 2% in 2010/2011. In order to improve the performance and to sustain its potential contribution to the economy, there is a need for strategic interventions with strong focus on increasing productivity (per unit of land and water), improving marketing policies, infrastructure development and improved sector governance through policy and institutional reforms. Also with much of the poor and vulnerable living in rural areas, agriculture development will be key in meeting the Millennium Development Goals (MDGs).

Raising growth and reducing poverty in rural areas would require a higher level of public investment in the sector. The current agricultural portfolio of major donors would also need to be strengthened to assist the government with pursing key policy changes and leveraging the public spending on the sector.

Guiding Principles for Recovery and Reconstruction

The guiding principles for restoration set out below reflect the experience in Pakistan and other countries in the region regarding agricultural reconstruction and rehabilitation after a natural disaster.

Focus on Poverty Reduction and Sustainable Livelihoods

The rehabilitation and reconstruction efforts must be and be perceived to be socially equitable with support being targeted mainly to those in greatest needs. Special measures will have to be put in place to ensure that vulnerable groups living in the flood affected areas, such as the landless farmers, tenants, and those in the riverine area where property rights are poorly defined, benefit fully in the support measures being provided

Create a Leading Role for Local People and Their Organizations

Rural communities should play a central role in the rehabilitation and reconstruction process. Their involvement will range from helping address land tenure and ownership issues expected to arise, to planning, monitoring and guiding the support effort. While the immediate recovery phase may require extensive involvement of the central and provincial government, responsibility for planning and implementing the rehabilitation and longer term reconstruction efforts should be handed over as soon as possible to communities and district governments. Cash-for-work and food-for-work programs should not only apply to rehabilitation of public infrastructure, but also target those who prefer to restart their own economic activities immediately.

Allow Markets to Lead Recovery

Markets must be left to play a key role in guiding existing and renewed productive patterns. This will be essential to ensure that the reconstruction activities of the agriculture sector are: (i) built on the natural and entrepreneurial assets of the affected areas; and (ii) that they are sustainable beyond the period that special assistance is being provided.

Build on Past and On-Going Projects and Programs

Agriculture, forestry and the water sector have benefited from a long series of project and program interventions stretching over 20 years and supported by donors such as the ADB, IFAD and the World Bank. The projects have resulted in a strong project management experience in all provinces and many districts. This strong implementation capacity needs to be quickly mobilized – possibly through reallocating funds and staff from ongoing projects and programs.

Issues of Immediate Urgency

In preparing a set of interventions, a number of key concerns and issues faced by agriculture sector need to be kept in view. The 2011/12 Rabi season is fast approaching, in Sindh. Although some areas may still be inundated and not suitable for planting, other areas urgently need support for land preparation and inputs, particularly for the wheat crop. Moreover, some of the affected areas rely on tubewells to fulfill their needs. Support is needed on an urgent basis to repair tubewell pumps, boreholes etc, to ensure that water is not a constraint. The rehabilitation work to the damaged lined and unlined watercourses need to be started soon to irrigation the lands. A number of farm machinery including tractors is damaged which may cause problems in timely seed bed preparation and increase the cost due to limited availability of tractors. Large numbers of livestock as main source of livelihood of poor people has been affected mainly with productivity loss, putting the food security at risk. Immediate measure for restocking for targeted groups in most affected areas may be needed. To restore animal productivity subsidized 'animal feed' supply and timely vaccination may be started.

Key Interventions Needed

Restoring Normalcy

Tens of thousands of rural families have seen their farms submerged by the floods. A primary goal for interventions is to allow people to return to their homes and restart economic activity. This will require, for example, help with provision of seeds, fertilizer and implements to start cropping, restoration of on-farm facilities such as watercourses and tubewells, as well as a restocking program complemented by provision of feed, fodder and medicine for their animals.

The recovery / reconstruction needs have been estimated at approximately US$ 306 million, as detailed in the Table below.

Table-Annex 5.7: Estimated Costs for Restoring Normalcy in Agriculture

Description	PKR million	US$ million
1. Crops		
Seed/fertilizer/land preparation/ tolls and implementation of Rabi 2011/12 and for Kharif 2012	25,120	289
2. Livestock		

Restocking, Feed/medicine, Animal Shelters	1,059	12
3. Fisheries		
Repair of fish hatcheries and stocking of ponds	146	2
4. On-Farm Water Management		
Repair of damaged infrastructure (watercourses, tube wells, etc.)	265	3
Total Program Costs	26,590	306

Restoring Normalcy - Cost Estimate – PKR 26.6 billion ($ 306 million)[1]

In the coming months, all efforts must be on saving the Rabi 2011/12, as well as future cropping seasons. At the same time there has to be an effort to safeguard and rebuild livestock herds. The main activities, along with an indication of how long they should last, are given below:

Crops (up to June 2012)

Famers need to be provided support for seed, fertilizer, tools and implements along with support for land preparation, including clearing of debris and silt. The programme should be focused on small farmers. A possible package could be based on the suggestions of the Ministry of Food and Agriculture last year, for wheat a support package for small farmers comprising 125kg seed, 125 kg DAP, 250 kg urea and PKR 12,000 for other costs, primarily land clearing and preparation. However, this package would need to be supplemented by tools and implements, as well as seeds for other crops including vegetables. The total cost of the package is estimated at about PKR30,000 ($345) per ha for the seed, fertilizer, land clearing and preparation, and tools and implements package. The package will be provided to small and medium-size farmers with up to 3 ha land only.

Livestock (for up to 2 years)

An assistance package would comprise animals, as well as supplementary feed, vaccination and standard medication such as de-worming for cattle, sheep and goat. A special package should be provided to the transhumant population comprising improved goats, sheep and essential medicines. The affected livestock farmers also need support in repairing the critical animal sheds, acquiring essential utensils and equipment. The scope, phasing, implementation arrangement, monitoring system, financial management and procurement aspects should be thoroughly designed in close consultation with provincial Governments. A typical livestock support package usually includes one large animal or two small animal with possible shelter, or 20 chicks of 13 weeks (2:18 male female ratio), with some feed and medicine. The amount lost due to death and distress sale of livestock and poultry is considered as the minimum compensation support needed for restoration of the livestock population in flood affected areas. The government may consider the following scenario of investment:

[1] For more details seek guidance from Pakistan Food Security Cluster, **Guidance on Emergency and Recovery Interventions in Sindh: 2011 – 2012,** Page 10 onwards

- Those living below the poverty line affected will be compensated equivalent to about 50 percent of animal losses they had endured during the flood.
- Thos living above the poverty line affected will also be compensated for about 30 percent of their total lost animals.

Fisheries (up to 2 years)

An equivalent of 50 percent of the total loss will be provided as subsidy for recovery needs of the fishing communities.

On-Farm Water Management (up to 2-3 years)

Of the total watercourses and tubewells damaged, 60% will be rehabilitated.

Possible Implementation Arrangements

The focus of assistance should be to rebuild the livelihoods of poor families who are likely to have severe problems to obtain machinery, equipment and inputs needed to clear their fields and cultivate them. In providing targeted supplies to poor farmers, local NGOs and others could play a key role. It is also essential that local suppliers and traders be drawn into the distribution system by the use of vouchers wherever practical and possible. The Sindh Government has already started a scheme for distribution of wheat seeds to farmers for maximum of up to 25 acres to flood affectees.

Food/Cash for Work

Such schemes would be particularly suitable for work associated with clearing of debris, cleaning of water courses and removal/spreading of silt. Where possible such activities should be organized on a community basis with local village organization being the main implementing agency.

The provincial breakdown of costs is provided in the Table below, and further details on provincial breakdowns are in Annexes.

Table-Annex5.8: Provincial Breakdown of Costs for Restoring Normalcy

Description	PKR million	Million US$
Balochistan	348	4
Sindh	26,243	302
Total	**26,590**	**306**

Annex 6: Education

Sector background

Pre-floods status of educational institutions and baselines

There were 49,152 educational institutions in Sindh, including: (i) 44,518 or 90.6% primary schools (out of which 8,458 schools were for females and 27,629 schools were mixed) and; (ii) 238 inter and degree colleges (out of which 91 colleges were for females and 40 colleges were mixed). A total of 144,610 teachers were associated with the educational institutions in Sindh, out of which 45,499 or 31.5% were female teachers. The number of educational institutions in the17 flood affected districts of Sindh was 39,348 including:(i) 39,132 schools (6,503 for females, 9,881 for males& 22,748 mixed); (ii) and 216 colleges (82 for females& 44 mixed). There were 101,081 teachers in the 17 flood affected districts of Sindh, of which female teachers constituted 23,746 or 23.5%.

Overall number of institutions in the province of Balochistan was 12,349 including: (i) 10,668 or 86.4% primary schools (3,394 were for females) with 48,348 teachers (15,551 or 32.2% were females) and (ii) 56 inter and degree colleges (19 colleges were forfemales and 19were mixed colleges). The number of institutions in five flood affected districts of Balochistan province was 2,849 including: (i) 2,834 schools (27.6% schools were for females) with 9,233 teachers (2,514 or 27.2% were females) and; (ii) 15 colleges (4 of which were for females).

Total enrollment in the schools of Sindh province was 4.4 million, of which females constituted 1.81 million or 41.2%. In schools of Balochistan province, enrollment was 1.04 million (females equaled 38.5%). Enrollment in the schools of 17 affected districts of Sindh was 3.17 million (38.4% females), while it was 0.24 million (33.3% females) in the 5 affected district of Balochistan.

Lessons learnt from 2010 floods and DNA

Educational Institutions in the provinces of Sindh and Balochistan have been badly hit by floods for three times during the last five years in 2007, 2010 and now in 2011. 13 out of the 17 affected districts in Sindh and all 5 of the affected districts in Balochistan were also affected by floods in 2010. Two affected districts in Sindh (Dadu and Qambar-Shahdad Kot) and three of the affected districts in Balochistan (Kalat, Jaffarabad and Nasirabad) were also hit by torrential rains during 2007. Schools that had been previously affected by floods were hit once again by heavy flashes of floods before they had the opportunity to rebuild. One important factor that came out clearly is the poor quality of architecture design and construction materials used for reconstructing school buildings, which cannot withstand the heavy flooding.

The recent floods, along with other natural calamities and continuously worsening security situation in the provinces, have adversely affected the already inadequate access, low enrollment ratios - more particularly for females, poor quality of education, weak management, and fragile supervision. This has become a vicious circle but no appropriate efforts are being made to break this circle. After the 2010 floods, educational activities in most cases have been taking place in the open (without adequate shelter) because of a lack of rehabilitation of few schools and occupation of educational institutions by groups of people affected by the floods.

Floods Damage Overview

Damage Criteria Verification and Means of Verification

For the purpose of this report, educational institutions are categorized partially or fully damaged; the state of damage equaling 40% or below constitutes partially damaged and 40% and above constitutes fully damaged infrastructure.

Nature and extent of damage: Damage to facilities (direct and indirect loss)

Total number of institutions including colleges[1], in the total affected districts, are 42,171, of which 4,096 (204 schools in Balochistan) institutions have been affected by floods. The damaged institutions are 9.8% of the total (Sindh: 9.9%, Balochistan: 7.20%) institutions in the affected districts and only 6.7% of the total institutions in the two provinces (Sindh: 8.0%, Balochistan: 1.7%).

Primary schools were the most badly hit constituting 3,597 or 87.8% of total damaged institutions, whereas middle, secondary, higher secondary and colleges combined constituted 12.18% of total damaged institutions (Table 6.1 below). 2,536 or 61.92% of damaged institutions were partially damaged and 1,560 or 38.08% were fully damaged (Table 6.2)

In Sindh, 1,032 schools for females have been damaged (385 of which are fully damaged and 647 of which are partially damaged), which consists of 26.5% of the total of 3,892 damaged schools. 2,860 schools for males were damaged (1,022 are fully damaged and 1838 are partially damaged) which constitute 73.5% of damaged schools in the province. In Balochistan, 51 schools for females have been damaged (3 are fully damaged and 48 are partially damaged) constituting 25% of the total of 204 damaged schools, while 153 schools for males were damaged (17 are fully damaged and 136 are partially damaged) constituting 75% of total damaged schools.

Table-Annex 6.1 Province and Level-wise Numbers of Damaged Institutions

Provinces	**Type 1** Colleges		**Type 2** Higher Secondary Schools		**Type 3** Secondary / High Schools		**Type 4** Middle Schools		**Type 5** Primary Schools		**Total**
	C D	PD	C D	PD	C D	PD	C D	PD	C D	PD	
Sindh	0	37	15	29	50	81	81	188	1261	2150	3892
Balochistan	0	0	0	0	0	9	1	8	19	167	204
Total	**0**	**37**	**15**	**29**	**50**	**90**	**82**	**196**	**1280**	**2317**	**4096**
Level Total	**37**		**44**		**140**		**278**		**3597**		**4096**
% of Total	**0.90**		**1.07**		**3.42**		**6.79**		**87.82**		**100**

[1] AEPAM Data 2008-09

Table-Annex 6.2: Province and Level-wise, Males and Females Damaged Institutions

Province	Primary schools			Middle schools			Secondary schools			Higher secondary schools			Colleges			**Total**		
Sindh	FD	PD	Total	FD	PD	Total	FD	PD	Total	FD	PD	Total	FD	PD	Total	**FD**	**PD**	**Total**
Males	927	1609	2536	46	129	175	40	57	97	9	21	21	0	22	22	**1022**	**1838**	**2860**
Females	334	541	875	35	59	94	10	24	34	6	8	8	0	15	15	**385**	**647**	**1032**
Subtotal	**1261**	**2150**	**3411**	**81**	**188**	**269**	**50**	**81**	**131**	**15**	**29**	**29**	**0**	**37**	**37**	**1407**	**2485**	**3892**
Balochistan	FD	PD	Total	FD	PD	Total	FD	PD	Total	FD	PD	Total	FD	PD	Total	**FD**	**PD**	**Total**
Males	17	122	139	0	5	5	0	9	9	0	0	0	0	0	0	17	136	153
Females	2	45	47	1	3	4	0	0	0	0	0	0	0	0	0	3	48	51
Subtotal	**19**	**167**	**186**	**1**	**8**	**9**	**0**	**9**	**9**	**0**	**0**	**0**	**0**	**0**	**0**	**20**	**184**	**204**
Total	**1280**	**2317**	**3597**	**82**	**196**	**278**	**50**	**90**	**140**	**15**	**29**	**29**	**0**	**37**	**37**	**1427**	**2669**	**4096**

Service and productivity losses – in qualitative/descriptive terms

In Sindh, 1,151 persons died or were injured (426 dead and 725 injured) out of which 228 were children (111 died, 117 injured)[1], however the number of students amongst the dead and injured is not known. No staff casualty has been reported either in Sindh or Balochistan. However, the indirect losses are in several shapes. A large number of institutions were used, and are still being used, to provide shelter to the flood affected population. In Sindh there were 803 reliefs camps mostly set-up in schools. Seven districts in Sindh contained 764 relief camps; each district containing over 20 camps. 620 of these camps were in the three districts of Sanghar (560), Matiari (34) and Mirpur Khas (26). As of November 1st, 2011 the number of relief camps in these three districts has decreased to 280, 26 and 5 respectively, however they are all set-up in school buildings. This has resulted in a loss of innumerable educational contact hours after the opening of schools from August 14th, 2011.

Students in schools are supplied free textbooks in all provinces, which would have been taken away by flood water or damaged and thus they are not available to students for studies. These books will need to be supplied again to the students.

The number of students and teachers in the affected districts of Sindh is 3.17 million and 101,081, respectively. In addition to students, millions of parents and their relatives have also been affected. These numbers are highly significant. As of the 1st week of November, 2011, only district Thatta, originally having 3 camps, presently has no relief camps and all schools are functional. The most affected district is Sanghar where 570 schools were still under water as of the first week of November, 2011. However, there are some improvements being made as 200 schools have been made functional in Temporary Learning Centers (LTCs) by UNICEF, while another 240 schools have been made functional in tents by the district administration and 7 high schools have been shifted in other schools as evening shifts. In district Mirpur Khas, 600 schools are still non-functional however UNICEF is likely to start LTCs in Taluka Jhudo. In district Matiari, two Union Councils of Taluka Saeedabad are still under water and schools are non-functional, however schools are operational in the remainder of the district; barring 5, which are being used as relief camps.

In Balochistan, no reports were made available regarding any damage to the students and children, neither is any institution reported as being used by the flood-affected communities.

It is highly likely that a large number of students and teaching and non-teaching staff will suffer from emotional trauma, especially because they had hardly recovered from the suffering of 2010 floods. This will necessitate counseling services. This in turn would require teachers to be trained for school-based psychosocial support. But practically no such arrangements are made after these calamities, and children, teachers and parents are left to manage at their own.

Furthermore, in the absence of proper facilities and equipment, it is not difficult to imagine that the existing poor quality of education may be impaired further. Alternate means shall be required to run the partially and fully damaged schools while waiting for their full rehabilitation or reconstruction and thus operational costs are likely to increase. These temporary solutions will also cost money and most of the arrangements made thus far would be wasted resulting in further losses to people and government, including loss to the economy.

Without proper schooling arrangements, the teachers and other staff will be getting salaries without giving any output or with a very little output. Teachers themselves are among the flood-affected persons and several

[1] PDMA Sindh Data, Dated 4th November, 2011

are bound to live in camps. Where teachers and students belong to the same village and are in camps, they can, perhaps, resume teaching-learning activities but in several cases the teachers are from other villages and cities not necessarily in the same camp. MDG goals, which were already behind target, will further go beyond the reach of the educational system.

Loss of learning-teaching time being colossal can neither be quantified nor costed. However, other indirect losses like loss of textbooks, damages due to use of school buildings by the flood affected population, facility surveys to estimate institution specific damages have been calculated in addition to costing to restart the education process.

The total damage and loss in both the provinces is PKR 12,013.78 million including indirect loss of PKR 1,856.37 million. As the number of damaged institutions is much larger in Sindh, therefore, damage and loss of PKR 11,751.54 million is also the highest both on indirect (PKR 1771.13 million) and direct loss (PKR 9980.28 million) accounts. In Balochistan, indirect and direct losses are PKR 85.11 million and PKR 177.13 million respectively.

Table-Annex 6.3: Damage and Loss Figures (PKR millions)

Provinces	Indirect Loss	Direct Damage	**Total**
Sindh	1,771.26	9,980.28	**11,751.54**
Balochistan	85.11	177.13	**262.24**
Total	**1,856.37**	**10,157.41**	**12,013.78**

Descriptive account of quantification process

Assumptions and constraints in quantification

The following assumptions have been made and constraints assumed most of which were used for the 2010 Floods:

a) If the building is damaged, it is assumed that furniture & fixture and equipment will also be almost fully damaged
b) Offices and residences damaged are included in the Governance Sector
c) Hostels are included in the damage to buildings particularly in colleges
d) FPA factor used both for Sindh and Balochistan is 17% while estimating the reconstruction needs
e) In the absence of separate data for number of rooms in the damaged primary schools, it is assumed that 80% of the primary schools are 2-Room and 20% are 5-Room schools.
f) In order to estimate cost of direct damages to flood affected institutions, depreciation factors used for 30%, 50% and 20% damaged buildings respectively are 0.9, 0.7 and 0.5. As the partially damaged institutions are assumed to be damaged 40%, therefore, depreciation factors used for 30%, 50% and 20% buildings are 0.9x0.4=0.36, 0.7x0.4=0.28 and 0.5x0.4=0.2 respectively.
g) 20% inflation cost has been added in the construction costs for various levels of institutions over the unit costs used during 2010 Floods.

h) None of the institutions affected by floods has been included in the current account of damaged institutions.

Proposed Sectoral Recovery and Reconstruction Strategies

Reconstruction Strategies

The reconstruction strategies being recommended here are similar to those proposed during DNA of 2010 floods because most of them are still appropriately relevant. These strategies will be helpful to federal and provincial governments while formulating their own detailed reconstruction strategies specific to their provincial and area needs. The strategy for the education sector should form part of the overall country and province-specific strategy to address multi-hazard risks and other common factors and requirements for the reconstruction.

The reconstruction strategy should be used as an opportunity for improved access to higher quality education through improved design of physical learning spaces, social and physical access, teacher development, and capacity development of the district education offices for improved service delivery. It also provides an opportunity to ensure that building codes are enforced. Monitoring of compliance with these codes is essential and here the national, provincial and district disaster management authorities have a critical role to play. The education departments at provincial and district levels will need to play a leading role in the planning and implementation of recovery and reconstruction of the education system. The capacities of district governments and other stakeholders such as NGOs and the private sector need to be pooled and efforts made to increase them for expediting implementation of the reconstruction exercise because government's own capacity may not suffice to meet these huge reconstruction needs together with most of the remaining work from 2010 floods.

The five major recommendations on policy guiding principles are as follows:

Start learning-teaching process immediately

The first and the foremost guiding principle is to ensure that all children of school-going age have access to education activities in a protective environment as soon as possible. The government has started providing temporary shelter and the provision of "school-in-a-box" kits, temporary learning centers with the support of donor agencies like UNICEF, and international and local nongovernmental organizations. In addition, arrangements will need to be put in place for textbooks lost during the floods and learning materials in view of the provincial governments' policies for provision of free textbooks up-to secondary level. Similarly, arrangement should be made for vaccination of children in their temporary residences and in schools, and providing suitable hygiene conditions in temporary or semi-permanent schools. Educational institutions shall need shelter, students would need books and other learning materials, and teachers wouldrequire orientation to meet the psycho-socio needs of the students, who suffered during the disaster.

Consolidate educational facilities

The provincial education departments have been making continuous and concerted efforts to consolidate educational facilities in order to minimize wastage and under/over-utilization of them. Consolidation will

female primary schools in the same village with low enrollments, if parents are willing; (e) providing classrooms in the damaged buildings according to number of students enrolled and not only on the extent of damaged facilities etc. To achieve this goal, education departments will assess enrolling capacity, before floods, of each damaged institution, actual enrollment, and making decisions about viability of further enrollment, closure or merger and provision of additional classrooms keeping out-of-school children in count for classroom spaces.

Conduct facility-by-facility survey

In order to make a more accurate assessment of the actual number of institutions affected and of the extent of damage to each institution, facility-by-facility survey will need to be conducted simultaneous to formulating the reconstruction and rehabilitation strategies and starting educational processes. This will help in assessing actual reconstruction needs of each facility and help making consolidation decisions including provision for future enrolment as per school going population of the area. Experienced teams of surveyors and data analysts will be required, who have the capability to map facilities and assess future needs.

Prioritization of reconstruction needs

Rural girls' institutions should be rehabilitated first followed by rural male boys, followed by semi-urban and urban institutions. This is necessary because in most cases urban-based and schools for males are preferred over schools for girls and rural-based schools, where educational levels are already low. Similarly, partially damaged institutions should be repaired first because they can be made functional with lesser cost and time and then fully damaged institutions should be reconstructed. For this purpose, female and rural educational facilities should be surveyed first and decisions about consolidation and reconstruction needs should be made and implemented.

Engage Parents-Teachers Associations (PTAs) / School Management Committees (SMCs) / School Councils (SCs) in reconstruction work

Government construction agencies and private contractors hired by them cannot alone carry out reconstruction work spread mostly over rural areas. Existing PTAs/SMCs/PTSMCs have to have enhanced role in rehabilitation and maintenance of schools. Actions required in this regard would be to engage with communities to enter into partnerships for school rehabilitation and arrange their orientation training.

Prioritized Sector Recovery Framework/Timeframe

In the short term phase the first priority will be given to, (i) starting educational activities immediately by cleaning the schools being used by the flood affected population, (ii) fumigation and dis-infectioning of educational campuses and, (iii) provision of textbooks and learning materials to the students. Simultaneously, teams would be constituted to carry out facility-by-facility survey of the institutions as discussed above under recovery and reconstruction strategies. Orientation for teachers, administrative and management staff would be held in suitable batches so that educational activity does not stop in any of the institutions. Various donors are already supporting education sector in one form or the other and their on-going programs can accommodate the immediate requirements. Planning for rehabilitation and reconstruction will be initiated with detailed surveys of damaged institutions, approval of PC-Is and architectural designs followed by budgetary provision and construction work.

Short term (6-12 months) recovery needs are costed at PKR 1,856.38 (US$ 21.34 million) for both the provinces. Short term needs for Sindh are PKR 1,771.26 million (US$ 20.36 million), and for Balochistan PKR 85.12 million (US$ 0.98 million) are required. Medium to long term cost of reconstruction is estimated to be PKR 20,733.1 million,out of which PKR 20,188.6 million is needed for Sindh and PKR 544.45 million is required for Balochistan.

Table-Annex 6.4: Prioritized Recovery Framework

Activity	Short-term (6-12 months)		Medium- and Long-term (12-36 months)	
	Sindh	Balochistan	Sindh	Balochistan
Resume teaching work and provision of books to students	1,679.7	79.85	0	0
Damage assessment, facility-by-facility survey	43.69	2.04	0	0
Teacher Orientation	47.92	3.23	0	0
Reconstruction work	0	0	20,188.6	544.45
Total (PKR million)	**1771.3**	**85.12**	**20,188.6**	**544.5**
Total (US$ million)	**20.4**	**0.98**	**232**	**6.3**
Grand Total (US$ million)	**21.34**		**238.3**	

Estimation of Recovery and Reconstruction Needs

The total cost of reconstruction for all the damaged institutions of both the provinces is estimated to be PKR 20,733.1 million (US$ 238.31 million) of which requirement for Balochistan is estimated at PKR 544.45 million (US$ 6.26 million). Fully damaged institutions are although lesser in number (1,437 as compared with 2,659 partially damaged) but due to higher cost of reconstruction of fully damaged institutions out of the overall reconstruction cost, 53.2% (PKR 11,030.91 million out of 20,733.03 million) is estimated for fully damaged institutions.

Overall recovery and reconstruction needs are estimated to be PKR 22,589.43 million (US$ 259.65 million). Reconstruction needs for Sindh would be PKR 21,959.86 million (US$ 252.41 million) and those for Balochistan would be PKR 629.57 million (US$ 7.24 million). In addition to reconstruction cost of damaged institutions, other reconstruction needs include teacher orientation, facility-by-facility survey of damaged institutions to work out actual needs of each institution, and provision of textbooks and other learning materials. Provision of free textbooks is the responsibility of each province as per current policy of the two provincial governments.

Table-Annex 6.5: Summary of Reconstructions Cost for Damaged Institutions (PKR million)

Province		FD	PD	Total
Sindh	Male	7,878.29	6,623.23	**14,501.52**
	Female	3,069.31	2,617.75	**5,687.06**
Subtotal		**10,947.6**	**9240.98**	**20,188.58**
Balochistan	Male	67.19	365.06	**432.25**
	Female	16.12	96.08	**112.2**
Subtotal		**83.31**	**461.14**	**544.45**
Total (both provinces)		**11,030.9**	**9,702.12**	**20,733.03**

Table-Annex 6.6: Summary of Recovery and Reconstruction Needs

Province	Short - term (6-12 months)				**Total Short term**	Long Term (12-36months)	**Grand Total**
	Start Education	Books	Teacher Orientation	Survey		Reconstruction Needs	
Sindh	1,529.15	150.50	47.92	43.69	**1,771.26**	20,188.6	**21,959.8**
Balochistan	71.4	8.45	3.23	2.04	**85.11**	544.45	**629.56**
Total	**1,600.55**	**158.95**	**51.14**	**45.73**	**1,856.37**	**20733**	**22,589.4**

Table-Annex6.6.1: Starting Educational Activities

Province	Destroyed/damaged (number)	Unit Cost	**Total Cost**	Used as relief camps (number)	Unit Cost	**Total Cost**	**Grand Total**
Sindh	3,892	0.35	**1,362.2**	477	0.35	**166.95**	**1,529.15**
Balochistan	204	0.35	**71.4**		0.35	**0**	**71.4**
Total	**4,096**		**1,433.6**	**477**		**166.95**	**1,600.55**

Province	Students Affected	Per st. T.Books	**Total Cost**	Teachers	Orientation Cost	**Total Orientation**	**Total**
Sindh	301,008	0.0005	**150.50**	9583	0.005	**47.915**	**198.42**
Balochistan	16,897	0.0005	**8.45**	645	0.005	**3.225**	**11.67**
Total	**317,905**		**158.95**	**10228**		**51.14**	**210.09**

Province	Affected Schools	Used as relief camps	Total Schools	Survey Per School	**Total Survey**
Sindh	3892	477	4369	0.01	**43.69**
Balochistan	204		204	0.01	**2.04**
Total	**4096**	**477**	**4573**	**0.01**	**45.73**

Table-Annex6.7: Recovery and Reconstruction Needs AssessmentSummary

Provinces	Reconstruction and Rehabilitation/Repair Costs (PKR millions)	Teacher Orientation (PKR millions)	Start Education and Books Provision (PKR millions)	Facility-by-facility Survey (PKR millions)	**Total**
Sindh	20188.60	47.92	1679.65	43.69	**21959.86**
Balochistan	544.45	3.23	79.85	2.04	**629.57**
Total (PKR millions)	**20733.05**	**51.15**	**1759.50**	**45.73**	**22589.43**
Total (US$ millions)	**238.31**	**0.59**	**20.22**	**0.53**	**259.65**

Annex 7: Energy

Background

The damage and needs assessment for the energy sector focuses on three main subsectors: (i) power, (ii) oil, and (iii) gas. Subsistence fuels (wood and dung) are not included in the scope.

Power sector

In the four provinces and Federally Administered Tribal Areas (FATA), power distribution is carried out by nine PSPs (distribution companies or DISCOs) and one private sector power company Karachi Electric Supply Company Ltd. (KESC). In Azad Jammu and Kashmir (AJK) and Gilgit Baltistan (GB), local electricity departments are responsible for distribution and hydro generation. Transmission is the responsibility of National Transmission and Dispatch Company (NTDC) which also dispatches the power and acts as the Central Power Purchasing Agent.

Power generation is provided by thermal plants, hydroelectric facilities and a small nuclear facility (300 MW). The 13 hydroelectric facilities (installed capacity 6,481 MW) are owned and operated by the Water and Power Development Authority (WAPDA), a public sector entity. Thermal power plants are owned by public and private companies. The public sector operates 13 thermal power plants (installed capacity 4,900 MW). About a third of Pakistan generation (5,987 MW) is provided by private sector companies (independent power producers or IPPs). Also, KESC operates plants with total capacity of 1,955 MW. Out of the total 19,252 MW of the national installed generation capacity, dependable generation is about 17,523 MW in the summer and about 14,640 MW in the winter, depending on the annual hydrology.

Petroleum sector

Ministry of Petroleum and Natural Resources (MPNR) coordinates oil and gas activities.

Oil sector

Oil refining capacity is 270,000 barrels per day (bbl/day) from five main refineries, Pakistan Refinery Ltd. (PRL), Par-Arab Refinery (PARCO), National Refinery Ltd. (NRL), BYCO Petroleum Ltd. (BPL), and Attock Refinery Ltd. (ARL). Refineries are primarily owned by the private sector. There are also a dozen oil marketing companies (OMCs). Product distribution is by road tankers (13.5 million tons/year), rail (1.5 million tons/year) and pipeline (6.8 million tons/year). The crude oil and product pipeline network covers over 2,000 km. Total product storage of OMCs can meet 22 days of oil demand while total product storage of OMCs, refineries and terminals can meet 38 days of oil demand.There are nearly 6,400 petrol stations nationwide.

Gas sector

Two state-owned companies, Sui Northern Gas Pipeline Ltd. (SNGPL) and Sui Southern Gas Company Ltd. (SSGCL) distribute about 78% of the total natural gas production to consumers. The state-owned Mari Gas Company Ltd. (MGCL) feeds 12% while independent systems supply 10%. Gas transmission lines span over 10,000 kms, and distribution lines another 101,000 kms supplying over 5.6 million consumers and power plants. SNGPL owns around 60% of the country's gas network with 3.2 million consumers. There are around 84 LPG marketing companies and 3,170 compressed natural gas (CNG) stations across the country.

Upstream Oil and Gas

The two main national oil and gas companies, Oil and Gas Development Corporation Ltd. (OGDCL) and Pakistan Petroleum Ltd. (PPL) and various international oil companies and domestic firms operate in the upstream sector.Current oil production is around 66,000 bbl/day. Recoverable gas reserves are 30 trillion cubic feet (TCF). Potential tight gas reserves are about 35 TCF.

Floods Damage Overview

Assessment is based on the information provided by the focal points of the different energy sector agencies under the Ministry of Water and Power (MOWP) and MPNR. Threshold of 40% was used to account for assets as completely damaged.

Power sector

Table-Annex 7.1: Physical Damage Details: Power Sector

	Grid station (units)	Transmission lines (km)	Distribution lines (km)	Distribution transformer (units)	Customer conn. (units)	Equipment (PKR million)	Hydro plants (units)	Thermal plants (units)
Completely destroyed			60	650	4,772	261.8		
Partially damaged	16	48				10.23		

Only two power distribution companies are operating in the flood affected areas, HESCO in Sind and QESCO in Balochistan. In the power sector, damages have only been reported by HESCO. Whereas, QESCO confirmed that no damages were caused due to floods. Majority of the damages identified by HESCO relate to distribution transformers. These include damages due to floods as well as heavy rains. It was difficult to bifurcate the two. No other power sector entity provided any details on damages.

Petroleum sector

Table-Annex 7.2: Physical Damage Details: Petroleum Sector

	Access road(km)	Gas field equipment damages (PKR)	Oil pipeline (km)	Oil depots (units)	Gas fields (sites)	LPG facilities (locations)
Completely destroyed	17	40				
Partially damaged		50			2	

In the petroleum sector, PSO and SSGCL confirmed that no damages were caused by the floods. PPL has reported some minor infrastructure damages as well as lost of revenue due to decrease in sales. The losses due to floods are covered under the insurance policy subject to a certain percent of deductibles.

Damage Quantification

Direct and indirect damage estimates were gathered from the relevant companies. Values were assessed for reasonableness and compared against available pricing data. Direct damage estimates are based on replacement cost. Indirect losses reflect a reduction in earnings due to loss of production or reduced business activity.

Table-Annex 7.3: Damage and Losses

Entity	Direct damage (PKR million)	Indirect damage (PKR million)	Total damage (PKR million)	Total damage (US$ million)
Generation				
Transmission	19.7		19.7	0.226
Distribution	261.8		261.8	3.0
Total Power	**281.5**		**281.5**	**3.226**
Oil downstream				
Gas downstream				
Upstream oil and gas	175	783	958	11.0
Total Oil and Gas	**175**	**783**	**958**	**11.0**
National total	**456.5**	**783**	**1,239.5**	**14.2**

Power sector

Estimated direct and indirect damage to the power sector from the flood is moderate at PKR 281.5 million (US$ 3.226 million), all of which is direct damage. No indirect losses have been reported.

Petroleum sector

Total reported damages are PKR 958 million (US$ 11.0 million). Damages are concentrated in the public sector (about 98%), with direct damage of PKR 175 million (US$2.01 million) and indirect damage of PKR 783 million (US$ 9 million) since the bulk of oil and gas infrastructure is publicly owned.

Proposed Sectoral Recovery and Reconstruction Strategies

The basic recovery strategy for the energy sector is:

- First priority is to restore basic services.
- Second priority is to rehabilitate supporting infrastructure.
- Third priority is restore projects that were completely damaged or under construction.

There is no formal institutional arrangement for risk management and mitigation strategies for the energy sector. Also there is no existing disaster risk reduction or climate proofing program for the energy sector.

Pakistan's development priorities are given in Vision 2030[1] and the medium-term development framework for 2005–2010 provides for priority investment in key sectors. There are annual development programs i.e., Public Sector Development Program (PSDP) for all the PSPs. Special development funds are also available for new village electrification and improvement of oil logistics.

In the power sector, Asian Development Bank (ADB), Islamic Development Bank (IsDB), Japan International Cooperation Agency (JICA), and the World Bank, has traditionally been major donors providing sizeable funding to assist energy infrastructure development. The United States Agency for International Development (USAID) has increased its assistance in recent years. For the petroleum sector, there is no major donor-assisted program. ADB assists with renewable energy development, power distribution and transmission networks, and energy efficiency improvement. World Bank and JICA focus on power transmission and distribution networks, and USAID on infrastructure development. IsDB's focus has been hydro generation, and increasingly on thermal generation. Other donors including France, Germany, Republic of Korea, and the Netherlands; and the United Nations Development Program support energy efficiency and renewable energy projects.

The energy sector is federally-based and policies, rules, pricing, projects and implementation issues are coordinated by the respective federal department, except in AJK, GB, and Sarhad Hydropower Development Organization (SHYDO) in KP. HESCO has redirected their internal resources to begin restoration work. PPL is replacing and restoring affected facilities in coordination with MPNR. Challenges to power sector development includes: (i) inadequate financial resources, (ii) insufficient quantities of equipment and stores, (iii) domestic manufacturing capacity to supply required equipment, (iv) reconstruction prioritization, and (v) financial strain from damages.

Needs Estimation of Recovery and Reconstruction Needs

Table-Annex 7.4: Recovery and Reconstruction Needs Assessment Summary

	Reconstruction and rehabilitation/repair costs (PKR millions)	**Total (PKR millions)**	**Total (US$ millions)**
Power	281.5	**281.5**	**3.226**
Petroleum	10.0	**10.0**	**0.115**
National total	**291.5**	**291.5**	**3.341**

[1] Government of Pakistan, Planning Commission. 2007. Vision 2030. Islamabad

Immediate needs for the power sector is PKR 281.5 million (US$ 3.226 million) covering direct damages by the PSPs. Needs for the petroleum sector is only PKR 10 million (US$ 0.115 million) covering the losses not covered by insurance. Insurance cover for public sector companies has not been factored into needs.

Opportunities to Build Back Better are few as most programs involve rehabilitation of existing infrastructure rather than building new facilities.

Prioritized Sector Recovery Framework / Timeframe

Power sector

Policy actions

- Policy for unrecovered receivables from customers in the affected areas.

Early recovery, short (<= 12 months)

- Fast track infrastructure restoration by diverting resources to restoration activities in the flood-affected areas, utilizing existing stores and existing civil works contractors.
- Reconstruct, repair and rehabilitate damaged facilities. Where appropriate Build Back Better.
- Fast track procurement for continuous replenishment of equipment to stores.
- Provide renewable energy systems to provide power to communities that are cut off.
- Establish emergency SOP including disaster management, stores back-up, prioritization, costing, providing renewable power equipment as emergency supply to cut off areas.

Medium term (0 – 24 months)

- Implement SOP for emergencies.

Long term (> 24 months)

- Long-term development planning for power generation, transmission and distribution improvement program, increase power supply coverage, explore alternate sources of energy.
- Long-term sustainable development.
- Develop improved and implement safety standards and building codes.

Petroleum sector

Policy actions

- Policy for unrecovered losses to public sector companies.

Early recovery, short (<= 12 months)

- Reconstruct, repair and rehabilitate damaged facilities.

Medium term (0 – 24 months)

- Establish emergency SOP and outline mitigating strategies.

Long term (> 24 months)

- Develop strategy for more robust refining and marketing, and gas distribution infrastructure.
- Develop a plan to reduce oil imports. Accelerate implementation of LNG import facilities.
- Develop a strategic stock policy to maintain adequate oil stocks for emergency situations.

Annex 8: Governance Infrastructure

Background

Governance related institutions in the flood-hit districts of Sindh have suffered damage to their assets, which in turn eroded their already limited capacities. In Balochistan, reported damage for governance sector was limited. Flooding caused by rains led to disruption of social and economic life and created a crisis. Demand of governance and related services in a crisis is much higher and ever more challenging to respond to effectively and promptly. Governance sector institutions in Pakistan, even before the disaster, faced many challenges.

Governance Structures and Institutions

Constitutional, federal, provincial and local agencies with governance related roles, are present across the districts. These include: *formal justice and law enforcement* - district and lower courts, police and prisons; *service delivery agencies* - Pakistan Post, the National Database and Registration Authority (NADRA) and Election Commission offices; provincial and district Accounts Offices; and the district and sub-district civil administration. Civil administration is responsible for land revenue and land titles, maintenance of public order and general coordination of government activities at the district level. Lower tier administration (*talukas* and union councils) are responsible for municipal services and maintenance of vital records such as births, deaths and marriage.

Governance structures in Sindh and Balochistan, as well as other provinces, have shifted back and forth between devolution and re-centralization in the last decade. Three-tier elected local governments were installed after the enactment of Local Government Ordinance of 2001. However, after two four-year tenures of elected local governments, the provincial governments are managing the local government agencies directly through civil servants. Balochistan Local Government Act of 2010 has effectively rolled back the local governments to the pre-devolution local bodies system, concentrating powers at the provincial level. While the local government system in Sindh remains in limbo, district authorities find themselves responsible for critical social services, land administration and revenue as well as frontline public agencies in crises and disasters. Maintenance of law and order has been a direct responsibility of the provincial government. Provinces are also responsible for providing financial resources to the judiciary.

Capacities to Deliver

Coverage and quality of services of two national institutions viz. Pakistan Post and NADRA have been largely adequate. Pakistan Post also performs 40 agency functions for the federal and provincial governments, and utility companies, including payment of pensions, money transfers, and saving bank services. NADRA provides the vital citizen registry services across the country. However, the lower judiciary, police, prisons, and civil administration have had entrenched problems of limited human, technical and physical resources. Both coverage and quality of the corresponding services and functions have been low. Structural issues, poor resource allocation, weak human resource, corruption, influences by vested interests and nepotism are reported as important factors constraining the performance and results of public service delivery.

While there have been considerable investments in the physical infrastructure for governance institutions over the last decade, given the resource constraint, these investments for the police, judiciary, prisons and other governance institutions remain inadequate. No less importantly a near-lack of public participation in planning, implementation and monitoring of public service delivery and governance combined with weak internal and

administrative accountability of public servants and agencies is both a cause and effect of weak governance systems.

Technical capacities and availability of human resources at district as well as provincial level have been inadequate even under normal circumstances. Relief and reconstruction are intimidating challenges, given the scale of the damage and recovery and reconstruction needs. Engineering, Finance, Planning and Project Management capacities are constrained even at the provincial level and are effectively non-existent with the districts.

Law and Order

Security situation in Balochistan and crime in Sindh- including those of gender and oppressive nature- are major law and justice related challenges facing state and society in both provinces. Limited capacities further eroded by chaos ensuing repeated floods in two consecutive years have adversely affected state capabilities to protect rights and shield vulnerabilities. Relief operations; transport and distribution of relief supplies and implementation of early recovery activities require security for orderly arrangements. This remains a challenge in relief and early recovery phases, as disaster related crime has been reported after the 2011 floods. 58% of the communities have reported theft and robbery following the rains.

Financial Management

Public expenditure effectively lacks linkage with performance, results and intermediate (administrative) and ultimate (parliamentary) accountability. Fiduciary risk management in public spending and value for money aspects are chronically weak. The poor, women, minorities and other vulnerable groups receive less than adequate focus in budget allocation and execution. Public Financial Management (PFM) reforms, and demand and evidence based prioritization of expenditure are overdue to improve delivery and results of services and performance of governance functions.

Governance Dynamics

Recent political progress of the country toward more provincial autonomy through the 18th Constitutional Amendment and upward revision of provincial share in federal revenues under the revised National Finance Commission (NFC) Award formula have empowered provincial legislatures and executives. Implementation of the 18th Amendment, involving transfer of functions, assets, staff and records, has been slow. Capacity of the provincial governments needs to be developed with a sense of urgency to fulfill their expanded mandate due both to the 18th Amendment and the discontinuation of devolved local government system.

Lessons Learnt from 2010 Floods and DNA

Disaster Management

Disaster management expertise with the provincial governments is limited, with a few personnel with relevant experience. National, provincial and district disaster management authorities - NDMA, PDMAs, and DDMAs found themselves inadequately resourced to launch a disaster response matching the scale of the catastrophe. Contingency planning existed in at least some cases. Role of DMAs can become more effective through developing better institutional partnerships. DMAs can be usefully geared to provide a platform for coordination of all government and non-government organizations involved in relief and recovery activities.

National Disaster Management Commission (NDMC) is the apex decision-making and oversight body under the National Disaster Management Act of 2010, which should be activated to institutionalize strategic coordination.

Public Sector Capacity

Weak PFM and technical capacities slowed down implementation and led to public resentment. Standardized fast track and yet transparent and accountable financial and managerial processes would need to be institutionalized to avoid similar problems. Much larger volumes of work in comparison to normal workload and output of the government agencies becomes an implementation bottleneck. Significant support would be necessary to bring in additional resources for technical and managerial capacities.

Difficulties were experienced by disaster victims in receiving cash compensation and other relief because they either did not have or had lost the computerized national identity cards (CNIC). NADRA's mobile service capabilities had to be stretched to visit/locate near relief camps and other convenient locations to issue new and duplicate CNICs in the flood-hit areas. It is estimated that more than 50% of the affected population lost their CNICs in the flooding this year.

Floods Damage Overview

Table 8.1 details damage to governance related infrastructure. Governance institutions in the 17 affected districts of Sindh have reported damage to 648 facilities including offices, residences. Aggregate covered area damaged or destroyed has been estimated to be slightly below three million square feet. In Balochistan, the 5 affected districts have reported damage to 18 buildings. Worst hit district in Sindh is Mirpurkhas where estimate of aggregate affected covered area is 845,000 sq feet, followed by Sanghar (299,000), Tharparkar (246,000), Shaheed Benazirabad (201,000), Dadu (186,000), Umerkot (171, 000), Khairpur (161,000), and Hyderabad (140,000).

Civil Administration in Sindh suffered heaviest damage to its facilities, where 257 buildings were reported to have been partially damaged and 86 as completely destroyed. Partial damage to 11 Prison and 71 Police facilities and complete damage to 3 Prison and 66 Police buildings has been reported. 14 court buildings have been partially damaged and 10 have been reported as completely destroyed. 21 Auqaf buildings are reported as completely damaged and 10 as partially damaged. NADRA, Post Offices and other governance institutions shared the remaining disaster damage.

Table-Annex 8.1: Physical Damage Details

Provinces	Unit (Square Feet)	District		Sub Division/Taluka		Union Council/Village	
		Completely Destroyed	Partially Damaged	Completely Destroyed	Partially Damaged	Completely Destroyed	Partially Damaged
Sindh	2,943,517	109	213	59	114	64	89
Balochistan	17,455	6	6	-	6	-	-
Total	**2,960,972**	**115**	**219**	**59**	**120**	**64**	**89**

Damage Quantification

Templates for data collection were developed by simplifying the ones used for the 2010 DNA. Government agencies were requested to nominate focal persons. The sector team gave orientation to the focal persons and liaised with field officers of various agencies in the affected districts to collect data. Efforts were made to ensure data quality while it was being collected and by follow up action to remove apparent flaws.

Damage assessment is based on reports from district officers and provincial and federal agencies. The damage data was reported in different formats, making standardization and quantification difficult. Covered area measured in scale or in number of rooms was used as the basis of damage quantification for buildings. Not all data templates provided by the districts and departments contained information on covered area. Similarly, information on damage to moveable assets was also not provided by most districts and departments. Validation of reported damage was carried out through field visits, meetings with frontline officials, cross verification and review of other publicly available data. Field visits were carried out in Badin, Tando Muhammad Khan, Mirpurkhas, Sanghar and Hyderabad districts of Sindh. Data coordination and validation in Balochistan was carried out by a team of consultants hired by WB/ADB who visited the districts. Validation did not reveal significant differences between reported and actual damage. However, compilation and consolidation of data consistency across districts and departments was aimed and appropriate adjustments have been made on the basis of explicit realistic assumptions, where necessary.

Table-Annex 8.2: Damage and Loss Figures

Provinces	Direct Damage (PKR millions)	Indirect Losses (PKR millions)	**Total**
Sindh	1,555.83	369.23	**1,925.06**
Balochistan	15.61	12.65	**28.27**
Total (PKR millions)	**1,571.44**	**381.89**	**1,953.33**
Total (US$ millions)	18.06	4.39	22.54

In case of governance institutions service and productivity losses create complex issues. Disruption of services or functions and inability to respond to much bigger demand can and do impede relief and reconstruction. States of rule of law, justice, security, property and citizenship records and management capacities of public accounting and local level public management become exposed to risk of deterioration because of damage and serious inadequacy in the face of much higher volume of output demanded by recovery and reconstruction needs. Disruption of governance services and functions affect the condition of population already suffering from the direct effects of the disaster. While the economic loss to population is complex to estimate as it would involve estimating economic value of security, justice and protection.

Moreover, indirect losses primarily relate to the economic and productive sectors and are catered for in damage estimates of the relevant sectors. Indirect loss to governance institutions is estimated on notional costs of continued services and functions despite loss to their facilities, records and reduced staff productivity/availability in the damage quantification.

Proposed Sector Recovery and Reconstruction Strategies

Key aspects of proposed governance sector strategy include mobilization of technical expertise; preparation, processing, approval of expenditure proposals; mobilizing and raising funds to finance the reconstruction expenditure; constructing a quality conduit for flow of funds by organizing capacity support to relevant agencies; and inclusive approaches to planning, implementation and monitoring of reconstruction activities.

While rule of law, access to justice, good governance and public service delivery are stated priorities of the government inadequate resources- institutional apparatus, financial and technical resources- impede progress and improvement.

Proposed sector strategy and costed strategic options for the government

Restoration of services and functions

In the short term, it is recommended that resources be mobilized and focused on full restoration of affected services and functions. In order to achieve this in short time temporary arrangements should be put in place. Planning for medium to long term activities must also be carried out simultaneously.

Expenditure planning capacity

Preparation of PC-1 is the first step on the part of government agencies to seek approval of capital expenditure. Compliance to technical standards of expenditure proposals proves to be a bottleneck in reconstruction. Capacities of the agencies need to be strengthened by providing trainings and outreach by the Planning and Development Departments (P&DD). The P&DD in Sindh has recently enhanced its capacity by recruitment of qualified Planning Officers, which can be utilized for outreach to departments and districts. Entire process of expenditure approval needs to be strengthened to ensure quality and yet match the needs of fast paced reconstruction.

Budget execution

After expenditure approval, budget execution comes as the next bottleneck to implementation of reconstruction plans. In addition to fast tracking ongoing PFM improvements, it is important that the entire process of disbursements be streamlined with appropriate risk management and transparency as well as expansion of capacity to handle larger volumes of work.

Monitoring and Evaluation

Sindh has made initial developments in a project monitoring and evaluation system (PMES). This function in both the provincial P&D departments is a priority reform. Capacity building of the M&E function, use of MIS, data bases, GIS technology and access to PIFRA system need to be done in order to monitor and report progress of implementation. There is a critical corresponding need to expand the capacities of line departments in fully implementing such systems.

Community oriented approaches

With help of NGOs and CBOs active in the flood-hit areas community centered approaches can be implemented to improve governance results by alternative approaches such as ADR to relieve pressure on formal justice institutions, community involvement in planning and implementation of relief as well as restoration of services.

Citizens Documentation Restoration

NADRA may have to mobilize to provide missing CNICs of the flood victims in order to enable them to register for relief. Significant number of flood victims may not have had CNICs. It is a foreseeable problem, which can be preempted by making arrangements for issuance of new CNICs in the flood-hit districts. NADRA should act early to enable other departments to issue duplicates for land records, vehicle and arms licenses etc.

Needs Estimation of Recovery and Reconstruction Needs

Value of reconstruction needs is based on the current government notified rates for contractors. Types of construction, pre-flood condition and nature of damage in precise categories proved challenging to collect in the short time available. Consequently, suitable assumptions and broad classifications had to be used. However, to improve accuracy of the estimates- statistically and factually- sound assumptions have been used. Computations have been made in spreadsheet with stated assumptions, criteria and parameters.

Table-Annex 8.3: Recovery and Reconstruction Needs Assessment Summary

Provinces	Reconstruction and Rehabilitation/Repair Costs (PKR millions)	Capacity Building (PKR millions)	Total (PKR millions)
Sindh	4,716.113	12.580	4,728.693
Balochistan	36.572	3.700	40.272
Total (PKR millions)	**4,752.685**	**16.280**	**4,768.965**
Total (US$ millions)	**54.629**	**0.187**	**54.816**

Prioritized Sector Recovery Framework

Recommended governance sector recovery framework is based on following strategic considerations:

- "Building back smarter" to intertwine institutional dimensions i.e. processes, technologies, alternative means for continued services- with physical, technical and human resource need and availability.
- Focus on aligning needs of population for uninterrupted governance services with limited resources and disaster risks in future.
- Reconstruction of facilities, restoration of records, capacity development of the staff for disaster preparedness, response and reconstruction- on the basis of lessons and future strategy for minimal disruption in future- to be mainstreamed in public planning, expenditure, institutional reform and capacity improvement programs.

Reconstruction and rehabilitation programming for the medium and long term should be done with following key components:

- Temporary arrangements for premises
  - Temporary readjustments of available space
  - Arrangements for additional space for short term needs
- Fast track rehabilitation of equipment and record
  - Procurement of goods and services for equipment rehabilitation
  - Staff availability and short intensive trainings for record restoration
- Preparation of expenditure proposals for premises reconstruction
  - Development of standardized disaster reconstruction planning process to allow fast track processing
  - P&DD to design and deliver trainings for preparation of expenditure proposals
  - Lay out schedule for approval and process/decision steps in time for next year's annual finance bill i.e. by March 2012
  - Develop custom M&E plan and capacity to monitor implementation
- Programming for future institutional and capacity improvements
  - Develop and implement a diagnostic and prescriptive program of action to improve capacities and management/coordination processes with contingent-service continuity planning as key objective
  - Develop and implement record digitization, remote back-up & access, and process automation plans
  - Develop human resource capacities for improved processes
- Inclusive Governance
  - Involve local communities and stakeholders in planning and monitoring for uninterrupted delivery of governance services and functions
  - Improve transparency and citizens' access to planning, expenditure and M&E information
  - Link real-time planning, expenditure and M&E information with websites of public agencies
  - Hold public discussions on planning and implementation of governance services.

Annex 9: Health

Sector Background

A large number of people, women and children being particularly vulnerable, are still living in scattered roadside camps without potable water, as fears of water-borne diseases loom large and many of humanitarian aid agencies with their limited resources find it hard to meet basic needs of the affected people. Women and children are particularly vulnerable as their precarious circumstances have left them without access to food, safe water, medicine and shelter. The situation in certain areas within affected districts is reported to be critical as affected communities are at risk of facing various communicable diseases. Also the situation with regard to childhood nutrition (38% of under 5 children in Pakistan are reported as being underweight) will certainly deteriorate as a consequence of the flood emergency. In particular, micronutrient deficiencies are widespread with high rates of iron-deficiency anemia, zinc, iodine folic acid and vitamin A deficiencies, having a particularly damaging impact on the survival, growth, development and productivity of pre-school children and pregnant women.

Infectious and communicable diseases are a major cause of concern and remain the prime cause of morbidity and mortality in the affected districts. Almost all the affected areas at high risk for epidemics for a large number of reasons such as overcrowding, poor housing, unsafe drinking water, insufficient sanitation, poor socio-economic conditions, poor health awareness, low vaccination coverage, and poor health services. The risk of disease outbreaks further increases during the humanitarian crisis. Communicable diseases account for a significant percent of the total burden of diseases (BOD). During the week of 28 October to 3 November 2011, a total of 379,536 patient consultations were reported to the disease early warning system (DEWS) by the mobile health centers established in the affected areas. The major causes for seeking health care were upper respiratory tract infections (19%), skin diseases (13%), suspected malaria (13%), acute diarrhea (8%), and lower respiratory tract infections (6%); representing 59% of the BOD[1]. Twenty percent of the total BOD account for reproductive health problems (maternal and peri-natal mortality and disability), and about 6% for nutritional deficiencies, particularly micronutrient related. Some of the key indicators of a few jurisdictions are given in the following table:

Table-Annex 9.1: Key Health Indicators

District	Maternal Mortality Ratio	Infant Mortality Rate	Immunization Rate (%)*	Contraceptive Prevalence Rate (%)
Punjab	238	81	53	33
Sindh	333	81	37	27
Khyber Pakhtunkhwa	323	63	47	25
Balochistan	856	49	35	14
Pakistan	**297**	**78**	**46**	**29.6**

Source: PDHS, 2007

* BCG, measles, and three doses each of DPT and polio vaccine (excluding polio given at birth)

[1] Weekly Epidemiological Bulletin, Volume 2, Issue 44, Epi week 44, 28 Oct to 3 Nov 2011, World Health Organizaiton -Sindh

Health services are provided by both public as well as private sectors. However, given the dearth of information on the private sector and its limited relevance in the affected districts, this report therefore focuses on public sector only. There are also practitioners of alternative and traditional medicine, and not-fully qualified providers (including rural medical practitioners and drug sellers, and traditional birth attendants). The public sector delivers both inpatient and outpatient services for curative and preventive care, but the utilization and quality of services is very low because of a number of factors including limited availability of basic amenities in these facilities – national average of first level care facilities with electricity is 60%, water supply 42%, public toilets 26%, and accessibility through roads 44%. (HMIS, 2007, Ministry of Health)

Like rest of the country, the public health care system in the flood-affected districts has multilayer structure. The provincial and district governments are responsible for the establishment, maintenance and staffing of the network. The overall quality of governance in the health sector has deteriorated gradually during the last two decades, with political polarization and increased political interventions. This has led to a significant negative impact on service delivery, as reflected by low utilization of health facilities and decreasing public confidence. Poor governance is reflected in: (i) site selection for health facilities, (ii) lack of merit-based recruitment and promotion, (iii) weaknesses in procurement system, (iv) rapid and frequent transfers of staff at senior management level both at provincial and district level, and (v) staff absenteeism. Most of government facilities, particularly in rural areas, lack quality basic inputs; they are often in an abysmal status with empty and dilapidated buildings, lacking or poorly maintained equipment, and a limited supply of medicines. A study conducted recently found that 28% health facilities had no laboratory equipment, 21% were without emergency equipment, 23% had no delivery equipment, and 22% were without ambulance, as per standard. Despite having a very high population per doctor ratio, staff expansion and distribution has not kept pace with the physical expansion of medical facilities. Available data indicates that a large number of the posts of doctors, particularly of women medical officers, are vacant in the affected districts.

Flood Damage Overview

The DNA was carried out in two phases: (i) data was collected from districts during the first phase and the second phase constituted consultation and verification of data with provincial health departments and field validation visits to some of the affected districts. During field visits, the team interacted with the people dislocated by floods, and also with government officials, local and international NGOs and UN staff and development partners. The data was provided for public sector health facilities only, as there was very little data available with the provincial governments on private sector facilities. Moreover, damages caused to the family planning outlets run by the provincial Population Welfare Departments were negligible, and since most of these outlets operate in rented houses, these damages have not been reported in this report; the housing sector has covered these damages in their report.

The reported damage to public health infrastructure has not been to the extent of paralyzing the health system; it sustained only mild damages. Most of the secondary health care facilities remained un-affected and – except for short interruption – continued service provision. No health staff is reported to have died or injured. Of the total 882 health facilities of various categories in 13 districts where health sector was affected in Sindh, 278 (32%) were damaged; this total includes 12 (1%) fully damaged, and 266 (30%) partly damaged. In Balochistan, of the total of 193 health facilities in the 3 affected districts, 28 (15%) were damaged, and the

damaged facilities include 13 (7%) fully damaged, and 15 (8%) partly damaged. The largest number among damaged facilities taken together of both the provinces is that of basic health units (BHUs) and government dispensaries (GDs), accounting for 236 (77%) of the total 306 damaged facilities. Table 9.2 shows the district wise data of damaged health facilities by type, and Table 9.3 presents the percent of damaged health facilities in each affected district and also as percent of total health facilities in the province:

Table-Annex 9.2: District Wise Damage Caused to Health Facilities by Type of Facility

District	Damaged											
	DHQ Hospital		THQ Hospital		Rural Health Centre		Basic Health Unit		Dispensary/ MCH Centre		Office/Institute	
	Fully	Partly	Fully	Partly	Fully	Partly	Fully	Partly	Fully	Partly	Fully	Partly
Sindh	**0**	**6**	**1**	**15**	**3**	**34**	**1**	**127**	**7**	**79**	**0**	**5**
Badin	0	1	0	1	1	3	0	21	4	14	0	2
Jamshoro	0	0	0	1	0	0	0	5	0	5	0	0
Khairpur	0	0	0	0	0	0	0	13	0	4	0	0
Matiari	0	0	0	0	0	1	0	2	0	0	0	1
Mirpurkhas	0	1	0	2	0	5	0	7	0	14	0	1
Naushero Feroze	0	0	0	2	0	7	0	0	0	0	0	0
Shaheed Benazirabad*	0	0	0	1	1	7	0	25	0	21	0	1
Sanghar	0	1	1	1	0	2	0	21	0	8	0	0
Tharparkar	0	1	0	3	0	2	0	23	0	11	0	0
Thatta	0	0	0	1	0	0	0	0	0	0	0	0
Tando Allahyar	0	1	0	0	0	2	0	3	0	0	0	0
Tando M. Khan	0	0	0	0	0	1	0	2	1	1	0	0
Umerkot	0	1	0	3	1	4	1	5	2	1	0	0
Balochistan	**0**	**1**	**0**	**0**	**1**	**0**	**6**	**2**	**6**	**8**	**0**	**4**
Jaffarabad	0	1	0	0	1	0	4	0	3	4	0	2
Nasirabad	0	0	0	0	0	0	0	2	0	4	0	2
Lasbella	0	0	0	0	0	0	2	0	3	0	0	0
Total	**0**	**7**	**1**	**15**	**4**	**34**	**7**	**129**	**13**	**87**	**0**	**9**

* The facilities visited by ADB's data validation Mission on 18 November 2011 were found partly damaged, which were otherwise reported as completely damaged by the district health authorities. A revalidation mission was fielded on 25

January 2012, which reclassified, in consultation with EDO Health and DG Health, 20 out of 21 facilities from completely damaged to partly damaged.

Table-Annex 9.3: Damaged Health Facilities as percent of Health Facilities in District and in Province

Province/District	Total health facilities of all categories	Number of damaged health facilities			Affected facilities as % of district total	Affected facilities as % of province total
		Completely damaged	Partly damaged	Total		
Sindh	**1,486**	**12**	**266**	**278**	**-**	**18.7**
Badin	61	5	42	47	77	3.0
Jamshoro	40	0	11	11	28	0.7
Khairpur	153	0	17	17	11	1.1
Matiari	28	0	4	4	14	0.2
Mirpurkhas	71	0	30	30	42	2.0
Naushero Feroze	95	0	9	9	9	0.6
Shaheed Benazirabad	75	1	55	56	75	3.7
Sanghar	97	1	33	34	35	2.3
Tharparkar	80	0	40	40	50	2.7
Thatta	84	0	1	1	1	0.06
Tando Allahyar	20	0	6	6	30	0.4
Tando M. Khan	21	1	4	5	24	0.3
Umerkot	57	4	14	18	32	1.2
Balochistan	**2,075**	**13**	**15**	**28**	**-**	**1**
Jaffarabad	83	8	7	15	18	0.7
Nasirabad	34	0	8	8	24	0.3
Lasbella	76	5	0	5	7	0.2
Pakistan	**9,721**	**25**	**281**	**306**	**-**	**3.1**

Damage Quantification

The damage estimate (direct losses) for all health facilities was calculated as PRs 431.85 million (US$4.9 m) – Sindh: PRs 404.85 m (US$4.6 m) and Balochistan: PRs 27 m (US$0.3 m) – on the book value taking into

account the generic depreciation factor which was assumed as 50% of the replacement cost based on the assumption that all health facilities were older than 15 years. There is no data available for calculating the indirect losses. However, the estimated amount required to meet short-term needs has been taken as proxy of indirect losses i.e., PRs 826 million (US$9.4 million).

Proposed Health Sector Recovery and Reconstruction Strategies

Overview of Existing Sector Development Programs

National Programs recently devolved to the provinces under 18 Amendment in the Constitution include Family Planning, MNCH, PHC, EPI, HIV/AIDS-, Malaria- and Tuberculosis control, nutrition, mental health, complemented by various programs in partnership with NGOs (e.g. National Action Plan for the Prevention and Control of Non-Communicable Disease, Health Promotion and the Leprosy Control Program). Donor/IFI financed direct assistance amounts to 3% of the total health sector expenditure. Among others, ADB, WB, JICA, USAID, CIDA, DFID, KfW, WHO and UNICEF have financed health programs either through budget support or as direct technical assistance support to country sector programs. (e.g., health system reform, MNCH, etc.).

Sectoral Strategy and Costed Strategic Options for the GoSindh and GoBalochistan

Like the previous year's floods, the 2011 floods provide the government with a strong opportunity to revamp and reform its existing health sector and build a better performing sector. To increase sector performance, the provincial governments may continue introducing innovative measures such as public-private partnerships, out-contracting of services and others. An imperative prerogative for the provincial DOH is to lead an efficient disaster preparedness and response which will require a detailed district master plan (for each district) with the participation and commitment of federal, provincial and district health authorities with the NDMA, PDMA and humanitarian cluster lead agencies.

The recovery strategy will have a short term, which is in addition to the plan developed by humanitarian agencies for early recovery, and a long term component. Based on service availability mapping, priority should be given to minimal coverage of essential health services (PHC, EmOC, and response to disease outbreak) to flood-affected communities, while taking into account recovery of other sectors complementing to care provision and accessibility (water, electricity, roads, etc). The estimated cost for activities to be undertaken under the short-term plan has been worked out as US$ 10.2 million. In the medium term a comprehensive health sector revitalization strategy should encompass a strategy aiming at the provision of minimum standards for health care, based on the key principles of *equitable access to essential health care, timeliness, results, and accountability*.

Short Term Measures (up to 12 months)

These measures will address the urgent needs for flood-affected communities, by sustaining and improving the functionality of an essential health care provision with alternative interventions (mobile team, mass vaccination, minimal rehabilitation). Due to budgetary constraints during the emergency situation budgetary support is needed for the continuation of services to the flood-affected population. Measures need to be taken to prepare for the smooth transition from short term to medium and long term strategies, which should include:

Continuation of quality PHC service delivery to affected populations, including those with special needs. The DoH, assisted by adequate support from UN agencies and NGOs should ensure service delivery in the areas of

- PHC services, including ANC, MCH, EPI and basic curative and preventive care services to the affected population. This includes also supplementation with micro-nutrients such as Vitamin A, oral re-hydration salts and zinc supplements. Other services to be established and/or strengthened include alternative PHC provision system (mobile and temporarily health structure) with a functional referral system for emergency services (EmONC), surgical services for critical health condition, DEWS, DHIS data collation and analysis.
- *Post-crisis epidemiological situation:* During the week of 28 October to 3 November 2011, a total of 379,536 patient consultations were reported to the disease early warning system (DEWS) by the mobile health centers established in the affected areas. The major causes for seeking health care were upper respiratory tract infections (19%), skin diseases (13%), suspected malaria (13%), acute diarrhea (8%), and lower respiratory tract infections (6%); representing 59% of the BOD. Twenty percent of the total BOD account for reproductive health problems (maternal and peri-natal mortality and disability), and about 6% for nutritional deficiencies, particularly micronutrient related. Since the beginning of the flood, all epidemic prone diseases are being closely monitored. Besides curative services, preventive and health promotional services are being provided to affected communities to mitigate risks. However, the disease surveillance system would require further strengthening.
- *District health planning based on service availability mapping and vulnerability Assessment of health facilities.* DoHs need to perform detailed needs assessments and mapping by district to assess health facility vulnerability/feasibility in terms of population movement, and functional status/utilization pattern of the existing facilities and the emerging health situation. In this context also the disease surveillance system should be improved or where necessary it should be introduced. To enable the DoHs to effectively accomplish this task, physical resources and equipment provided by relief organizations need to be coordinated with and later handed over and integrated into the existing PHC system.
- *Establishment of Emergency Response Cells (ERC).* DoHs need to establish/strengthen the ERCs to timely plan, coordinate and manage health service delivery for the post disaster period and be prepared for the recovery and rehabilitation phase for the current and future disasters.
- *Human Resources planning and management.* Dislocated staff and service providers need to be encouraged with appropriate incentives to relocate or to return to their original place of services. At the same time healthcare workers need to be assisted in coping with the extremely stressful working environment, which they are subjected to during the relief and recovery period.

Medium to Long Term Measures (12 – 36 months)

In the medium to long term, affected health facilities at all levels will need to be reconstructed/rehabilitated and re-equipped.

- *Reconstruction and reequipping of health facilities.* Keeping in view the pre-flood utilization rates and vulnerability to natural hazards of the damaged facilities, a detailed damage assessment with financial analysis needs to be undertaken to facilitate decision for repairing, reconstructing, or relocating the facilities. The DoHs need to restructure provision and delivery of PHC services through BHUs and RHCs, introducing agreed package of basic health services, including minimum quality care standards and addressing key principles of equity, accessibility to care, timeliness and accountability.

- *Strengthening of health system management:* At district level, the build up of the low health management system is essential, through technical assistance, in-service training, and introducing performance based incentives to staff for effective implementation.
- *Assessing alternative models of health care financing and service delivery:* DoH also need to look into other possibilities of support for field operations in the health facilities as due to budgetary limitations there is a severe strain on the system which hinders its capacity to absorb even minor emergencies let alone a major one like the current floods.
- *Application of DNA Cross Cutting Principles in Development of Sectoral Strategies*: Maternal and child health care constitutes almost 70% (ante, peri and post natal care, safe motherhood, reproductive health, vaccination, nutrition, etc.) of the primary health care package designed for all first level care facilities (FLCF). Still 80% of deliveries are home-based and are performed by traditional birth attendants. The already high maternal mortality ratio (ranging from 238 in Punjab to 856 women in Balochistan dying per 100,000 live births) may increase due to lack of access to obstetric care following the damages to health facilities. While Pakistani government and NGOs have sent female health workers in the camps, their numbers are not sufficient to meet the enormous demand. Due to the cut off from supply of contraceptives, a wave of unwanted pregnancies with all the ensuing complications is certain. Destruction of district and rural roads limits access for women already suffering from mobility constraints to health care. With limited road access, transportation costs increase, reducing the probability of families sending their female family members to health facilities. Thus pre-natal, post-natal check up and deliveries in health facilities will most likely decrease from an already low baseline. Women doctors might return later in the recovery period than male doctors to rural health facilities, which will render it impossible for women to consult a physician (due to the prevailing culture for women only to consult women doctors). This void in women's health service coverage jeopardizes achievements made so far, i.e. to promote health-facility-based or home based deliveries attended by a medical professional. With increasing financial constraints due to the loss of assets during the flood, less household expenses will be spent on health care, meaning that women, children and the elderly as the most vulnerable population groups will suffer most. In this context it is also essential to combat the already precarious nutrition situation in children by supplying in particular micro-nutrients. Also the establishment of a nutrition surveillance system to strengthen the existing nutrition information system needs to be addressed. Cooperation with the private sector as an important provider of nutrients and micro-nutrients should be intensified.
- *Common Elements of Recovery Strategies Across Provinces:* Emergency preparedness and response capacity of the health sector at all levels has been very low and require urgent and sustained strengthening at all levels. ERC need to coordinate the relief and recovery strategies across provinces. Hazard resistant health care facilities should be built on priority in all affected areas based on mapping and vulnerability assessments.
- *Existing Risks and Challenges to Health Sector Development:* Poor overall governance of the health sector, a weak and inefficient physical and functional structure of public health facilities aggravate severely the consequences of disaster related damages. The lack of quality services provision, insufficient funding and the absence of a functional emergency response system contribute significantly to the aggravation of the incurred damages. To ensure acceptable health service delivery during and after the emergency, an improved human resources management and distribution, an efficient and transparent financial management and a well coordinated and functional disaster response mechanism are mandatory.

Needs Estimation of Recovery and Reconstruction

Short-Term: From humanitarian response toward an integrated recovery and rehabilitation (PKR 826 million [US$ 9.4 million])

In the aftermath of the flood, interventions were aiming at saving life through a range of activities. The WHO has prepared a plan for the early recovery phase (12 months) which is being implemented in collaboration with the provincial and the district health authorities in the affected districts. In order to integrate WHO's early recovery activities with the health sector's overall rehabilitation, a short-term recovery framework at a cost of US$9.4 million (see below under section 'F' of this report) needs to be implemented. This integration effort will take into account the unequal and inequitable pre-crisis health facility coverage, the post-crisis deterioration of the health system, the flood related public health threats, and the return modality and pattern.

Medium/Long-Term: From integrated recovery/Rehabilitation to Reconstruction (PKR 863.7 million [$9.8 million])

Total reconstruction cost estimates for the fully and partially damaged health facilities have been worked out as PRs 863.7 million (US$ 9.8 m) based on the scheduled rate per square foot of covered area plus 15% as price escalation factor and 10% for external development. The total base cost so computed was then applied to the size of different types of damaged health facilities, which were provided to the Health Sector Team by the respective governments. Additional 10% cost for seismic/flood proofing and 15% for equipment and furniture were also added to the total cost of a damaged facility to come up with the replacement cost of each damaged facility. The partial damage to health facilities was not uniform as the damage ranged from 1% to 40%, which was therefore averaged out to 25%. The cost for repair/renovation of partly damaged facilities was thus calculated as 25% of the total replacement cost. The damage quantification does not include: (i) private health facilities because of unavailability of data, (ii) population welfare facilities as majority of them were in rented houses (1-2 rooms) without expensive equipment/furniture, and (iii) again because of unavailability of data, the indirect losses due to expenditure on treatment of survivors and additional costs on public health interventions; and inability to provide services, etc. The detailed working of the costs of direct damages by province is given in the table below.

Table-Annex 9.4: Estimates of Book Value of Damaged Health Facilities and their Replacement Costs

Facility Type	Average covered area (Sft)	Number of facilities damaged		Cost per Facility[1] (Million PRs)		Total Cost Estimates of damaged facilities (M/PRs)	
		Fully damaged	Partially damaged	Fully damaged	Partially damaged[2]	Fully damaged	Partially damaged
Sindh (Base rate PRs1200/sft (inclusive of 15% price escalation and 10% external dev) + 25% of base rate = PRs 1500/sft)							
DHQ Hospital	50,000	0	6	00	18.750	00	112.5
THQ Hospital	31,000	1	15	46.5	11.6	46.5	174.0
RHC	15,000	3	34	22.5	5.6	67.5	191.2

Dispensary/MCH	1350	7	79	2.0	0.5	14.1	40.0
Office/Institute	3,000	0	5	00	1.1	00	5.6
Total						**132.9**	**676.8**
Total Replacement Cost for Sindh							**PRs 809.7 m**
@ PRs 88 = US $1							**$ 9.2 m**
Total Book Value of Damaged Facilities in Sindh							**PRs 404.85 m = US$4.6 m**
Balochistan (Base rate PRs1200/sft (inclusive of 15% premium and 10% external dev) + 25% of base rate = PRs 1500/sft)							
DHQ Hospital	31,000	0	1	00	11.6	00	11.6
THQ Hospital	20,000	0	0	00	00	00	00
RHC	7,909	1	0	11.9	00	11.9	00
BHU	1,533	6	2	2.3	0.5	13.8	1.0
Dispensary/MCH	925	6	8	1.4	0.3	8.4	2.8
Office/Residence	3,000	0	4	00	1.1	00	4.5
Total						**34.1**	**19.9**
Total Replacement Cost for Balochistan							**PRs54.0 m**
@ PRs88 = US $1							**$0.6 m**
Total Book Value of Damaged Facilities in Balochistan							**PRs 27 m = US$0.3 m**
Sindh and Balochistan							
Grand Total of Replacement Cost							**PRs 863.7 m**
Grand Total							**US $ 9.8 m**
Grand Total of Book Value of Damaged Facilities for Pakistan							**PRs 431.85 m = US$4.9 m**

[1]/ The base cost is inclusive of 15% price escalation factor and 10% for external development. On the top of base cost 10% has been added as earthquake/flood proofing factor and 15% for equipment and furniture.

[2]/ The cost of partially damaged has been calculated as 25% of the cost of fully damaged facility since the damage caused by rains/flood was marginal. The dalipidated condition of health facilities was mainly because of neglect/deferred maintenance, and very little blame could be put on rains and flood.

[3]/ The book value has been calculated as 50% of the replacement cost assuming average life of all health facilities as older than 15 years.

Prioritized Health Sector Recovery Framework / Timeframe

Activity	Short-term / 12 months	Medium- and Long-term
DoH resumes PHC services as early as possible primarily through Emergency Relief Health Services to : address immediate health care needs of the affected population; and ▪ response to disease outbreaks ▪ prepare for early recovery	MCH services – currently delivered by Relief Organizations be extended to assist DoH to ensure continuity of: pre-natal, delivery and post-natal care, and EPI coverage expanded to prevent CD outbreaks DoH takes over PHC services to deliver routine MCH and basic curative and preventive care services including psychosocial care of affected people; and DEWS, and DHIS data collation and analysis. Diarrhea/cholera treatment centers ***Budgetary support needed*** ***[Est. PRs 800 m (US$ 9 m) over 1 year (PRs 50 million for each affected district)]***	PHC services with MCH as its intergral part, to be delivered by BHUs and RHCs and (ii) secondary care services to be provided by THQ/DHQ hospitals. DoH to restructure provision & delivery of PHC services to ensure (i) minimum standards for quality care and (ii) respond to key principles of equity, accessibility to essential care, timeliness, results and accountability (focusing on MCH services). Also strengthen response to any disease outbreak.
DoH works on affected health infrastructure ▪ damage assessment and utilization profile ▪ Service availability mapping to fill accessibility gap ▪ district health planning for facility (re)location ▪ rehabilitation and reconstruction of facility type ▪ hazard-resistant building code	Provide and deliver health care services [< 6mths] through currently in place emergency set up e.g. medical camps, mobile teams and static clinics in safe and accessible locations near to either existing facilities or where affected population is concentrated. Assess facility damages and utilization before allocating facilities to either: repair/ renovation/ rehabilitation or full reconstruction in accordance with requirements for hazard-resistant building code. ***TA needed*** ***[Est. included in TA estimate below]***	District and provincial plan based on service availability mapping and return pattern. For affected facilities provide and deliver health care services in the (i) medium-term (< 3 years) through semi-permanent structures e.g. pre-fabricated BHUs and RHCs; and (ii) longer term (> 3 years) through reconstruction of nominated facilities to required service standards. Standard floor plans and facility designs ensuring facility and equipment meet prescribed quality service standards.
DoH acquires physical resources and equipment for continuing services and operating facilities	Relief Organizations will leave behind physical resources and equipment upon their departure. EDOs/DHOs to ensure that handover of physical resources and equipment from partner organizations be kept functional through adequate maintenance and provision of operational costs; and registered on official assets list for functional maintenance and end-of-life replacement (as for routine government assets)	Reconstructed (including refurbished) facilities will be re-equipped as per the *service package* to be delivered from the targeted facility. Standard equipment packages are available for equipping various types of facilities to ensure equipment meets the prescribed standards for quality services delivery. ***Funds needed for (re)construction/ refurbishment of facilities/eequipment*** ***[Est. PRs 863.7 m (US $9.8 m]***
DoH improves health services management functions and supply systems and set up a financing system based to avoid financial barrier to	DoH must take on coordination of relief organizations health programs and must allocate services to priority health need areas. An emergency response cell (ERC) needs to	In the medium-term , the ERC/HEPR should develop a framework outlining appropriate strategies and timeframe for relief agencies to phase out by ensuring services are smoothly handed over to, sustained and operated by government service providers; and build-up

health care	manage health services delivery, ensure continuity of supplies and prepare system for early recovery. Humanitarian response should be free ***TA needed*** ***[Est. PRs10 m (US $0.11 m)- PRs5 m for each province)]***	service coverage of resettled population in the longer term. Measures for improving good governance, responsibility and accountability should be taken. Ensure that vulnerable population will continue to have free access while recovering from flood with transitional measures.
DoH builds up staffing and develops capacity of service providers to deliver health services to the required standards	Staff and service providers may have been relocated with families to safer places. In the short term relocated staff including LHWs could be enticed to return to resume services using incentives e.g. hardship and/or performance remuneration, provision of safe staff accommodation, skills upgrade through in-service training leading to improved career prospects. Skills upgrade linked to in-service to deliver services, in particular MCH, at the required quality standards. ***Budget support*** ***[Est. PRs 16 m (US $0.18 m (PRs 1 m for each affected district)]***	In the medium-term a *package of basic PHC services* needs to be ratified and adopted for PHC services outlining in detail: types and scope of basic services to be delivered by different levels of health facilities; staffing and equipment required to deliver health care services to the required quality standards; and medicines and operational costs including maintenance and asset replacement costs. In the longer-term prescribed *quality standards* will require facilities and providers to be licensed and accredited to ensure adequate clinical resolutions and to meet patient safety standards and satisfaction.
DoH seizes opportunity to redevelop and/or strengthen health system performance	Initiate Clean-Up activities immediately to enable health services to be restored quickly to ensure continuity of PHC/MCH services. Identify affected facilities and assess damages in relation to how quickly they could be made operational again. Prioritize facilities for rehabilitation schedule – seizing opportunity to (i) introduce rational planning for health services delivery sites and types; and (ii) require collation of health information data (DHIS) ***TA needed [Est. included in TA above]***	Adopt medium-term strategy of health services quality improvement to ensure patient safety by rehabilitating infrastructure for services delivery as well as staff accommodation to entice health staff to return to their posts; ensure quality standards in services provision and delivery; build capacity of health managers and providers to restore health services in a post-disaster response context. ***TA needed*** ***[Est. included in budget support]***
DoH to develop a disaster preparedness plans based on lesson learnt and make provisional budget for response	Build capacity of MoH and local partners during humanitarian interventions and contribute in the lesson leant process for a better preparedness. ***TA needed [Est. included in TA above]***	Develop a comprehensive disaster preparedness plan with contingency plans and defined standard operating procedure. ***TA needed [Est. included in TA above]***
Total (US $)	**US $ 9.4 million**	**US $ 9.8 million**
Total (PKR)	**PKR 826.0 million**	**PKR 863.7 million**

Annex 10: Housing

Sector Background

State of Sector Prior to Disaster

The 2011 floods impacted private housing more than most sectors due to it predominantly being of *katcha* construction type. A typical affected house in the disaster-affected area in rural Sindh and Balochistan consists of one or two rooms, an animal shed, storage silos for grain, space for open cooking, and a latrine and washing area which are generally without roof, with 4-5 feet high walls. The average size of a housing unit varies, between an average of 1.76 rooms (381 sq. ft.) in Sindh (including urban areas) and 2.24 rooms (485 sq. ft.) in Balochistan, and an average household comprising 6.0 persons in Sindh and 6.7 in Balochistan. Most of the affected houses are of *Katcha* (non/semi-permanent)[1] type construction, which is the predominant type in rural areas[2]. *Pucca* (permanent) type construction is found in some rural and most urban affected areas. Virtually none of the houses in the affected areas had been designed for flood-resistance.

Baseline Housing Stock

The pre-flood baseline housing stock for the **affected districts** has been estimated by applying district-wise inter-censal (1981-1998) housing growth rates to the housing stock as reported in the 1998 Census Reports. In the case of Sindh however, application of the district/tehsil-wise population growth rate was deemed more appropriate. The baselines so developed were disaggregated into katcha and pucca categories using the district-level katcha/pucca housing proportion also inferred from the 1998 Census.

According to the estimated baselines, there were **4.128 million** housing units in the 22 flood-affected districts in Sindh and Balochistan. Of these, 1.08 million units were pucca (26%) while 3.05 million units (74%) were katcha. This proportion varies greatly across and within the two provinces, with 90% katcha prevalence in affected districts of Balochistan and 74% in affected districts of Sindh. Moreover, a part of this housing stock is exposed to risks of recurrent natural disasters making *one-solution-fits-all* reconstruction inappropriate, or unnecessarily costly if risk resistant standards are to be adopted across the board. This alludes to the need for differential and localized (district-level) housing reconstruction solutions.

Table-Annex 10.1: Baseline Housing Stock in Flood-Affected Districts

District	Type of Construction		**Total**	% Katcha	% Pucca
	Katcha	Pucca			
Sindh (Affected Districts)					
Badin	229,201	44,249	**273,450**	84%	16%

[1] This predominantly includes Jhumpari (grass cottage, built with twigs woven around vertical posts with mud %30plaster), mud houses adobe block or brick construction, and fired brick with mud mortar construction types for Sindh. In Balochistan, Katcha houses generally consist of mud houses.

[2] Mud house is generally of uncompacted earth lumps stacked to make walls. These may be augmented by:

- Brick masonry up to two to three feet and mud walls above;
- Stone masonry up to two to three feet and mud walls above;
- Brick masonry up to two to three feet with the addition of plastic sheeting at the plinth level;
- Use of fired bricks on the inner and outer face and core of mud in it.

Dadu	220,961	55,897	**276,858**	80%	20%
Ghotki	177,064	75,564	**252,628**	70%	30%
Hyderabad	53,450	230,606	**284,056**	19%	81%
Jamshoro	80,962	55,134	**136,096**	59%	41%
Khairpur	272,502	72,687	**345,189**	79%	21%
Larkana	184,672	54,372	**239,044**	77%	23%
Matiari	80,626	39,525	**120,151**	67%	33%
Mirpur Khas	137,638	62,559	**200,197**	69%	31%
Naushero Feroze	178,941	48,393	**227,334**	79%	21%
Sanghar	245,590	95,080	**340,671**	72%	28%
Shaheed Benazirabad	157,769	57,370	**215,139**	73%	27%
Tando Allahyar	119,449	42,049	**161,498**	74%	26%
Tando Mohammad Khan	115,552	37,033	**152,584**	76%	24%
Thatta	237,059	47,665	**284,724**	83%	17%
Tharparkar	213,340	16,192	**229,532**	93%	7%
Umerkot	151,755	22,744	**174,499**	87%	13%
Sindh (Affected Districts) Total	**2,856,529**	**1,057,119**	**3,913,649**	**73%**	**27%**
			Balochistan (Affected Districts)		
Jaffarabad	76,491	7,477	83,968	91%	9%
Kalat	36,811	999	37,810	97%	3%
Killa Abdullah	68,285	4,303	72,589	94%	6%
Lasbela	52,833	15,706	68,539	77%	23%
Nasirabad	54,783	3,194	57,977	94%	6%
Balochistan (Affected Districts) Total	**289,202**	**31,680**	**320,883**	**90%**	**10%**
Affected Area Total	**3,048,047**	**1,080,574**	**4,128,621**	**74%**	**26%**

Note: Baselines have been calculated by projecting Housing Stock values in 1998 Population Census, for affected tehsils only, to the year 2011 using inter-censal (1981-98) population growth rates in case of Sindh and housing stock growth rates in case of Balochistan.

Damage Overview

The floods caused total or partial damage to an estimated **999,388** housing units in Sindh and Balochistan. An estimated **514,283** houses have been completely destroyed[1] and another **484,093** have suffered partial damage[2]. This translates into 99% of the total affected housing stock being in Sindh.

Characteristics of Damage to Katcha and Pucca Houses

As expected, the extent of damage incurred to katcha houses is far higher with 29% of the katcha pre-flood housing stock affected (903,000 housing units), with 495,000 housing units completely destroyed. By contrast, only 7% of pucca pre-flood housing stock (96,000 housing units) has suffered damage, with about 19,000 being completely destroyed. In general, pucca houses have performed better but have still been vulnerable to collapsing of roofs, undermining of foundations, and scouring/erosion at the base of walls and corners. Furthermore, standing water has subjected submerged portions of walls to hydraulic pressure, often causing walls to overturn or tilt laterally . At places subsidence of the ground under water-logged foundations has resulted in cracking and collapse of walls. For katcha buildings, the impact has often been extreme and irreversible.

Table-Annex 10.2: Consolidated Damage Details (number of houses)

District	Katcha			Pucca			Total CD	Total PD	District Total	% of Pre-flood stock
	CD	PD	Total	CD	PD	Total				
Sindh										
Badin*	55,195	57,725	112,920	1,914	12,747	14,660	57,108	70,471	127,580	47%
Dadu*	4,782	7,960	12,742	706	2,278	3,929	5,488	10,238	16,671	6%
Ghotki*	4,577	0	4,577	0	680	680	4,577	680	5,257	2%
Hyderabad*	6,951	8,869	15,820	0	5,352	5,352	6,951	14,220	21,171	7%
Jamshoro*	12,457	20,828	33,285	765	5,265	6,030	13,222	26,093	39,315	29%
Khairpur*	11,553	17,470	29,023	26	837	863	11,579	18,307	29,886	9%
Larkana*	56	3,072	3,128	0	0	0	56	3,072	3,128	1%
Matiari*	4,857	14,555	19,412	0	0	0	4,857	14,555	19,412	16%
Mirpur Khas	69,881	22,424	92,305	624	3,262	3,886	70,505	25,686	96,191	48%
Naushero Feroze*	5,773	26,025	31,798	395	1,255	1,650	6,168	27,280	33,448	15%

[1] This primarily includes completely washed away, fully collapsed, or structurally damaged houses with foundation failure or erosion of supporting walls

[2] This mostly includes cases of roof damage and repairable damage to walls, etc.

Sanghar	59.4	31.7	91.1	29.5	7.4	128.0	2.6	10.3	12.84
Shd. Benazirabad	62.2	39.5	101.6	31.8	7.7	141.1	2.8	10.6	13.41
Tando Allahyar	25.0	9.3	34.4	11.2	2.8	48.3	1.0	3.9	4.92
Tando M. Khan	20.5	3.2	23.7	8.3	2.2	34.1	0.7	3.3	3.98
Thatta	0.1	0.2	0.3	0.1	0.0	0.4	0.0	0.0	0.03
Tharparkar	51.1	20.6	71.6	24.3	6.3	102.2	2.1	9.1	11.15
Umerkot	64.3	6.4	70.8	24.4	6.2	101.4	2.0	9.6	11.61
Sindh Total	**431.5**	**195.6**	**627.0**	**206.4**	**52.1**	**885.5**	**17.9**	**74.2**	**92.07**
Balochistan									
Jaffarabad	0.5	0.7	1.2	0.3	0.1	1.6	0.0	0.1	0.14
Kalat	1.0	0.6	1.6	0.4	0.1	2.2	0.0	0.2	0.21
Killa Abdullah	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Lasbela	0.2	0.3	0.5	0.1	0.0	0.6	0.0	0.0	0.06
Nasirabad	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Balochistan Total	**1.8**	**1.5**	**3.2**	**0.9**	**0.2**	**4.3**	**0.1**	**0.3**	**0.41**
Grand Total	**433.2**	**197.1**	**630.3**	**207.3**	**52.3**	**889.9**	**18.0**	**74.5**	**92.5**

CD = Completely Destroyed; PD = Partially Damaged

* Some Tehsils within these districts were affected by the 2010 floods as well.

Means of Validation

Validation through Plausibility Checks and Statistical Analysis

Primary data on damage to housing stock from Sindh and Balochistan was initially analysed using various statistical techniques for quantitative and qualitative rationalization. Statistical techniques employed to rationalize the data made available by the government and to ensure internal consistency included: (a) comparison of damage figures reported for each affected tehsil with the baseline housing stock (see table above), in terms of katcha and pucca categories, as well as the overall housing stock; (b) analysis of reported damage figures for katcha housing stock within a tehsil with the corresponding damage numbers for pucca houses within the same tehsil and vice versa; (c) iterative plausibility checks aimed at the identification and subsequent normalization of salient damage characteristics (number of affected katcha houses vs. number of affected pucca houses, number of katcha houses completely destroyed vs. number of pucca houses

houses within the same tehsil and vice versa; (c) iterative plausibility checks aimed at the identification and subsequent normalization of salient damage characteristics (number of affected katcha houses vs. number of affected pucca houses, number of katcha houses completely destroyed vs. number of pucca houses completely destroyed, number of pucca houses completely destroyed vs. number of pucca houses partially damaged, et al.) reported for katcha and pucca houses that had been reported as partially damaged or completely destroyed within a tehsil; and (d) cross comparisons amongst the scale and profile of damages reported for a tehsil vis-à-vis other similarly affected tehsils from the same as well as other districts to identify damage normalization coefficients, wherever needed.

Validation through comparison with other sources of data

While data provided by government agencies represented the primary source of data utilized for the current exercise, other sources of primary data available were utilized for counter-analytic and cross-comparison purposes such as the damage estimates for United Nations Inter-Agency Shelter Cluster report, based on primary data collected during field assessments by agencies such as the World Food Program, the Temporary Settlement Support Unit, National Rural Support Program, and other NGOs. These sources were particularly useful for identification of the scale and characteristics of damage within each district in Sindh. In addition, damage figures for the health sector were also consulted, particularly as a basis for comparison with the tehsil-wise damages reported to pucca housing stock.

Validation through Remote-Sensing Data

Satellite imagery-based information developed by SUPARCO for the FAO was used to analyse area inundated within each district. Moreover, data from such sources as UNOSAT, German Remote Sensing Data Center, and iMMAP was used to identify the duration and characteristics of inundation for affected areas. These data sets have been used to validate and rationalize damage estimates on a district, and in some cases tehsil/taluka, level - particularly in the case of Sindh.

Risks in Quantification due to housing damages from 2010 Floods

As shown in Table 10.2 above, part of the housing stock in 12 of the 17 districts affected by the 2011 floods was also affected during the floods of 2010. The scale of flooding and therefore damages has varied within the districts and sub-district administrative units between the two flood events. However, there is a high risk that some housing stock damaged in the 2010 floods but not reconstructed or repaired to date, may have been double counted during the current assessment of housing damages due to the 2011 floods. This risk is further compounded by the fact that no detailed housing damage assessment survey was undertaken in the intervening period, or any comprehensive housing reconstruction programs initiated after the 2010 floods.

In order to quantify this risk, a detailed analysis has been undertaken by the DNA Housing team to determine: (a) the districts and tehsils affected by 2010 as well as 2011 floods; and (b) the total housing stock within the districts and tehsils affected in both years. A comparison of the corresponding numbers of affected housing stock at the district and tehsil level has been used to compute the total number of houses which are at risk of being double-counted in the current assessment. The results from these analyses show that a total of approximately 118,700 housing units situated within the tehsils[1] affected in both 2010 and 2011 are at the risk of being double counted. This represents about **11.95%** of the total housing stock affected by the 2011 floods.

[1] Tehsils affected in both 2010 and 2011 floods: Badin, Dadu, Mehar, Khairpur Nathan Shah, Johi, Ubauro, Daharki, Hyderabad City, Latifabad, Hyderabad Rural, Qasimabad, Kotri, Sehwan Sharif, Khairpur, Gambat, Kotdiji, Kingri, Larkano, Ratodero, Dokri, Matiari, Hala, Naushero.Feroze, Moro, Kandiaro, Sanghar, Nawabshah, Sakrand, and Thatta.

Damage and Loss Quantification

Direct Damage Estimate

The term 'Damage' refers to the loss in depreciated monetary value due to structural damage to the housing stock caused by the disaster. The damage costs for a typical house vary depending upon the severity of damage, size of house, type of construction, and the age of the housing unit. A detailed model was developed for the assessment - using differential rates for pucca and katcha housing types. This model helped estimate the average unit reconstruction cost for each area. Based on the 1998 Census data, the average number of rooms in a typical house, averaged across all districts in each province, has been used to calculate average unit size for each province. The cost of a typical katcha and pucca house has been estimated using construction costs collected from field visits by the DNA team, as well as desk estimates. Reconstruction of a katcha house to pre-flood standards is estimated to cost PKR 230 per sq. ft and a pucca one at PKR 650 per sq. ft.

Damages to partially damaged houses, considered repairable, are assumed to be 40 percent of damages to an equivalent completely destroyed house. Furthermore, depreciation factors have been determined for each province/region using Census 1998 data on average age of housing units. Two additional categories have been added to calculate total damage to housing infrastructure and assets. These are specific for housing assets and include: (a) damage to household goods and assets estimated as a proportion (15%) of the value of housing unit as well as the estimated value of lost appliances based on the available statistics[1]; and (b) estimated damage to household water and sanitation facilities based on representative data[2].

Using the above model, the direct damages (depreciated) costs for partially damaged houses is estimated at US$ 197.1 million, and for completely destroyed houses at US$ 433.2 million, giving a total direct damage cost of US$ 630.3 million. Damages to housing assets (depreciated) include: (a) US$ 207.3 million in household goods and assets, US$ 52.3 million in water and sanitation facilities, with a total of US$ 259.6 million. Adding up the two categories of infrastructure and assets, the total housing sector damage (depreciated) is estimated at US$ 889.9 million.

Loss Estimate

The value of losses including costs of debris removal and provision of temporary shelter, as prescribed by the UN-ECLAC methodology have also been calculated. The cumulative value of indirect housing sector losses is estimated at US$ 92.5 million, including US$ 18.0 million for demolition and debris removal; and US$ 74.5 million for provision of temporary shelter.

Table-Annex 10.3: Depreciated Value of Housing Sector Damage and Losses (US$ million)

District	Value of Housing Stock (Direct Damages)						Indirect Losses		
	CD	PD	Total Damage	HH Goods and Assets	WATSAN infrastructure	Total Housing Damage	Debris Removal Costs	Temporary Shelter Costs	Total Damage & Loss

[1] Census of Electricity 2005-06
[2] Pakistan Social and Living-Standard Measurement (PSLM) Survey 2006-7

Sindh									
Badin	47.8	29.6	77.4	25.1	6.3	108.9	2.2	8.8	11.01
Dadu	5.3	4.5	9.9	3.0	0.7	13.6	0.3	1.0	1.23
Ghotki	3.6	0.6	4.2	1.4	0.4	6.0	0.1	0.5	0.67
Hyderabad	5.5	7.6	13.1	4.0	1.0	18.0	0.4	1.3	1.61
Jamshoro	11.5	11.3	22.8	7.2	1.8	31.7	0.6	2.3	2.99
Khairpur	9.2	6.3	15.4	5.2	1.4	22.0	0.4	1.9	2.36
Larkana	0.0	1.0	1.0	0.3	0.1	1.4	0.0	0.1	0.13
Matiari	3.8	4.6	8.4	2.9	0.8	12.1	0.2	1.0	1.27
Mirpur Khas	56.5	10.0	66.5	22.9	5.9	95.3	1.9	8.9	10.85
Naushero Feroze	5.4	9.3	14.8	4.8	1.3	20.8	0.4	1.6	2.00
Sanghar	59.4	31.7	91.1	29.5	7.4	128.0	2.6	10.3	12.84
Shd. Benazirabad	62.2	39.5	101.6	31.8	7.7	141.1	2.8	10.6	13.41
Tando Allahyar	25.0	9.3	34.4	11.2	2.8	48.3	1.0	3.9	4.92
Tando M. Khan	20.5	3.2	23.7	8.3	2.2	34.1	0.7	3.3	3.98
Thatta	0.1	0.2	0.3	0.1	0.0	0.4	0.0	0.0	0.03
Tharparkar	51.1	20.6	71.6	24.3	6.3	102.2	2.1	9.1	11.15
Umerkot	64.3	6.4	70.8	24.4	6.2	101.4	2.0	9.6	11.61
Sindh Total	**431.5**	**195.6**	**627.0**	**206.4**	**52.1**	**885.5**	**17.9**	**74.2**	**92.07**
Balochistan									
Jaffarabad	0.5	0.7	1.2	0.3	0.1	1.6	0.0	0.1	0.14
Kalat	1.0	0.6	1.6	0.4	0.1	2.2	0.0	0.2	0.21
Killa Abdullah	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Lasbela	0.2	0.3	0.5	0.1	0.0	0.6	0.0	0.0	0.06
Nasirabad	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00

Balochistan Total	**1.8**	**1.5**	**3.2**	**0.9**	**0.2**	**4.3**	**0.1**	**0.3**	**0.41**
Grand Total	**433.2**	**197.1**	**630.3**	**207.3**	**52.3**	**889.9**	**18.0**	**74.5**	**92.5**

CD = Completely Destroyed; PD = Partially Damaged

Proposed Housing Recovery and Reconstruction Strategy

The suggested recovery and reconstruction strategy comprises a variety of activities to assist households to be re-housed in permanent housing. The predominant form of suggested assistance is cash grants for owner-driven rebuilding – a mode well suited to the predominantly rural affectees, and already being used by the government for immediate assistance. This would be responsive to individual preferences and maximize household ownership thereby keeping expectations of, and demands on, government realistic. It would mobilize self-standing reconstruction and rehabilitation efforts primarily at the level of the affected households, thereby not burdening government administrative capacity with a large volume of contract management. The objective of the reconstruction grant would be to replace a destroyed house with a *new core unit,* preferably of flood-resistant standards. A repair grant would help restore structurally damaged portions of houses to a livable state.

Urgent attention to beneficiary identification and eligibility verification is required, to ensure transparency. The strategy also recognizes the need for extended-term intermediate sheltering options for households that will need to be relocated from areas that are severely hazard-prone, or at a risk of recurrent flooding. Although permanent relocation will require time, replacement site identification and re-planning are short-term priorities. Priority also needs to be given to zoning of the affected area for recurrent hazard risks, to enable application of appropriate engineering design solutions. The post-earthquake housing reconstruction program, substantially implemented over 2006-09, achieved impressive results and provides valuable lessons and the strategic underpinnings for developing a post-floods housing reconstruction program, with appropriate adjustments.

Proposed policy principles

1. Ensure rebuilding is owner-driven.
2. Rebuild in-situ as far as possible, but relocate settlements away from recurrent risk areas.
3. Offer equitable assistance package for a core unit that is not compensation-based, but is differential based on applicable natural hazard risks.
4. Adopt and promote use of cost-effective, hazard-resistant engineering designs and reconstruction standards.
5. Rebuild with easily accessible materials reflecting cultural preferences.
6. Ensure consistency of policy principles & strategies across provinces, and centrally coordinated policy framework, monitoring, and standards for equity.
7. Route housing grant disbursements through the provinces.

1. Undertake detailed Damage Assessment and Eligibility Verification survey based on uniform technical criteria to ensure consistency across affected areas.
2. Require uniformity of implementation approach across funding sources/partner organizations.
3. Sign MOUs with beneficiaries to ensure judicious use of grants (for the purposes intended) & adherence to applicable hazard resistant standards.
4. Require assisted, inspected, and certified tranche-based disbursement of reconstruction assistance linked to stages of construction, and adoption of applicable hazard-resistant standards.
5. Ensure consistency & complementarity between early recovery & permanent housing solutions.
6. Establish participatory and inclusive information management and grievance redressal systems.

Costed Strategic Options

Since parts of the affected area are prone to recurrent flood risks, reconstruction of houses should be based on appropriate cost-effective, flood-resistant engineering standards as far as possible. While this approach will increase initial costs of reconstruction to some extent, it will constitute the most economically efficient solution when viewed over the full useful life of these investments.

Locations vulnerable to recurrent flooding have been identified using historical evidence and recorded damage figures. A number of districts including Badin, Hyderabad, and Thatta have been affected during flood emergencies in 2003, 2010, and 2011. In particular, the floods in 2003 closely resembled the current situation since they were also caused by unusually heavy rainfall over the lower Sindh region, and witnessed breaches along the Left Bank Outfall Drain (LBOD). Badin and Thatta being located along the coastal belt are also susceptible to cyclones and typhoon hazards. Thus adoption of hazard-resistant construction standards is strongly recommended for restoration of the damaged housing stock in these districts.

Estimated Needs for Permanent Housing Reconstruction

The reconstruction and repair needs for Housing have been calculated for the two options explained below. They range between US$ 986 million and US$ 1.04 billion. These estimates are based on replacement of a destroyed house with a core unit of 500 sq.ft covered area, calculated on the basis of currently prevailing prices of materials and labor.

Table-Annex 10.4: Housing: Summary of Reconstruction Cost Options

Reconstruction Options	Pros and Cons	Reconstruction / Repair Costs (US$ mill)
Option-1 (Base Case Scenario): **Uniform Subsidy** calculated on the basis of a katcha core unit. Subsidy of **PKR 115,000** for reconstruction; **PKR 55,000** for repairs.	**Not Recommended:** Least cost but **sub-optimal** option from engineering/ disaster risk reduction perspective	**985.8**
Option-2: **Differential Subsidy** - providing for **reconstruction to flood-resistant standard for units located in recurrent flood hazard areas only**. Subsidy of **PKR 205,000** for reconstruction of flood-resistant **hybrid** house; **PKR 115,000** for reconstruction in the rest of the affected areas; **PKR 55,000** for repairs.	**Recommended**: Caters to flood risk, providing optimal balance between affordability and BBB	**1,051.8**

Option-1 (Base Case): Uniform subsidy

The base case assumes provision of a uniform subsidy equivalent to the amount required to construct a core katcha unit. It implies a standardized cash grant of PKR 115,000 (approximately US$ 1322) to each household whose dwelling was completely destroyed, and PKR 55,000 (approximately US$ 632) to each household for repairs of dwellings damaged partially. It does not cater for the prevalent risks of recurrent flooding or other disasters in parts of the affected area, and is costed*only for comparison purposes*. Since it putsfuture investment that will go into housing reconstruction at risk,itis a sub-optimal use of scarce public resources, andis **not recommended**.

Option-2: Partially Differential Subsidy (Flood Premium)

This option provides for restoration to flood-resistant standard for units located within the flood hazard areas. It offers a subsidy of PKR 205,000 (US$ 2356) including a flood premium of PKR 90,000, for reconstruction of a flood-resistant hybrid house in flood hazard areas only. Completely destroyed housing units in districts Badin, Hyderabad, and Thatta have been included for the purposes of this calculation. The total number of completely destroyed houses in these districts on which flood premium is recommended is 71,392 (57,108 in Badin, 14,220 in Hyderabad, and 64 in Thatta). The additional outlay required for the payment of flood premium is estimated to be USD 66 million which amounts to 7% of the total cost for the Uniform Subsidy Option. However, a detailed Damage Assessment and Beneficiary Eligibility Survey will be required to identify the exact number of houses eligible for a reconstruction grant that includes a flood premium. It requires of pucca construction of foundations and plinth (burnt brick, concrete block or stone masonry, set in cement-sand mortar), raised to an average height of six feet, with a katcha (adobe or mud wall) super structure. The subsidy for units outside these areas remains PKR 115,000.

The Reconstruction Grant will be released in two tranches: (i) an advance payment; and (ii) as second payment after completion and certification of construction up to plinth level. All partially damaged units will continue to be eligible for PKR 55,000 for repairs, since existing structures cannot be repaired to flood-resistant standards. This is the **recommended option** and is generally recommended for the flood-affected areas that are vulnerable to recurrent flooding.

Since the amounts of the proposed reconstruction subsidies have been calibrated on the basis of a katcha core unit, owners of pucca houses that have been completely destroyed will find the proposed subsidy for the base case inadequate. While it cannot be varied for reasons of equity, it is recommended that the government try to facilitate access to housing loans through existing financial institutions for creditworthy house owners within this category.

Table-Annex 10.5: Costed Reconstruction Options (Million PKR)

District	Option 1 - Base Case				Option 2 – Differential Subsidy			
	Reconstruction	Repair	**Total**	USD million	Reconstruction	Repair	**Total**	USD million

Badin	6,567	3,876	**10,443.4**	120.0	11,679	3,876	**15,554**	178.8
Dadu	631	563	**1,194.3**	13.7	631	563	**1,194**	13.7
Ghotki	526	37	**563.8**	6.5	526	37	**564**	6.5
Hyderabad	799	782	**1,581.5**	18.2	1,425	782	**2,207**	25.4
Jamshoro	1,521	1,435	**2,955.6**	34.0	1,521	1,435	**2,956**	34.0
Khairpur	1,332	1,007	**2,338.5**	26.9	1,332	1,007	**2,338**	26.9
Larkana	6	169	**175.4**	2.0	6	169	**175**	2.0
Matiari	559	800	**1,359.1**	15.6	559	800	**1,359**	15.6
Mirpur Khas	8,108	1,413	**9,520.8**	109.4	8,108	1,413	**9,521**	109.4
Naushero Feroze	709	1,500	**2,209.7**	25.4	709	1,500	**2,210**	25.4
Sanghar	7,554	4,676	**12,229.6**	140.6	7,554	4,676	**12,230**	140.6
Shd. Benazirabad	8,090	4,280	**12,370.4**	142.2	8,090	4,280	**12,370**	142.2
Tando Allahyar	3,157	1,368	**4,525.8**	52.0	3,157	1,368	**4,526**	52.0
Tando M. Khan	2,990	529	**3,518.7**	40.4	2,990	529	**3,519**	40.4
Thatta	7	32	**39.3**	0.5	13	32	**45**	0.5
Tharparkar	7,279	3,129	**10,408.3**	119.6	7,279	3,129	**10,408**	119.6
Umerkot	9,097	814	**9,911.0**	113.9	9,097	814	**9,911**	113.9
Sindh Total	**58,933**	**26,412**	**85,345**	**981.0**	**64,675**	**26,412**	**91,087**	**1,047.0**
Balochistan								
Jaffarabad	59	96	**154.9**	1.8	59	96	**155**	1.8
Kalat	124	80	**204.5**	2.4	124	80	**205**	2.4
Killa Abdullah	0	0	**0.0**	0.0	0	0	**-**	0.0
Lasbela	26	37	**63.2**	0.7	26	37	**63**	0.7
Nasirabad	0	0	**0.0**	0.0	0	0	**-**	0.0
Balochistan Total	**209**	**213**	**423**	**4.9**	**209**	**213**	**423**	**4.9**
Grand Total	**59,143**	**26,625**	**85,768**	**985.8**	**64,885**	**26,625**	**91,510**	**1,051.8**
			Premium over Base Case Option					**107%**

CD = Completely Destroyed; PD = Partially Damaged

Development of Unit Rates for Reconstruction

Since the damaged housing stock is spread across most of Sindh and parts of Balochistan, geographical variations are expected for types as well as prices of preferred construction materials. The estimation of unit reconstruction rates for the housing options considered for estimating 'needs' has involved the use of a *unit cost housing model,* designed and tailored by the DNA Housing team for owner-driven, rather than contractor-driven, reconstruction. The reported prices of basic construction inputs obtained from various credible sources have been fed into this model for developing the damage and needs scenarios presented.

Priorities for Recovery and Reconstruction

- *Information Dissemination* should be a crucial part of the government's strategy. This should include information on the full range of assistance options, their eligibility criteria and the means of accessing them, as well as improved construction methods for hazard-resistant houses.
- *Detailed Damage Assessment and Eligibility Verification Survey* is an urgent task, and needs to be undertaken using uniform technical standards, to ensure transparent eligibility verification.
- *Flood Risk investigation* studies need to be undertaken to identify land susceptible to future natural disasters like recurrent flooding as well as other disasters.
- *Developing Appropriate Hazard-resistant Engineering Design Options:* Since different parts of the affected area may be prone to flood/cyclone/typhoon risks, developing cost-effective engineering design solutions should be a priority.
- *Training for Safe Construction* for artisans, contractors, home-owners, and construction supervisors should be an integral part of government's reconstruction strategy. This should be initiated as soon as possible, and housing assistance needs be tied to the adoption of the improved construction practices.
- *Recycling Materials from Debris* will reduce reconstruction costs and have a positive environmental impact. Communities need to be educated on optimal reuse of materials from the housing debris.
- *Community Mobilization* will be needed to ensure information dissemination, better construction methods/skills training, mutual support and oversight. Moreover, vulnerable-headed eligible households will need special attention and assistance via such mechanisms.

- *Availability of Construction Materials* during the reconstruction phase will be critical, particularly with the compounded needs of multiple sectors. Special efforts will be needed such as setting up of construction material hubs throughout the affected areas.
- *Settlement Planning and Development* should be reviewed in light of the possibility of introducing flood protective measures for entire communities in areas prone to risks of recurrent flooding. Protective measures for entire communities, like construction of levees (earthen embankments) offer optimal use of resources, enabling engineering standards for individual buildings to be lowered.
- *Appropriate Implementation Arrangements for Housing Reconstruction*, particularly one that is: (a) owner-driven; and (b) predominantly rural, are needed. The successful post-2005 earthquake rural housing reconstruction program offers a most useful precedent.

Follow-up Actions Required for Housing Sector

i. *Focus on federal-provincial dialogue* to harmonize provincial strategies and plans for housing reconstruction along proposed policy parameters.
ii. Develop consensus on roles: (a) for *central (federal) coordination, monitoring, and standard setting* for equity, and (b) provincial level implementation.
iii. Explore the potential of introducing *urban housing loans and rural microfinance* through existing mechanisms, for providing supplementary support to creditworthy house owners.
iv. Develop incentivized *community protection approaches and programs* to ensure greater disaster (flood) risk reduction for communities at high risk of recurrent flooding. This could include introduction of community level protective infrastructure such as bunds, spurs, and dykes. In case of some communities prone to significant flood risks, it may be more cost-effective to reconstruct individual houses to the base standard, and collectively use the proceeds of the eligible flood risk premium to finance community level protective infrastructure.

Annex 11: Private Sector, Industries and Financial Sector

I Private Sector and Industries

Background

A significant number of micro and small enterprises in Sindh and Balochistan were affected by the 2011 floods, but there was little direct affect on formal private sector enterprises. We estimate that approximately half of Sindh's enterprises in the affected areas were impacted directly (damaged) or indirectly (loss of economic activity) by the floods. The impact in Balochistan was very small. As noted above these were primarily informal micro and small enterprises. These enterprises are engaged in services and small-scale manufacturing.

For many enterprises this was a double-hit as these were also impacted by the 2010 Floods: The 2010 floods affected economic centers across the country, including the province of Sindh, where damages of PKR 24.0 billion (US$ 275.86 million) to the private sector were reported[1] with an estimated reconstruction cost of around PKR 4.0 billion (US$ 46.0 million). The floods resulted in heavy losses to micro and small enterprises in the manufacturing and services sectors. The sectors of cotton ginning, sugar and rice processing took the worst hit in Sindh, and as a result, the livelihoods and household incomes of the affected communities received a serious blow. The consequences were even graver for women and ethnic minorities in the province of Sindh, as the contribution of women towards agricultural labor (for example cotton picking and spraying pesticides) was never properly documented and monetized. Similarly, due to their relatively small population, the participation of the ethnic minorities in the workforce has not been visible.

Lessons can be learnt from 2010 Rehabilitation efforts for the Private Sector: In addition to the cash transfers program and other relief packages offered by the GoP, organizations like the Pakistan Poverty Alleviation Fund (PPAF)[2] came forward to launch immediate relief activities. The PPAF generated PKR 965 million (US$ 11.09 million) through its own resources and through partnerships with KfW, USAID, WB and corporate sector. It managed to reach out to 22 districts providing direct support to 519,155 affected individuals and few micro and small enterprises.

Establishing baseline data has been difficult due to the high levels of informality in the Pakistani economy: In Pakistan approximately 1% of enterprises are formally registered. The remaining 99% are not captured in Government's data. There are many estimates of the number of these informal non-farm enterprises in Pakistan. SMEDA suggests there are 3.2 million of these enterprises and the World Bank's 2007 report on rural growth and poverty reduction, suggests there are 3.8 million non-farm rural enterprises[3]. Extrapolations from these overall estimates have been used to establish the baselines. With a few exceptions noted in this report, the formal and registered enterprises of the two provinces were not affected by the floods.

[1] MoF (2011). 'Pakistan Flood Impact Assessment' – Section 2, Special Section. Economic Survey of Pakistan 2010-2011. Ministry of Finance. Government of Pakistan.
[2] PPAF is the apex microfinance institution that provides credit to its partner institutions for on-lending as microcredit and for supporting other activities such as community infrastructure, service delivery etc.
[3] These are classified as firms engaged in any activity excluding primary agricultural production (crops, livestock and fisheries) – Pakistan Rural Investment Climate Assessment 2005

Estimated Damages – PKR 6,840 million (US$ 78.62 million)

Although final estimates of the scale of the damage especially to the real sector are not yet available, it is quite evident that the floods have inflicted heavy losses to the infrastructure, property and standing crops, thereby directly affecting the inhabitants, farmers and workers alike. For the purpose of this report, losses to the sales revenues of the damaged enterprises and damages to the assets have been calculated with an assumption that the completely destroyed units will not be able to commence operations for at least a year, whereas the partially damaged would have started operations in a week's time. The detailed calculations follow in the table below.

The estimated number of non-farm rural enterprises that were directly affected in Sindh and Balochistan by the 2011 floods is around 200,000 and 1,100 respectively. We estimate 10% of these enterprises were destroyed, further we estimate 80% were in the services sector and 20% in manufacturing. For calculating the impact on the sales revenues, we used the figure of PKR 180,000 for annual sales, as quoted in the 2007 Agricultural Growth and Poverty Reduction Report of the World Bank. The involvement of these enterprises, especially in the affected districts of Sindh was in agro-based industry including backward and forward linkages with manufacturing plants of fertilizer, apparel, cotton ginning, rice and sugar mills, and also through, localized food processing e.g. bakeries, small-scale fabrication e.g. furniture and a wide variety of small-scale, often curb-side services e.g. trading, transportation, and construction.

Table-Annex 11.1: Damage and Loss Figures (PKR millions)

Provinces	Assets Destroyed	Assets Partially Destroyed	Sales Loss for Destroyed	Sales Loss for Others	**Total**
Sindh	1,440	720	3,600	720	**6,480**
Balochistan	80	40	200	40	**360**
Total					**6,840**

The floods will directly impact the income generating potential of the local communities, as the operations of the affected enterprises came to a halt for few days, and there will be a general reduction in demand from the losses of on-farm income. Whilst this impact has not been directly calculated, it is important to note that this severely impacts the households of the daily wage earners. The earlier mentioned 2007 World Bank report on rural growth showed that the non-farm income accounts for 32 percent of household income in rural Sindh, and the poorest households are relatively more dependent on non-farm self-employment and wage incomes than richer households. Hence, there will be a reduction in consumer demand due to loss of farmer and workers' income, thereby affecting the revenues of the trading and service sectors in particular. These follow-on effects could easily surpass the specific losses calculated in the above table.

The Balochistan province has reported the only significant formal sector damages. These damages are in the brick industry of Jaffarabad district. The 30 brick kilns located in the district have been affected however the details and numbers are unavailable. It is assumed that the rain water and floods have damaged the inventory (baked and raw bricks) of these kilns and have rendered the daily wage earners jobless for at least 2-3 days. Each kiln has the potential to employ 100-150 workers, so the overall impact on the income of the local

communities would be significant. The district of Kalat has reported partial damages to three units of handicrafts, carpet and apparel with a direct but temporary impact on 79 workers. The remaining three districts affected by rains have reported no losses to the private sector. It is believed that the damages and losses have been accounted for in the calculations enumerated above in the preceding table.

Proposed Sectoral Recovery and Reconstruction Strategies

Immediate Restoration of Economic Activities

Since the flood has hit the relatively less developed towns and districts in Sindh and Balochistan, it will be important to provide financial assistance and handholding support to the enterprises that were completely destroyed by the floods. This will help in the restoration of jobs in the affected areas. The provincial governments should consult with the rural support programs and development partners including the International Labour Organization (ILO) to initiate these schemes. An immediate step would be to introduce a matching grants program for the affected enterprises which would support enterprises that wish to re-establish themselves. Within such matching grants scheme, priority should be given to women-owned enterprises, and to enterprises that only employ women workers (such as bangle manufacturing cottage industry, selective handicrafts) and ethnic minorities. Any standard financial sector support would not be effective as these enterprises are have limited or no access to the formal financial sector. Moreover, after two successive floods, entrepreneurs may be very risk averse. In fact, in order to avoid the hassles, such as cumbersome documentation and collateral involved in the formal financial sector lending procedures, the troubled entrepreneurs and small farmers will probably resort to seeking financial assistance from the informal money lenders. Hence grants programs should be introduced without further delays.

It is very important for the government to ensure restoration of key infrastructure including electricity, water and gas supply and roads to these areas so that the private sector can resume its operations.

For the medium-long term support to the sector, the officials in the public sector should be provided with adequate capacity to collect the data and maintain an up to date database on the private sector and especially, the non-farm rural enterprises of the respective provinces. This can help the government and development partners better assess the needs of the sector and extent of damages in case of a natural calamity.

Similarly, the presence of institutions such as the Small and Medium Enterprise Development Authority (SMEDA) and SME Business Support Fund (BSF) in the two provinces should also be strengthened so that the desired handholding support to the private sector can be extended in normal times as well.

Recovery and Reconstruction Needs

To ensure that viable enterprises are restored, it is estimated that a matching grant scheme of approximately PKR 870 million (US$ 10 million) would suffice. Of this amount, it is recommended that approximately 20% is routed through an agency like SMEDA, which would target the small number of larger enterprises affected, and the remainder (80%) through the PPAF which would target micro and very small enterprises where the bulk of the damage occurred.

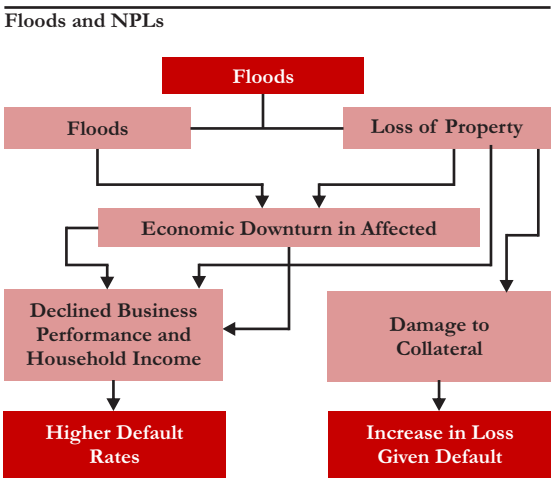
11 Financial Sector

Background

The impact of the floods on the financial sector was greater compared to the private sector. The financial sector was affected by the 2011 floods in three main ways: (i) direct losses (damaged crops and enterprises) from the floods in the agriculture and private sector, (ii) general reduction in demand which affects business viability and ability to make interest and principal repayments, and (iii) impact on the insurance sector. The figure below shows how the floods affect the credit risk of the banking system due to loss of life and property, slowdown in economic activity, and also by damaging the collateral received by the banks against the credit. The financial sector, in turn, consists of a mix of large commercial banks, some specialized banks which tend to be public sector owned, microfinance institutions and insurance companies.

The 2010 Floods had a major impact on the financial sector. As a result of 2010 floods, areas across the country with higher indices of poverty were inundated, thereby crippling life and reducing economic activities of the already marginalized population to a minimum. The 2010 Floods DNA anticipated that in addition to the physical damages to 86 bank branches in the affected areas, the banking sector NPLs were expected to increase from PKR 24.6 billion (US$ 282.75 million) to PKR 52 billion (US$ 597.7 million). The estimated NPLs in the microfinance sector were PKR 1.85 billion (US$ 21.26 million) as agriculture, housing, infrastructure and MSMEs took the worst hit.

Figure-Annex 11.1: Floods and NPLs



Source: Adapted from The Shirouka Bank, LtdRisk Management Deptt.

Source: SBP's FSR (December 2011). Page 33

2010 Rehabilitation Efforts for the Financial Sector

There have been some efforts to rescue the financial sector from the situation created due to floods of year 2010. In anticipation of the NPLs rising around PKR 52 billion (US$ 597.7 million), the SBP, launched a PKR 10 billion (US$ 114.94 million) concessional financing scheme in Nov 2010, for flood affected SMEs and agricultural sector, and allowed banks/DFIs rescheduling of loans in the flood affected areas. The

affected areas, identified by the NDMA and, under the relief package, banks could only defer loan payment for a maximum of one and a half year[1]. There was very little uptake of the package and the banking sector could not really benefit from the scheme due to the associated mark up and other terms and conditions.

Baseline Data

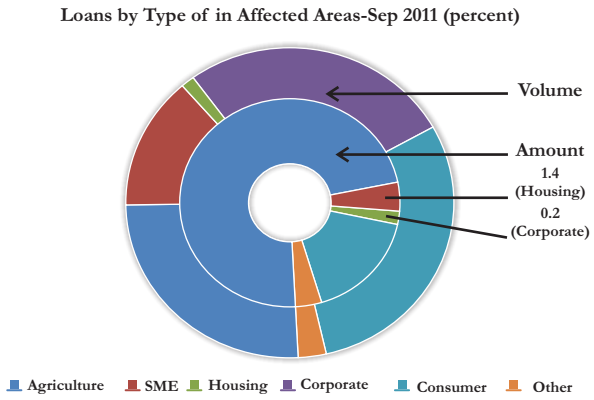
For the purpose of 2011 DNA, the data for the expected increases in NPLs was gathered from the central bank (SBP) and is representative of the commercial, specialized and Islamic banks. The estimates for the NPLs in the MF sector, and losses to the insurance sector are also included in the overall assessment of the financial industry.

Floods Damage Overview

Estimated Damages – PKR 20.414 billion (US$ 234.64 million)

The agriculture sector in the affected areas, constitutes about 71 percent of loans by volume and 26 percent by amount. A detailed breakup of the affected loans by type is given in the figure below. The agriculture credit was extended to almost all the affected districts in Sindh, and significant NPLs have been reported by one specialized bank for the zones of Mirpur Khas (US$ 56 million), Sukkur (US$ 44.5 million), Nawabshah (US$ 34 million) and Hyderabad (US$ 28 million). The SBP suspects that since the floods have rendered heavy losses to crops, property and businesses in Sindh, hence a number of additional borrowers are likely to default on their commitments. It is likely, that the NPLs for the province will exceed PKR 17 billion (US$ 195.40 million) which is more than twice the pre-flood NPLs. In short, an increase of about PKR 12.9 billion (US$ 148.27 million) in new NPLs is likely[2]. There have been no reports of damages to the Balochistan lending portfolios of the financial sectors. The penetration of the financial sector in the area is the lowest of all provinces, and there are very few Microfinance Providers (MFPs) operating in Balochistan, who may report NPLs later in the year.

Figure-Annex 11.2: Loans by Type in Affected Districts



Source: SBP's FSR (December 2011). Page 33

[1] 2010. 'Flood-hit areas: SBP launches Rs 10 billion plan'. Nov 3, 2010. Website of Pakistan Microfinance Network visited on Dec 27, 2011 at www.microfinanceconnect.info

[2] SBP (2011). Impact of Recent Floods on NPLs. Financial Stability Review – First Half 2011. Box 2.1 Page 33-34. Downloaded from www.sbp.gov.pk on Dec 20, 2011.

The 2011 Financial Stability Review (FSR) of the SBP mentions that the banks will be able to recover around PKR 4.7 billion (US$ 54 million) from insurance companies against damage to collateral, however, the new NPLs will still infect the balance sheets of the banks. For the agricultural credit, banks will recover around PKR 4.1 billion (US $ 46.5 million), which is almost half of the additional NPLs through the insurance proceeds.

The projected amount of flood related incremental NPLs is substantial. For the province of Sindh, the estimate is one-third of the net profit generated by the entire banking sector during the first half of FY11 or about 9 percent of existing net NPLs.

Of the US$ 234.5 million, the share of the Microfinance Providers (MFPs) through NPLs in Sindh is estimated at PKR 3,011 million (US$ 34.6 million)[1]. Around 159 branches of the MFPs in the affected areas have also reported physical damages to their premises.

Although, the penetration of insurance products and density in the affected areas is quite low, eleven insurance companies have reported losses to the tune of PKR 403 million (US$ 4.63 million), including 367 claims against fire breakouts, and those filed by sectors, such as marine, crop and motor vehicles[2]. In addition to that, a secondary impact will kick in since banks will recover PKR 8.8 billion (US$ 100 million) through the sector against their NPLs. This is likely to mount if the textile sector, which has a higher insurance density, is affected by the damages to the cotton crop.

Eleven bank branches and a national savings centre in districts of Badin and Mirpurkhas were physically damaged by the rains.

Table-Annex 11.2: Damage and Loss Figures (PKR millions)

Provinces	Direct Damage[3] (PKR millions)			**Total (PKR millions)**
	Public Sector Specialized Banks and Private Commercial Banks	Microfinance Providers	Insurance Sector	
Sindh	17,000	3,011	403	**20,414**
Balochistan	N/A	N/A	N/A	**N/A**
Total (PKR millions)				**20,414**

Proposed Sectoral Recovery and Reconstruction Strategies

Although the extent of losses to the micro-finance sub-sector will not be clear until every micro-finance institution (MFI) has assessed its clients, yet several proposals could be considered for the sector's rescue—for instance, interest rate subsidies, a risk-mitigation fund, an emergency liquidity facility, and access to liquidity from the SBP. Also, demand for credit does not always rise as strongly as the MFIs expect. For example, with the Benazir Income Support Programme (BISP) and the Watan Card acting as entry points for

[1] Preliminary information reported to PMN by its members.
[2] Provisional estimates submitted by the Securities and Exchange Commission of Pakistan (SECP)
[3] Includes NPLs …

cash transfers and food, it is unlikely that clients would choose to borrow to repay later. The next two years years are therefore crucial to test the demand for credit. MFIs may want to explore an expansion of the services that are often most in demand immediately after a disaster, ranging from conventional savings and and remittances to micro-insurance[1].

At the community and microenterprise levels, an important area for intervention is financing of the public private partnership (PPPs) ventures to support small projects. These could include construction of small dams, setting up of risk mitigation funds for the cottage industries and farmers, and training of district government officials in the areas of disaster preparedness. The model could be replicated in areas vulnerable to natural disasters especially heavy monsoon rains and floods.

Another area for post-crisis development is housing. It should be the strategy of the provinces to build back better. The provincial governments should also try to address the long pending issues around management of land records and title deeds. This will then trigger a response from the financial institutions who can then utilize their excess liquidity by extending housing finance products and services and home improvement loans. As recommended in the 2010 Floods DNA, compiling comprehensive electronic land records and clean titles should be a priority in the reconstruction phase.

Recovery and Reconstruction Needs

Estimated Recovery Needs (PKR 7,308 million - US$ 84 million)

The analysis shows there is a need for recapitalization in the case of the MFIs and the Specialized Agriculture Banks. Given that MFIs have limited ability to replenish capital when there are losses such as in this case, they need to be rescued. Similarly, in the case of specialized banks, their reserves are thin and their relatively undiversified portfolio limits their ability to make up the losses. The replenishment requirements of the MF sector in Sindh and Balochistan are around PKR 3,304 million (US$ 38 million). Meanwhile, the strong capital base of the commercial banking sector apparently enables it to withstand the losses inflicted by their additional NPLs. It is also worth noting that the final shape of the banking sector losses will become clearer when SBP publishes its next FSR in May 2012 for the second half of year 2011. The specialized banks with exposure to districts in Sindh and Balochistan may need immediate help as a big percentage of their portfolio comprised agricultural loans, and their refinancing need could be as high as PKR 4 billion (US$ 46 million). Regardless, no blanket write offs are recommended in the commercial banking and MF sectors. Such decisions should be made at the institutional level on case to case basis. Some of the MF borrowers will make genuine cases for loan write offs as many poor and transient poor households have lost their livelihoods and assets. It is recommended that women borrowers of the MF products should be given special consideration as they were already marginalized and hence more vulnerable to such shocks. No specific assistance is recommended for the insurance sector.

[1] Khan, Z (2010). 'Consequences of the floods'. A Silent Revolution Not to Be Silenced: An Overview of the Microfinance Sector and Its Impact in Pakistan. QFinance website visited on Dec 27, 2011 at http://www.qfinance.com/financing-best-practice/a-silent-revolution-not-to-be-silenced-an-overview-of-the-microfinance-sector-and-its-impact-in-pakistan?page=5#s7

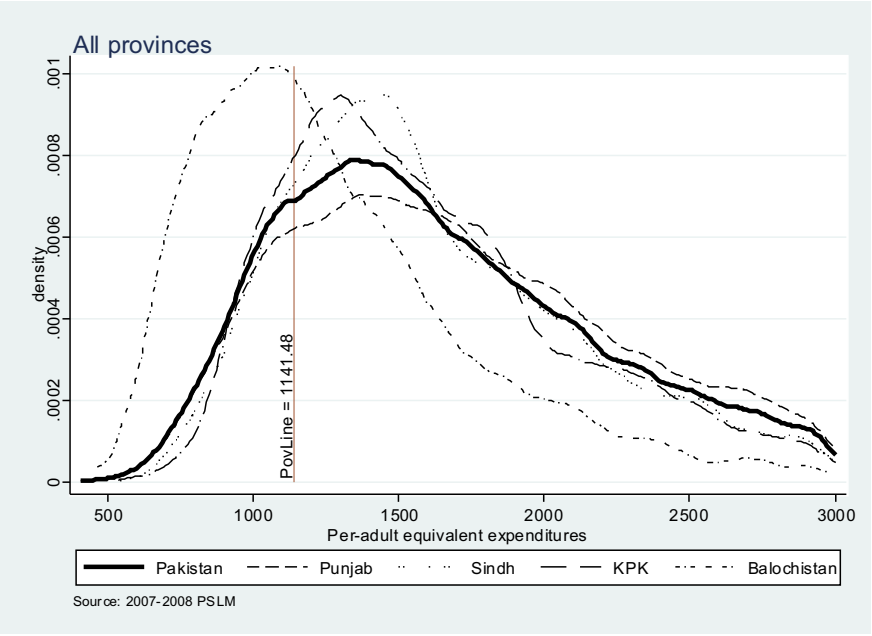
Annex 12: Social Protection

Sector Background

Pre-Flood Poverty Profile

Pre-flood poverty data based on the BISP poverty scorecard shows an average poverty score of 33.1 in Sindh and 26.2 in Balochistan, compared to the national average of 31.7. Variations between districts within the same province are significant: average poverty scores in Sindh range from 23.1 in Ghotki to 38.1 in Hyderabad, and in Balochistan from 19.2 in Kalat to 27.6 in Lasbela. Comparison of flood and non-flood districts reveals that in both Sindh and Balochistan, the flood affected districts are amongst the poorest in the province, in particularly those that were also hit by the 2010 floods.

Figure-Annex 12.1: Distribution of Per-Adult Equivalent Expenditures, PSLM 2007-8



Detailed analysis of poverty data reveals that a significant proportion of the population in Sindh and Balochistan (flood and non-flood districts) is concentrated around the poverty line. This implies that an external shock such as the 2011 floods would push the vulnerable below the poverty line and the poor deeper into poverty – the total number of people in need of social safety nets support would increase (albeit perhaps only temporarily).

The pre-flood population profile of affected districts also reveals the following: a) average household size is 6.3 in Sindh and 7.0 in Balochistan; b) the proportion of female-headed households in Sindh is 1.9 percent and in Balochistan 0.6 percent; c) the elderly dependent population is minimal (1.7 and 1.1 percent respectively in Sindh and Balochistan) but the dependent population under ten years is substantial – 29.3 percent in Sindh and 32.7 percent in Balochistan; d) house ownership (a liability in disaster situations since damage to housing entails significant reconstruction expense) is high at 85.6 percent owner occupancy in Sindh and 86.8 percent in Balochistan; e) agriculture is the main source of employment in both provinces, accounting for 38.5 percent of the workforce in Sindh and 45.3 percent in Balochistan; this means that flood

impact on employment will depend largely on damage to the agriculture sector; and f) human development indicators are generally low, for example school attendance among 5-17 year olds is 60.2 percent in Sindh and just 50.2 percent in Balochistan.

2010 Floods

During the 2010 floods, 20 million people across the entire length of the country were affected. There was widespread damage to homes, infrastructure, agriculture, and so on. The 2010 Floods Damage and Needs Assessment reported that over 2 million poor households were in immediate need of livelihood support. It recommended provision of cash support to vulnerable populations for a period of six months to address their short-term needs; additional measures were suggested in the medium- to longer-term.

In response to the 2010 floods, Zakat, Pakistan Bait-ul-Mal and other safety net providers distributed relief goods to affected population, but did not expand their regular programs. Instead, the government launched the Citizens' Damage Compensation Programme (CDCP), more commonly known as the Watan Card scheme. Flood affectees had to register for this card, which entitled them to a one-off cash grant of PKR 20,000 to help their rehabilitation. Targeting was based on affected *communities* in Punjab, Sindh and Balochistan (at least 40 or 50 percent of a community had to be calamity-affected for the community to be eligible), but on affected *households* in KP (based on the findings of a Rapid Household Survey). Registration was carried out with support from NADRA, and was dependent on possession of Computerized National Identity Cards (CNIC). Payment was through bank ATM machines. A total of around 1.4 million families were helped under Phase 1 of the Watan card scheme. An evaluation of the scheme reported that people had found the Watan card easy to use and generally had not had problems accessing payment.[1] However, effectiveness of targeting was more problematic, with exclusion rather than inclusion errors.

The PSLM 2010/11 has been completed and preliminary data is available. An indication of the impact of the 2010 floods on poverty levels can be gauged from household perceptions of change in economic situation compared to the previous year. Aggregate data for Sindh reveals that the perceived economic situation of 47 percent of households remained the same, for 12.72 percent it improved, and for 39.44 percent it worsened; similarly in Balochistan for 37.53 percent of households it remained the same, for 12.19 percent it improved and for 50.52 percent it worsened. These figures indicate an increase in poverty since the 2010 floods (though the fact that districts not affected by the 2010 floods also reported a worse economic situation suggests other factors are at play).

The 2010 Floods DNA made a number of recommendations for short-, medium- and long-term measures to meet the needs of the poor and vulnerable and help lift them out of poverty. While cash grants were provided to needy families under the Watan card scheme, there has been little action on the other recommendations. An important element of mitigating future shocks is pre-crisis planning and, specifically, having mechanisms in place to collect updated information on the poor and vulnerable. The BISP poverty database (see below) is a useful tool in this regard, but is not yet being utilized to its full potential. Overall, the need to institutionalize disaster preparedness and social protection mechanisms called for in the 2010 Floods DNA, has not been adequately addressed. Implementation of DNA recommendations needs to be improved.

[1] *Evaluating Implementation of Pakistan's Citizens' Damage Compensation Programme (Phase I) Final Report.* Oxford Policy Management, April 2011.

Pre-Flood Social Protection Measures

In recent years there has been growing recognition (at both federal and provincial level) of the need for effective social protection measures, and a growing commitment to social protection. This is reflected in policies: the National Social Protection Strategy was adopted in 2007; PRSP-II has a pillar dedicated to social protection ('Protecting the Poor and Vulnerable'). It is also reflected in resource allocations: the launch of BISP (see below) led to a substantial increase in social protection spending, taking this to almost 1 percent of GDP.

The two main social safety net programs in Pakistan used to be Zakat and Pakistan Bait-ul-Maal (PBM). The former provides support to needy Sunni Muslims, the latter to all groups. Almost two-thirds of Zakat funds go on the Guzara allowance for poor families, the rest on education stipends, health care and marriage grants. Individual financial assistance (for higher education, healthcare) and the Child Support Programme (education related CCTs) account for the largest share of PBM funds. Both Zakat and PBM suffer from weaknesses in terms of targeting, as well as level and scope of benefits.

To address these issues the government launched the Benazir Income Support Programme (BISP) in 2008. This is a nationwide program in which beneficiaries are decided on the basis of a poverty scorecard. PKR 2,000 is provided to poor households every two months. As of June 2010 some 2.28 million beneficiaries had been provided cash transfers under BISP. The BISP poverty scorecard has potential applications far beyond selecting BISP beneficiaries: it can be used to identify recipients for other programs (e.g. CCTs), support planning of development initiatives (schools, clinics, livelihood schemes, etc), and promote better targeting in post-crisis situations. While protocols are being developed for sharing of the BISP poverty database, this has not yet been made available for wider use. BISP itself is developing/piloting a number of poverty exit strategies: these are linked to vocational training, micro-credit (*Waseela-e-Haq*) and health insurance.

Floods Damage Overview

Figures for affected populations in Sindh are based on the provincial government's latest estimates at district level of the percentage area affected. Given that data on specific areas damaged within districts was not available, the populations in flood affected districts are assumed to be uniformly affected in a proportion equal to the share of area affected in their districts. However, the same estimation process for 'total affected population' cannot be utilized in the case of Balochistan due to paucity of data. Instead, the figures used for 'total affected population' are as reported by PDMA Balochistan.[1] The number of affected households is calculated by dividing the total affected population of the respective province by its average household size (Balochistan = 6.8, Sindh = 6). While these figures are relevant, analysis from the social protection lens requires disaggregation of these into the target group 'poor and vulnerable population affected by the floods', hereinafter called the 'severely affected population'.

Estimation of 'Severely Affected Population'

The 'severely affected population' is calculated as follows:

[1] Pg3. http://www.fao.org.pk/news/11/Floods/Statistical_Data/Flood_Situation_Update_v10_20111114.pdf

(i) Every household in a district with a damaged or destroyed '*kacha ghar*' (mud house) is identified as a severely affected household.[1]

(ii) In addition, district post-flood poverty rates have been projected and applied to the remaining affected households (total affected households – no. of affected households by destroyed/damaged *kacha ghar*) in a district to obtain the final range of severely affected population.[2]

Estimation of 'Post-Flood Poverty Rates'

PSLM data is used to estimate the provincial post-flood poverty rates. PSLM 2010-11 is the latest in the series, but as its micro-data has yet not been released, the analysis was based on PSLM 2007-08 and 2008-09 data (the former to impute the household consumption data, as the latter does not contain consumption aggregates). Furthermore, given the largely agrarian employment patterns in the flood affected region, agricultural damage data has been used to look at the impact on household consumption. Using this data, the provincial post-flood poverty rates have been projected by assuming several damage scenarios, elaborated below, and applying these to the households' predicted expenditure as provided in PSLM 2008-09.

Damage Scenarios for estimating 'Post-Flood Poverty Rates'

The consumption of all households in the flood affected districts is assumed to be affected in a proportion equal to the share of damaged agricultural land in their respective districts. However, the impact of the damaged agricultural land on household consumption can differ according to the income group the household belongs to. Households have been categorized into three, not necessarily mutually exclusive, income groups:

(i) Households owning agricultural land;
(ii) Households not owning any agricultural land; and
(iii) Households comprising of agricultural wage workers.

Each of these three categories is further classified in two specifications (Specification 1 and Specification 2), which highlight a) who will be affected by the floods, and b) what will be subject to flood damage. The following two specifications against each category have been considered in order to project the provincial post-flood poverty rates (see figure below):

(i) Households owning Agricultural Land:

Specification 1: All such households will experience a reduction in consumption owing to own production.

Specification 2: All such households will experience a reduction in entire household's consumption.

(ii) Households with no Agricultural Land:

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[1] The figures for damage to mud houses (katcha ghar) both in Sindh and Balochistan have been taken as reported by PDMA Sindh and Balochistan respectively. In case of district Larkana of Sindh, disaggregation in terms of 'pakka' and 'katcha' housing was unavailable, therefore, the GoSindh's assumption has been used, i.e. 90 percent of the fully damaged or destroyed houses are 'kacha ghar' belonging to poor and vulnerable households.

[2] With the exception of districts Jamshoro, Larkana, Mirpurkhas, Shaheed Benazirabad, and Tharparkar, where the reported kacha ghar damage was more than the total affected households. In these cases, the district post-flood poverty rate has been applied directly to the total affected households to obtain the range of severely affected households.

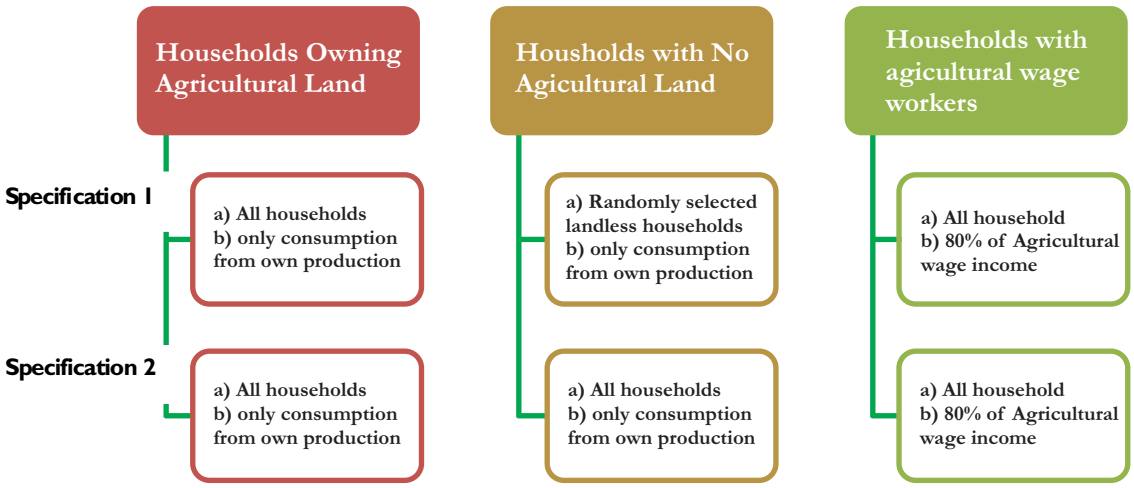
Specification 1: Randomly selected landless households will experience a reduction in consumption owing to own production. This shall cater to the fact that not all landless households consume from own production.

Specification 2: All such households will experience a reduction in consumption owing to own production.

(i) Households with agricultural wage workers:

Specification 1 and Specification 2: All such households will experience a reduction in their consumption by 80 percent of the agricultural wage earned, assuming that is the percentage of wage-income from agriculture used for household consumption.

Figure-Annex 12.2: Summary of Specifications for Projections: Who will lose and what will be subject to flood damage



After simulating the above-stated specifications, the severely affected poor households who require assistance to cope with the negative impact of the floods fall in the range of 801,897 to 851,439, representing 52-54 percent of the total affected population. The severely affected population ranges from 786,917 to 836,311 in Sindh, which represents 50-54 percent of the total affected population. In Balochistan, the range of severely affected households stands at 14,981 to 15,127, which pertains to 53-54 percent of the total affected population. The districts having the larger share of severely affected households, i.e. 50 percent or more, are Badin, Dadu, Khairpur, Matiari, Mirpurkhas, Sanghar, Tando Allah Yar, Tando Muhammad Khan, and Thatta in Sindh province, and the districts Kalat, Jaffarabad, and Lasbela in Balochistan.

Table-Annex 12.1: Summary Estimates of Severely Affected Poor Households- Floods 2011

	Total Affected Population	Total HH Affected	Severely Affected Households		% of Severely Affected Households	
			Specif. 1	Specif. 2	Specif. 1	Specif. 2
Sindh	8,216,788	1,369,465	786,917	836,311	50%	54%
Balochistan	188,736	27,755	14,981	15,127	53%	54%
Total	**8,405,524**	**1,397,220**	**801,897**	**851,439**	**52%**	**54%**

Proposed Sectoral Recovery and Reconstruction Strategies

As noted in Part A, the poverty profile of flood affected districts in Sindh and Balochistan shows a heavy concentration around the poverty line. This implies that an external shock, such as large-scale floods, would push the vulnerable below the poverty line and the poor deeper into poverty. Traditional informal safety nets among the poor include reduced consumption (especially by women and girls), increased household labour supply (working more hours or putting more household members to work), sale of assets, pulling children out of school, and increased borrowing (often at high interest rates). All of these carry the risk of depleting assets and human capital over the long term (both in terms of health and education outcomes) and pushing people into a cycle of deepening poverty.

To avert this, and to prevent increases in the numbers of chronically poor (permanently dependent on transfers), it is important to provide safety nets: transfers in cash or kind to poor families to help them maintain consumption and prevent depletion of assets and human capital. These are the immediate need, but at the same time a medium- and long-term perspective is required. This will entail measures that can mitigate the effects of future shocks, and that can help lift families out of poverty (or at least reduce dependence on aid). In designing social protection interventions in post-disaster situations, it is important to ensure that these tie in with existing social protection mechanisms; this will promote cost and implementation efficiency and effectiveness, as well as sustainability. Based on this premise, the following measures are proposed to help poor and vulnerable households in flood affected districts of Sindh and Balochistan.

Provision of Cash/In Kind (Food) Transfers for Six Months

To meet the immediate basic needs of poor and vulnerable affected families it is recommended that they be given cash or in kind transfers for a period of six months. Cash transfers would be appropriate where markets are functioning properly; food transfers would be better where this is not the case. After six months, families still in need of safety net support could be integrated into the BISP system. The goal is that other families would be facilitated to re-enter the labour market during this period and thereby support themselves.

Creation of Temporary Employment Opportunities

These would again enable families to meet their basic needs until more permanent livelihood options are restored. Suitable programs would be large-scale government funded public works programs, focusing on reconstruction/rehabilitation of large public infrastructure in the disaster area (e.g. highways, bridges, hospitals); and community-generated small-scale social and economic infrastructure projects that build up community assets (e.g. local roads, wells, irrigation channels, schools).

Rebuilding Livelihoods

Measures are needed that can promote the restoration of permanent (long-term) livelihoods for affected people. Options for these include vocational training and skills development, and provision of micro-credit to set up small and medium enterprises. It is important that the former meet market needs, and that trainees are supported to link up with potential employers. Interventions should include a focus on women and youth – the former because it is traditionally difficult for them to access decent livelihood opportunities, and the latter because those outside the education system need productive activities that can place them on a path of income generation, rather than one of chronic unemployment and poverty.

Targeting Safety Nets

In post-disaster situations it is important to, one, institutionalize mechanisms to address large-scale needs, e.g. for food, water, shelter, and, two, be able to quickly and accurately identify those in need. Targeting requires a dynamic approach, because while the pre-disaster poor are likely to be in even greater need following a disaster, many of those who would previously not be considered poor or needy could be rendered so by a disaster. Any cash transfer scheme will also be dependent on availability of data about potential beneficiaries, i.e. on effective targeting. The BISP poverty scorecard database has potential applications both in the immediate aftermath of a disaster to identify the poor and vulnerable, and in the longer-term for targeting of CCT support. There is a strong commitment to share BISP data, but as yet little progress has been made on this. It is also important to develop effective monitoring mechanisms, to provide data on support provided and to enable evaluation of the impact of different social protection initiatives.

Estimation of Recovery and Reconstruction Needs

Given the macro-economic situation of Pakistan, where inflationary pressures have been in constant play, the poor are being further driven down into the poverty trap. Here, the changes in prices that have led to an increase in the food basket cost are captured through the consideration of equivalence scales.

Equivalence Scale

Due to economies of scale in consumption, the needs of a household grow but not proportionately. This can be reflected using equivalence scales, by which each household type in the population is assigned a value in proportion to its needs. Factors such as household size and the age of its members are commonly taken into account to assign these values. Using a commonly used OECD[1] equivalence scale, we assign 1 to the first household member, 0.7 to each additional adult and 0.5 to each child. With an average HH size of 6.4 (for Balochistan and Sindh), the scale comes out to be roughly 4. Taking this figure and multiplying it with the food basket cost of PKR 1,670 per month per head [as reflected in the article *'Change in the cost of food basket 2010-11'* from the annual report of Planning & Development Division Nutrition Section], the household monthly food basket cost amounts to PKR 6,680.

Based on this, the temporary cash grant program will cost approximately PKR 34,126 million, corresponding to US$ 392 million, as estimated in the table below.

[1] OECD- Organization of Economic Cooperation and Development

Table-Annex 12.2: Summary Estimates of Cash Grants to Severely Affected Poor Households using Equivalence Scales

	No. of Severely Affected HHs[1]	Cash Grant of PKR 6,680 per month for 6 months	Cash Grants (US$ millions)
Sindh	836,311	33,519.35	385
Balochistan	15,127	606.31	7
Total	**851,439**	**34,126**	**392**

Prioritized Sector Recovery Timeframe

Table-Annex 12.3: Recovery Timeframe

Activity Description	Short-term 12 months	Medium- and Long-term[2]
Provision of Cash/In Kind (Food) Transfers for Six Months	6 months	
Creation of Temporary Employment Opportunities	6 - continuous	Continuous
Rebuilding Livelihoods	6 - continuous	Continuous
Safety Net Coordination		Continuous

[1] Specification 2 figures are used to estimate the cash grant support representing the higher end of the range of severely affected households

[2] This should include activities related to medium to long term recovery, and should not overlap or duplicate activities under the UN early recovery program. Close coordination with the respective UN agencies shall have to be maintained by the DNA sector teams in this respect.

Annex 13: Transport and Communications

Sector background

The 796,095-square kilometer area of Pakistan and its 190 million inhabitants[1] are connected through a transport and communications (T&C) network of 259,618 km of roads; [2] 7,791 km of railways; 42 airports; and 34,950 km of telecommunication lines and other infrastructure. The 11,800 km long national highways and motorways network is the spine of the primary transport corridor. This is supported by the provincial highways network of 37,400 km that fans out to the districts through 161,000 km of district roads (including farm-to-market and access roads) in rural areas and 54,000 km of municipal roads in urban areas.

In the two flood-affected provinces, the national highway system traverses 1,975 km in Sindh and 4,630 km in Balochistan. About 13,700 km of provincial highways and 31,900 km of district roads are in Sindh and 11,800 km of provincial highways and 20,200 km of district roads are in Balochistan.[3] The railway network of 7,791 km railway lines[4] and 1,100 stations serve the long-distance main NS corridor and connections to other regions including Balochistan. Approximately 1,899 km of railway lines are in Sindh while 1,202 km in Balochistan. Six international airports in major cities serve as hubs connecting to 19 regular and 17 feeder and other airports. The telecommunication infrastructure consists of 3,155 exchanges; 34,950 km of optical fiber transmission lines for the landline networks; and 25,554 transmission towers for the cellular telephone networks.[5]

Floods Damage Overview

Damages and Losses

The rains and floods during August and September 2011 damaged the transport and communications (T&C) infrastructure in the province of Sindh and Balochistan. Based on the data received on the damages in T&C Sector, a total of 5 districts in Balochistan and 18 in Sindh have been affected by the floods, longer spell and high intensity of rains. It affected the network of national and provincial highways, district and municipal roads. Damages to the road infrastructure were caused by submergence, high surface runoffs and ingress of water in roadway formation. The incremental deterioration in road asset condition as a result of floods varied - depending on the intensity of floods/rains, topography, design standard especially of drainage, quality of construction, remaining service life and pre-flood maintenance level of affected roads. The damage consisted mostly of washed away or eroded shoulders, surface impairment, localized failures like rain cuts in embankments, widening of potholes and edge breaks, and structural damages to cross drainage structures, bridges, retaining and protection works. Like roads, floods have caused damages to railway tracks, bridges, stations and residential buildings under the administrative control of Pakistan Railways. There were no reports of damages by Civil Aviation Authority in the aviation sub-sector. In the communication sector, damages were reported to the buildings, equipments and transmission network of cellular and landline operators.

The reported damage is classified into two broad categories: completely destroyed (CD) and partially damaged (PD). For roads and railways, the data is segregated into lengths of roads, railway lines and number

[1] Projection of population by DNA Core Team based on 1981 and 1998 Census Federal Bureau of Statistics Pakistan
[2] Economic Survey of Pakistan 2009-10
[3] It is based on the Pakistan Transport Policy Study (JICA, 2006) and information provided by the Government agencies.
[4] Year Book 2008-09 Ministry of Railways
[5] As reported by the Ministry of Information Technology (MoIT) and Pakistan Telecommunication Authority (PTA).

of affected structures.[1] For telecommunication infrastructure, the reported damage is more specific. Four national highways were affected at various places[2]; three in Sindh and one in Balochistan. On these highways, seven bridges were also reported to be partially damaged; all located in Sindh. About 1,955 km of provincial highways in Sindh, representing 15% of the provincial highway assets and 5,773 km of district roads were affected (including municipal and urban roads). On the contrary, damages in Balochistan are lesser and comprising about 426 km affected sections of provincial highways and district roads (about 1% of this road stock). A summary of direct damage to road infrastructure is given in Table 13.1.

Table-Annex 13.1: Physical Damage Details in Road Subsector

Provinces	Motorways / National Highways (km)		Provincial Highways (km)		District Roads (km)		**Total (km)**
	Completely Destroyed	Partially Damaged	Completely Destroyed	Partially Damaged	Completely Destroyed	Partially Damaged	
Sindh	1	50	274	1,681	808	4,965	**7,779**
Balochistan	1	1	5	92	16	312	**427**
Total	**2**	**51**	**279**	**1,773**	**824**	**5,277**	**8,206**

Similar to the roads, the damages to railway lines involved inundation and erosion of railway track formation including embankment and track structure. A length of 190 km railway line was damaged located in Sindh and under the railway administrative divisions of Sukkur and Karachi. Bridges and other supporting structures were also damaged along the railway lines involving 2 stations, 395 residential buildings and 14 bridges. In telecommunication, major damages to the telecommunication infrastructure involved damages to 233 cellular sites[3] and 12 exchange centers of a landline operator. It includes damages to the equipment and cables due to floodwater ponding in buildings, settlement and collapse of boundary walls, short circuits, power system damages, outages and disruption in services and, damages to the allied residential buildings due to accumulation of water.

The indirect losses due to damages in road sector were also calculated. It was based on an increase in the road user cost due to incremental deterioration in the roadway roughness. Since these losses are time related, they have been capped to three years. The indirect losses have been estimated using a phased recovery period – 10% of the facilities recovered within 12 months, 50% within 24 months, and only 30% of damages reconstruction will continue in the third year.

[1] Bridges and other small structures, such as culverts and retaining walls, are included in the damage estimates.
[2] In Sindh, national highways are N-5 (Karachi-Kot Sabzal), N-55 (Kashmore-Kotri) and N-120 (Hyderabad-Mirpurkhas-Umarkot- Khokhrapar). In Balochistan, only two kilometers were affected on N-50 (Kuchlak - Qila Saifullah – Zhob).
[3] Four mobile and one landline operators have reported damages to the infrastructure to the Pakistan Telecommunication Authority.

Data Verification and Validation

During the DNA 2010 Floods in Pakistan, one of the biggest constraints in data collection and physical verification in the province of Sindh was submergence of the infrastructure, especially the road network. In the current DNA, field surveys were possible as water has receded from the road surface. The data for national and provincial highways in Sindh was received much earlier and therefore field coordinators were mobilized to verify and validate the reported damages on this network[1]. Prior to the field visit, a consultative session was held in Hyderabad with the officials of the Works and Services Department (W&S) Sindh to discuss data gaps and seek clarification. The field coordinator's verification work was supplemented by sector specialist's visit. A random sample of affected roads was visited in seven districts of Sindh along with the reporting officer of the W&S responsible for filling in the DNA template. The field visit revealed that in some cases poor condition due to deferred maintenance was also attributed to recent floods. Based on the result of random sampling the extent, type and cost of damages were reconciled with the template data. The difference in the results of verification and validation exceeded 15% and the corrections were applied on the damage estimates and overall figures.

Damage Quantification

Government agencies were given templates prepared by the ADB and WB team to report damage. W&S Department Sindh and Pakistan Railways started collecting data before the DNA's templates were finalized by ADB and the World Bank. This preliminary damage information was analyzed. The bulk of the data was received during the last week of November and early December. The data is reported in two broad categories: completely destroyed and partially damaged. Most of the damages fall in the latter category. There was inconsistency within and across the organizations in quantifying the costs of damages which led to variation in estimates of road damages. It was harmonized based on the physical damage, class of road, type of surface and carriageway width. The revised costing was used in the analysis and the damage cost was depreciated to arrive at final damage figures.[2]

The total damage including direct damage and indirect losses is summarized in Table 13.2.

[1] The rest of the data on roads continued to receive in the last week of November till first week of December. Field visit was not possible where data was received with delays or in inappropriate form.

[2] Value of damages was calculated based on the depreciated price of replacement of damaged asset. Depreciation approach to valuation was used which is based on the assumption that depreciation of the network equals the sum of the depreciation of all of the asset components comprising the road network. Depreciated cost is calculated linearly after deducting to represent the remaining life of the asset (service level). The design life of road component was grouped by i) pavement, and ii) structures and bridges.

Table-Annex 13.2: Damage and Loss Figures (PKR millions)

Provinces	Direct Damages	Indirect Losses	Total
Roads			
Sindh	14,850	9,974	24,824
Balochistan	1,095	108	1,203
Subtotal	**15,945**	**10,082**	**26,027**
Railways			
Sindh	277		277
Balochistan	-		-
Subtotal	**277**	**-**	**277**
Telecommunications	165	-	165
Total	**16,386**	**10,082**	**26,468**
	$188	**$116**	**$304**

Proposed Sectoral Recovery and Reconstruction Strategy

The recovery strategy varies across each transport and communications sector based on the nature of the responsible agency and the importance of the infrastructure. For telecommunications, the private sector operators have mobilized and carried out repairs, and restored telecom services. For roads, diversion routes were created and services restored. Emergency repairs on railway lines have been taken. As a short term measure, the National Highways Authority has tasked the regional maintenance units to undertake the emergent works through pre-qualified contractors and using proceeds of the annual road maintenance funds. It is proposed that NHA undertakes detail assessment of the damages, as it carried out after the floods of 2010, followed by field surveys, engineering design, and bid documents for packaging, procuring and awarding the reconstruction contracts well within the first year after disaster.

The provincial and district road agencies in Sindh and Balochistan should a) complete the condition surveys for detailed assessment of the damage, b) identify and prioritize minor damages that requires repairs to restore the infrastructure and facilitate vehicular flow, c) prepare project processing documents (PC-1) and start packaging works in small contracts. For larger and complex works, the preliminary surveys, engineering designs and estimation of major damages should be undertaken as a preparatory work till the reconstruction project and financing is committed. Where required, engage consulting firms to augment the departmental design and implementation capacity. The district and road agencies' respective regional offices are encouraged to undertake both the recovery and reconstruction works, through small contracts engaging local

construction firms and labor. Local inter- and intra-village roads and unpaved tracks could be reconstructed through a participatory mechanism using community-based organizations under the supervision and technical guidance of local NGOs. Workfare schemes could also be used to generate employment in the recovery phase. The reconstruction activity offers opportunities to revive the economy and provide livelihood opportunities for the people that are affected by the floods.

Needs Estimation of Recovery and Reconstruction Needs

The estimates for rehabilitation and reconstruction are based on the current costs for each element of transport infrastructure. For roads, unit rates were harmonized to remove inconsistencies.[1] The other costs that have been reflected in Table 13.3 below include cost for complying with i) social safeguards during implementation, ii) engineering design, construction supervision, project management and capacity development of the government agencies, and iii) escalation in prices[2] during the reconstruction period (taken as three years).

Table-Annex 13.3: Recovery and Reconstruction Needs Assessment Summary (PKR million)

Provinces	Reconstruction and Rehabilitation / Repair Costs	Social Safeguards	Design, Supervision, Project Management	Escalation in Prices	Total (PKR millions)
Roads					
Sindh	25,641	256	2,051	3,077	31,025
Balochistan	1,873	19	150	225	2,267
Subtotal	**27,514**	**275**	**2,201**	**3,302**	**33,292**
Railways					
Sindh	395		32		427
Balochistan					
Subtotal	**395**		**32**		**427**
Total	**27,909***	**275**	**2,233**	**3,302**	**33,719**
	$321	**$3**	**$26**	**$38**	**$388**

* It does not include PKR 183 million (US$ 2 million) required in the telecommunication sector.

[1] The rates were taken from the National Highway Authority's Composite Schedule of Rates 2009 with a premium of 30 percent. The premium was calculated using the engineers estimate/tender cost of various projects and updating it to the current value using the CPI/WPI/SPI index published by Government of Pakistan.
[2] Average of Planning Commission's suggested escalation for three years.

reconstruction may be based on the criteria to i) reconstruct the four national highways, provincial highways connecting major provincial cities to the national highway network, ii) followed by district roads connecting district capitals or major population centers to the provincial highways, and iii) district roads providing access to areas of agricultural production or key industries and municipal roads connecting to major provincial and district roads. The Table 13.4 provides sector recovery framework and time frame.

Table Annex 13.4: Prioritized Sector Recovery Framework/Timeframe (PKR million)

Activity	Short-term (12 months)	Medium- and long-term
Emergency Works (for restoration of services and infrastructure)	Railways: 395 Roads: 2,752 Total: 3,147	
Rehabilitation and Reconstruction		Roads: 24,762
Studies, Surveys, Design, Supervision	401	1,541
Social Safeguard Measures	110	165
Administration Cost	85	206
Escalation during Implementation		3,302
TOTAL	**3,743***	**29,976**
	$43	**$345 m**

* It does not include PKR 183 million (US$ 2 million) required in the telecommunication sector.

Annex 14: Water and Sanitation (WATSAN)

Sector Background

A signatory to the MDGs declaration, Pakistan is committed to extending improved sanitation to 67% of its population by 2015. The PSLM Survey 2010 shows that 78% households had access to flush or non-flush latrines in Pakistan in 2008-9 compared to 57% households in 2001- Further, the number of households without any toilet facility decreased from 43% to 22% during this period. This is significant progress in quantitative terms. However, the qualitative aspects have been quite weak. The fact that 75% households use latrines without drainage facility or with open drains point toward the fact that many latrines are acting as transfer stations to shift waste from within the household to outside the households. This raises an urgency to focus on the quality of services.

Access to drinking water which - an essential for life – is quite impressive being 92% overall in Pakistan. This is 95% in urban areas and 91% in rural areas. However, a number of gastro-related episodes are killing thousands of children and elderly each year. The main source of drinking water in Pakistan is tap water. Hand pumps and motor pumps together provide 54 percent of households with drinking water in 2008-09, as compared to 51 percent in 2006-07.

While increasing access to an improved sanitation facility is paramount, there are other dimensions to sanitation which impact on health outcomes. Domestic waste containing both household effluent and human waste may be discharged to a sewer system, a natural drain, a water body, a nearby field or an internal septic tank. There is little separation of industrial waste from municipal waste in Pakistan, with both flowing directly to open drains and then open water bodies. Floods provide us an opportunity to plan in a manner that infrastructure is not only sustainable but also a complete solution. The Floods in Sindh and Balochistan reminds us of the absolute vacuum in solid waste management. Only Sukkur and Tando Mohammad Khan reported on losses to solid waste.

The table below presents the water and sanitation situation in Sindh and Balochistan:

Table-Annex 14.1: Key Indicators for Water Supply and Sanitation

Province	Main Source of Drinking Water										Type of Toilets in Households			
	Tap Water		Hand Pump		Motor Pump		Dug Well		Flush		Non-Flush		No Toilet	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
Sindh	74	11	9	65	12	6	0	9	95	25	4	55	1	20
Balochistan	85	25	3	4	3	1	2	21	75	10	21	66	5	24

Reference: Pakistan Social and Living Standards Measurement Survey (PSLM), 2008-2009

Service delivery institutions face a shortage of skilled personnel, and even where skilled staff is available, the overall institutional space for a number of reasons inhibits their capacities. At decentralized levels,

capacity-constraint in the public sector. In addition, the institutions face lack of efficient administrative systems which enable delivery of services and integration of other vital forces such as private sector and NGOs.

Floods Damage Overview

The government of Sindh had indicated seventeen (17) districts as flood affected where damages needed to be assessed. However, flood damage data was forthcoming only from thirteen (13) districts. From the Balochistan province flood damages were reported from Kalat, Lasbela, Nasirabad and Jaffarabad districts, and that too for the water supply sector only. The most obvious result from the data compilation is the finding regarding the relative damage distribution amongst the districts and talukas. In the Sindh province that has been mainly affected in the 2011 floods the Shaheed Benazirabad (Nawabshah) district by far shows the most extensive damages both in the public water supply and sanitation sectors. Badin, Sanghar and Mirpurkhas districts also show significant damages to the water supply related infrastructure and facilities (Table 14.2). More damages are reported in the sanitation sector as compared to the water supply sector. Shaheed Benazirabad (Nawabshah) district is the worst hit accounting for 42% of the overall damage cost in the public sanitation sector.

Nature and extent of damage

Total damages for water supply and sanitation for both direct and indirect damages are PKR 1,160 million and PKR 43.6 million in Sindh and Balochistan, respectively. Direct damages in Sindh are PKR 456.6 million in 378 reported schemes in the flood affected districts. These damages include PKR 147.6 million for public water supply and PKR 253 million for public sanitation. An amount of Rs 56 million for community infrastructure damage is also included. In Balochistan, WATSAN damages have been assessed at PKR 46.6 million, in a total of 80 schemes.

The data indicates that the most expensive damages in terms of needs are accounted by fresh water sedimentation and collection tanks on the water supply side and paved streets and street drains on the sanitation side. Only Tando Mohammad Khan has reported about losses regarding solid waste management. No data on damages to privately created and owned assets (community infrastructure) was forthcoming from the government. As such reliance had to be made on data provided by locally mobilized NGO's (Table 14.2). There may be some issues and concerns regarding the reliability and authenticity of the data and field validation of these reported damages which was not possible.

Table-Annex 14.2: Water Supply and Sanitation Physical Damage by Reporting Entity (Number of Schemes and cost in PKR Million)

Districts	Total No. of Schemes	PHED PKR million		NGO/Community (Water & Sanitation) PKR million	Total PKR million
		Water Supply	Sanitation		
Sindh Province					
Badin	31	27	13.5	16.5	57
Ghotki	30	2.7	21.1	-	23.8
Khairpur	36	6.92	27.4	-	34.3
Matyari	23	0.39	29.9	3.4	33.7
Mirpurkhas	28	13.1	0.1	6.7	19.9
Naushero Feroze	18	0.7	19.3	-	20
Sanghar	62	19.4	18.8	-	38.2
Shaheed Benazirabad	109	60	107	0.4	167.4
Tando Allah Yar	26	6.2	12.5	3.97	22.7
Tando Muhammad Khan	3	3.3	1.6	1.7	6.6
Umerkot	12	7.9	1.94	-	9.9
Dadu	-	-	-	0.5	0.5
Hyderabad	-	-	-	0.3	0.3
Jacobabad	-	-	-	0.1	0.1
Tharparkar	-	-	-	6.7	6.7
Thatta	-	-	-	15.7	15.7
Provincial total	**378**	**147.6**	**253**	**56**	**456.58**
Balochistan Province					
Kalat	25	12.2	-	-	12.2
Lasbela	33	9.5			9.5
Nasirabad	13	8.7			8.7
Jaffarabad	9	13.2			13.2
Provincial Total	**-**	**43.61**	**-**	**-**	**43.61**

Note: The figures have not been depreciated

Indirect Losses

Indirect losses for Sindh have been calculated to at Rs 703.6 million. No such loss is calculated for Balochistan due to lack of data. Indirect losses which derives from higher expenditures related to (i) supplying potable water (tankers, cost of hand-pumps, water tanks, purification and disinfection processes), and (ii) cleaning, wells, sewers and pipes; and for the loss of revenue from interrupted water supply services.

Damage Quantification Process

The assessment relied on government reports of damage for public sector infrastructure, provided by the Public Health Engineering Department (PHED), and to a lesser extent from local NGOs (community infrastructure data). The data quality and authenticity varied, depending on access to damage sites and on the organizational capacity of the provincial government. The collected data in cases was probably more of an estimate where apparently no physical inspection was possible or time available to do so was insufficient. Where validation has been possible in Sindh, validators found damages overstated.

Damage has been quantified on the basis of an assessment by the Government of Sindh, where they identified the schemes in each district/tehsil and the extent of damage to each scheme. The actual cost was calculated based on the actual cost of construction. Most of the schemes are between 10-20 years of age; however a depreciation factor has not been applied because inflationary appreciation of cost in relation to current market value is much higher.

As soon as detail damage data at scheme level was obtained, the Team began a validation process that consisted of site visits by team members to review the estimates, document damage and make some assessment on building back better requirements. The validators were accompanied by PHED and/or TMA staff familiar with the schemes. Based on this information, the validators engaged with the Government representative on areas of concern. The data initially provided by PHED was completely revised on the basis of the findings of the validation visits.

Box 1: Challenges to Data Collection and Validation

- Data collection templates not strictly followed by all government agencies, nor well understood; data quality varies
- New schemes added by government agencies; some overestimation indicated
- Lack of asset inventories; no baseline for infrastructure or service levels
- Under-reporting of damage to non-functional schemes possibly understates damage to public assets
- No centralized source for information on community infrastructure

Recovery and Reconstruction Need Assessment & Build Back Smarter Factor:

Need Assessment

A total need of PKR 1,378.6 million has been assessed for the losses in Sindh. A need could not be assessed for Balochistan because of lack of data from the government, however, it is estimated that it would be much more than the damage i.e. PKR 43.61 million. The need is based on construction of similar facilities that have been damaged. PKR 610.53 million have been assessed for water supply and PKR 768.08 million for sanitation. Completely destroyed public infrastructure requirements for WATSAN stand at PKR 514.14 million and partially destroyed public infrastructure is at PKR 864.47 million.

No need has been assessed for the community infrastructure damage. It is also worth noting that sanitation needs are more than that of water supply possibly due to costly drainage schemes. There must also be household needs to construct toilets which are not part of this calculation. Table 14.3 depicts the district-wise needs for both, completely destroyed and partially destroyed schemes for both water supply and sanitation. This calculation is based on government's estimates conducted through district offices of PHED. Districts which show a need of 'zero' rupees are where either there is no need for infrastructure due to damages of the rains or insufficient data existed.

Table-Annex 14.3: District-wise Needs Assessment for Public Water Supply and Sanitation

District	Public Water Supply Facilities		Public Sanitation		Total Damage
	Destroyed - PKR Million		Destroyed - PKR Million		PKR million
	Completely	Partially	Completely	Partially	
Badin	24.04	32.26	8.00	12.88	**77.18**
Dadu	0.00	0.00	0.00	0.00	**0.00**
Ghotki	0.00	0.00	4.07	10.78	**14.85**
Hyderabad	0.00	0.00	0.00	0.00	**0.00**
Jamshoro	0.00	0.00	0.00	0.00	**0.00**
Khairpur	15.27	10.43	2.84	99.60	**128.13**
Larkana	0.00	0.00	0.00	0.00	**0.00**
Matiari	1.05	2.11	1.13	75.35	**79.64**
Mirpurkhas	157.26	27.74	6.50	86.10	**277.60**
Naushahro Feroze	2.40	3.60	0.00	46.16	**52.16**
Nawabshah (Shaheed Benazirabad)	4.30	15.36	15.50	100.86	**136.02**
Sanghar	77.49	25.03	19.70	32.63	**154.84**
Tando Allahyar	14.50	0.72	88.64	1.00	**104.86**

Tharparkar (tehsils)	12.92	17.00	15.54	11.96	**57.42**
Thatta	0.00	0.00	0.00	0.00	**0.00**
Umerkot	0.00	157.30	0.00	95.63	**252.93**
Total All Districts	**319.01**	**291.52**	**195.13**	**572.95**	
Total (WS and Sanitation):		**610.53**		**768.08**	**1,378.61**

Build Back Smarter

Considering the nature of damage due to excessive rainfall, the Build Back Smarter Factor (BBS) has been evaluated for two parameters i.e. (i) technical upgrade factor and (ii) disaster mitigation factor. A 15% increment has been assumed for each of the proposed factors in all districts of Sindh and Balochistan. In addition, several other awareness, hygiene and disaster related factors have been costed given in the table below:

Table-Annex 14.4: Incremental Factor for BBS

Factors	Sindh	Balochistan
WATSAN infrastructure/system specific review	PKR 3.6 million	PKR 300,000
Tariff awareness + willingness to pay	PKR 42.5 million	PKR 2.5 million
Establish information and policy framework	PKR 16 million	PKR 4 million
Emergency response plan preparation and training	PKR 17 million	PKR 5 million
Total	**PKR 79.1 million**	**PKR 11.8 million**
Disaster-Mitigation Factor	15%	15%
Technical Upgrade Factor	15%	15%

The Reconstruction Needs inclusive of BBS in Sindh and Balochistan are PKR 1,900.2 million, which includes PKR 1,831.7 and PKR 68.5 million for each, respectively. In Sindh, it has been calculated to be PKR 833.24 million and PKR 998.5 million for water supply and sanitation, respectively. The Reconstruction Needs inclusive of BBS for Balochistan are only for water supply amounting to PKR 68.5 million.

Existing sectoral policies/strategies and priorities

Amongst the key areas that the national and provincial governments have focused on are the development and roll out of a clearly articulated policy framework, sector financing and understanding institutional

constraints. The Government of Pakistan has notified a National Drinking Water Policy and a National Sanitation Policy.

The Government of Sindh has only very recently notified a Sanitation Strategy for the province of Sindh. The Strategy identifies a number of areas for reforms within the sector that though focus on the sanitation sector can easily be related to the water supply sector also. Such recommendations are also relevant within the backdrop of post flood rehabilitation and contingency planning. The Strategy emphasizes that sanitation services development should be based on comprehensive and strategic medium-term sanitation planning at the city, town and village level. Once completed, the province wide sanitation strategy can then be translated into recurring annual sanitation action plans. The series of steps can be adapted to the overall WATSAN sector that can go into the building of the sector development framework and would represent a continual development process inclusive of disaster related contingency planning.

One critical shortcoming and constraint in both collection and validation of flood damage data was the inadequacy of documentation/records that are also not constantly updated. The Strategy stressed the critical importance of prioritizing operation & maintenance and improving monitoring & evaluation. The overall WATSAN sector needs a new vision and approach for sector monitoring and evaluation, incorporating strategic interfaces between the sector functions and processes of monitoring & evaluation for improving quality of service and social accountability of the sector players.

Proposed Sectoral Recovery and Reconstruction Strategies

Guiding principles for the proposed reconstruction and recovery strategy may include:

- Investment in recovery will be wasted unless sector is pivoted around a carefully designed and structured monitoring & evaluation regime linked with service and performance standards
- New models for rural and urban water supply and sanitation services delivery should be based on use of appropriate technologies, customer-focused, performance-driven and financial sustainable
- Capacity building in absence of sound management and incentive structures is ineffective
- A realignment in sector linkages both within and without the sector is critical that can improve both the rapidity and effectiveness of the sector in crisis and disaster situations

Table-Annex 14.5: Recovery Strategies

Province/Area	Variances and Preferences	Common Elements
Sindh	• More extensive, lengthy inundation necessitates longer transition and reconstruction period • Drainage provisions and related infrastructure to be developed based on site specific physical and natural requirements	• Management models for urban and rural areas require structural changes to ensure effectiveness of recovery investments • Use of appropriate technologies and re-evaluation of criteria/specifications for infrastructure development • Effective management information

Balochistan	• Modular designs if possible to simplify process, accelerate implementation, reduce costs • Rural water supply storage tanks at ground level for earthquake resilience • Earthquake resilience a priority	• systems, including accounting, inventory and customer complaints systems needed linked with a comprehensive monitoring & evaluation regime • Incentivize service providers to monitor water quality, inventory and maintain assets, record and respond to customer needs • Incorporate disaster planning within the planning processes • Harness economies of scale; tap private sector expertise and resources

The recovery process should begin with clear understanding of the baseline for pre-flood services and WATSAN assets, followed by scheme-specific and community system-specific analysis of damages, with consideration for building back better and smarter –with view to ensuring that reconstruction enhances overall system performance. This would require a thorough process of inventory development that should then become part and parcel of the sector responsibilities and functions – data updating and record keeping. Options for reconstruction should only be enforced where the damaged facility may be redundant. Immediate actions that may also assist in identifying area/scheme related repair/reconstruction needs may include system de-clogging/cleaning, priority repairs and review of the models for managing capital investments and service delivery in rural and in urban areas. The program for repair and reconstruction should be coupled with a rethink on selection of building materials/technologies, models for system management (community ownership, government-community partnership etc.). Specific drainage provisions and flood management plans would have to be considered to avoid extended inundation in the future. However, for such a process to find sustainability and effectiveness it has to be linked with much enhanced investment in research and development and staff training and capacity building.

As mentioned earlier also, in the post flood scenario, scheme selection criteria, including design standards and specifications, flexibility of expansion, and quality and level of service, location of schemes in flood-prone areas and their respective protection are critical areas requiring improvement. Standard operating procedures (SOPs) in such emergencies should be put in place for WATSAN service providers, LGD, and PHED. In addition, relevant line departments and other agencies/communities should be made a part of the emergency preparedness programs.

Table-Annex 14.6: Prioritized Sector Recovery Framework/Timeframe

Timeframe	Activity
Short Term (12 months)	System cleaning, de-clogging, disinfection
	Priority water supply and sanitation repair and reconstruction
	Study to develop 'Sector Baseline' that does not only provides coverage to the flood affected areas
	but the entire province
Medium & Long Term (12 to 24 months)	Emergency response plan/ risk reduction plans preparation and training and capacity building of relevant sector personal
	Study to evaluate and asses the building/procurement specifications, selection criteria for technology options that focus on use of appropriate technologies/site selection of key infrastructure and facilities and materials with relevance to sustainability of use in disaster situations such as floods
	Study on WATSAN services management and alternative models for organizing service delivery, particularly in rural areas that pivots the sector around carefully designed and structured monitoring & evaluation regime linked with service and performance standards

Annex 15: Irrigation and Flood Management

Sector Background

Sindh's agriculture accounts for 17.4 percent of the provincial GDP and 50 percent of the employment. The Sindh irrigation system consists of Guddu, Sukkur and Kotri Barrages on the Indus River. These barrages divert water into fifteen canals— four at Guddu, seven at Sukkur and four at Kotri Barrage commanding 2.5 million ha. A total of 2,240 km of drains and 5,835 tube wells complement the irrigation system. In Balochistan only about 767,120 ha land in 3 out of the 26 districts is irrigated by Indus Basin Irrigation System. The main canals are the Pat Feeder, Kirther and Uch canals. In remaining parts of the province there are many small basins where spate irrigation, karezes, small irrigation schemes, small dams and tube wells are the main sources of irrigation.

Floods Damage Overview

Unprecedented rainfall in two major spells during August and September 2011, caused wide spread damages in most parts of Sindh province and some of Balochistan. Twenty one of 30 districts in Sindh, and 14 of 24 districts in Balochistan were affected due to extremely high intensity and long duration rains. Vast portion of agricultural land remained inundated for more than two months thus causing huge agriculture and crop losses alongside damages to irrigation, drainage and flood protection infrastructure. Mostly banks canals and drains got eroded. Initially drains overflowed due to excessive water and subsequently ran in fully submerged conditions. Residential and office buildings, already prone to collapse due to long deferred maintenance worsened, actually collapsed. The damages reported are actually reconstruction cost worked out by using prevailing composite schedule of rates (CSR) in each province. The cost of damage is worked out by applying depreciation factor of 0.5 because most of the infrastructure is more than 15 years old. The cost of damage is provided in the summary para of main report, whereas this annex shows all figures for reconstruction.

Sindh provincial Irrigation and Power Department (SID) reported damages amounting PKR 15,774 million (US$ 181.3 million) in all its six administrative regions covering 38 operational divisions. However, after field verification and data validation these damages reduced to PKR 7,872 million (US$ 90.5 million). Similarly, Balochistan Irrigation and Power Department (BID) reported damages worth PKR 1,720 million (US$20 million) in 14 irrigation divisions, which reduced to PKR 1,654 million (US$ 19 million) after field validation. Table 15.1 shows the damages reported by each Region and Figure 15.1 shows distribution of same damages by regions. In Sindh most of the damages were to canals, drains and appurtenant structures. Offices and residential buildings of the Irrigation department also suffered damages. Flood embankments and other minor infrastructure also suffered few losses. In Balochistan most of the damages were to small dams, diversion channels, flood embankments, canals and drains. Table 15.2 reflects the damages by type of structure and Figure 15.2 shows distribution of damages by type of structure.

Table-Annex 15.1: Damages by Region/Zone (PKR million)

S.No.	Regions/Zones	Total
Sindh		
1	SIDA	3,369
2	Sukkur Barrage Left Bank	2,175
3	Kotri Barrage	887
4	Development	746
5	Sukkur Barrage Right Bank	638
6	Small Dams	58
	Sindh Total	**7,872**
Balochistan		
1	North Zone	779
2	South Zone	783
3	Canal Zone	92
	Balochistan Total	**1,654**

Figure-Annex 15.1: Distribution of Damages by Region (%)

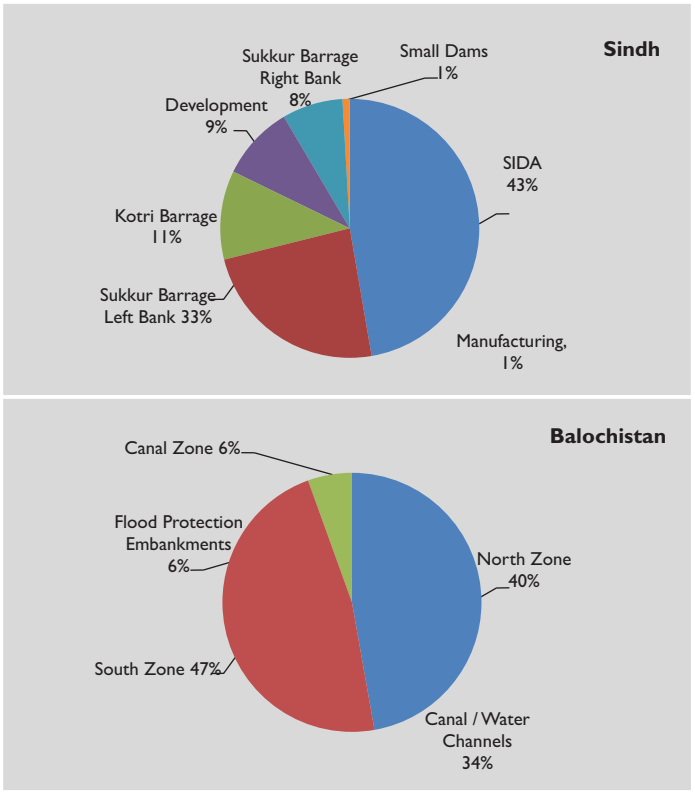
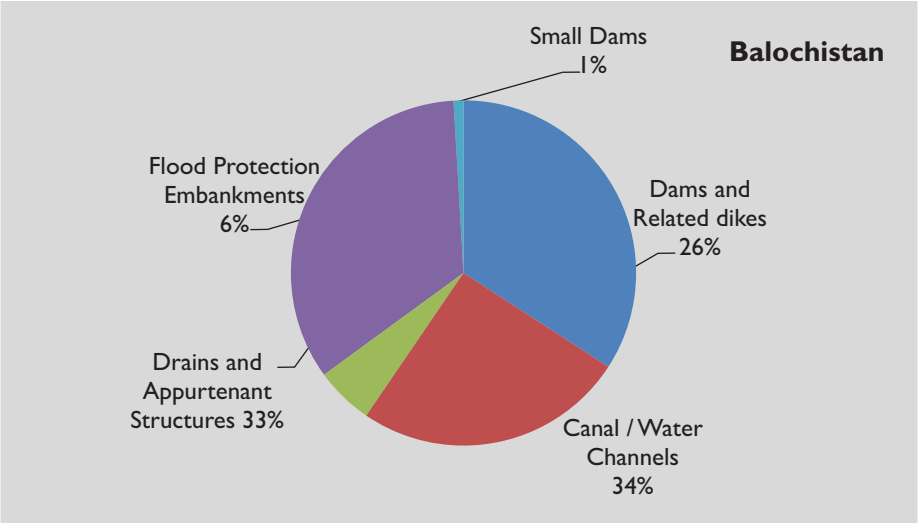
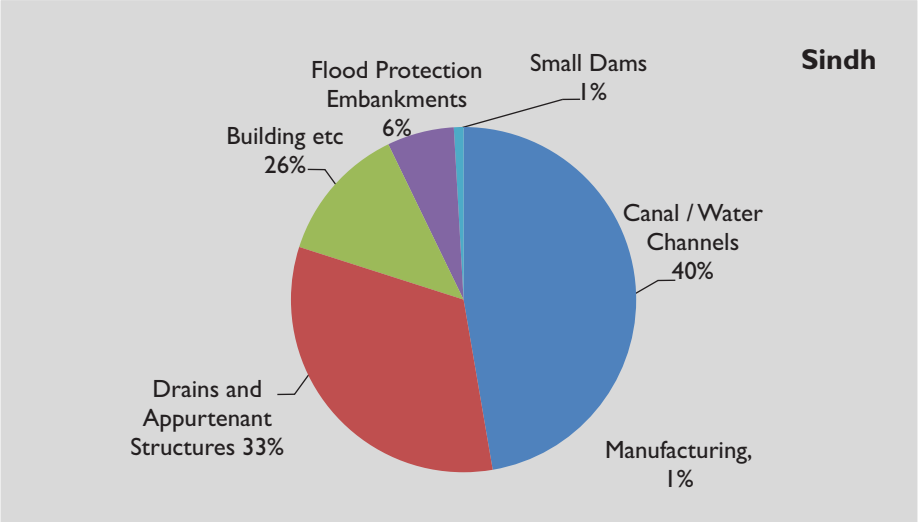


Table-Annex: 15.2: Damages by Type of Structure (PKR million)

S.No.	Structure description	Total
Sindh		
1	Canal	3,724
2	Drains and Appurtenant Structures	2,563
3	Building etc	1,009
4	Flood Protection Embankments	512
5	Small Dams	63
	Sindh Total	**7,872**
Balochistan		
1	Dams and Related Structures	557
2	Flood Protection Embankments	561
3	Canals	435
4	Drains and Appurtenant Structures	87
5	Building etc	14
	Balochistan Total	**1,654**

Figure-Annex 15.2: Distribution of Damages by Type of Structure (%)





Damages to Canals

Damages incurred to main canals, branch canals, distributaries, minors and head/cross regulators, which were 47% of the total cost of damages in Sindh and 26% in Balochistan. The field validation/ verification exercise revealed that major damages occurred on embankments of main/branch canals as a result of slippages, and to the berms due to inundation. The inspection path along canals, however, sustained minor losses in terms of settlement or small pitting. Akram Wah main canal in Sindh is an exception where large breeches resulted due to both relief cuts made by the farmers and heavy rains. Following first spell of rain in August 2011, the farmers in Sindh made relief cuts at various reaches to drain their inundated farmlands. These relief cuts which were not largely plugged before second spell of rain in September further widened and/or breeched. In Sindh, more than 50% of damages have been reported in only nine divisions operating main canals like Fullili, Akram Wah and Ghotki Feeder. In Balochistan, damages to aqueducts, head regulators and feeder channels have been reported. Table 15.3 gives the damages by canal types.

Table-Annex 15.3: Canal Damages by Type (PKR million

S.No.	Sub types	Total
Sindh		
1	Main Canals	1,180
2	Branches	986
3	Canal Minors	581
4	Distributaries	527
5	Head / Cross Regulators	450
	Overall	**3,724**
Balochistan		
1	Canals/Channels	232
2	Aqueducts	80
3	Feeding Channels	32
4	Head / Cross Regulators	29
5	Others (Culverts etc)	62
	Overall	**435**

Damages to Drains and Appurtenant Structures

Damages to main/outfall drains, secondary and tertiary drains, regulators and embankments are 33% of the total in Sindh and 5% in Balochistan. Left Bank Outfall Drains (LBOD) and in particular spinal drain eventually took entire drainage load of left bank of Indus river in Sindh. SID estimated that flow in spinal drain reached four to five times of its designed capacity, but it is not verified. A number of breaches and overtopping was reported between RD 204 to RD 297 and at some reaches (RD 6 & RD 7 and in between RD 0 to RD 6). The drain banks completely washed away where farmers have made relief cuts[1]. The spinal drain along with its tributary drains remained inundated for several weeks causing erosion of embankments and inspection paths. Other major drains like Mirpur Khas main drain, Fullili-Gunni, Karo Naro drain, Duro Puran outfall drain (DPOD) and Kadhan Patiji outfall drain (KPOD) sustained similar losses all along their lengths. Relatively lesser damages have been reported for allied regulators, and no regulator was reported as completely damaged or washed away. Table 15.4 shows damages by type of drain.

[1] LBOD Daily status report by Director Left Bank Canals Area Water Board

Table-Annex 15.4: Damages by Type of Drain (PKR million)

S.No.	Sub types	Total
Sindh		
1	Minor Drains	962
2	Main/outfall Drains	837
3	Branch Drains	359
4	Tubewells	230
5	Disposal Channels	116
6	Regulator/Outfall Regulator	60
	Overall	**1,454**
Balochistan		
1	Main/outfall Drains	67
2	Branch Drains	10
3	Minor Drains	10
	Overall	**87**

Damages to Buildings

Official buildings, rest houses, residences and staff quarters of SID suffered around 14% of the total damages. Severe damages have been reported in 11 divisions including Rohri, Nasir, Ghotki, Barrage, Thar, Drainage-Sanghar Tubewell, Fullili, Drainage-Badin, Mirpur and Akram Wah, where slabs of offices and rest houses collapsed. Field validation though confirmed the extent of damages but observed that these were largely attributed to long deferred maintenance and heavy rain only contributed in final collapse. In Balochistan, only four of the 14 affected divisions reported damages to the buildings which are only 1% of the total damages in the province. Table 15.5 reflects the damages against each subtype of Building category in Sindh.

Table-Annex 15.5: Damages by Type of Building (PKR million): Sindh

S.No.	Sub types	Total
Sindh		
1	Residences	537
2	Office Buildings	274

Damages to Flood Protection Embankments

Relatively lesser (7% of total) damages were reported to flood protection works in Sindh as most of these embankments lie outside the heavy rainfall areas. Only 15 out of 38 divisions reported damages to flood embankments in their jurisdiction. The major embankments reported damaged include Gaj Diversion Bund (RD 0-32), Larkana Sehwan (LS) bund, Flood Protection (FP) bund and Sagyun Matiari (SM) Bund. The damages to these bunds occurred mostly on outer side and largely because of water pooled on farms having no drainage. As a result frequent slippages occurred at bottom of bund sections all along their lengths. No breach was reported in any of major embankments. In Balochistan, damage to flood embankments is 34% of the total damages. Table 15.6 gives flood protection damages in Sindh by divisions and damages in Balochistan by type of flood protection structure.

Table-Annex 15.6: Damages to Flood Protection Embankments by Division (PKR million)

S.No.	Division	Total
Sindh		
1	Southern Dadu Division	132
2	Hala	110
3	Rohri	83
4	Kohistan I	42
5	Northern Dadu Division	32
6	Lower Pinyari	20
7	Thar	18
8	Warah Division	16
9	Dad	13
10	Rice Canal Division	13
11	Saifullah Magsi Division	11
12	Drainage Thatta	10
13	Upper Pinyari	6
14	Kalri Beghar	5
15	Shahbaz Irr Division	4
	Overall	**512**
Balochistan		
1	Flood Protection Bunds	470
2	Flood Spurs	60
3	Bund Sluices/Escapes	31
	Overall	**561**

Damages to Dams and related Structures

Minor damages of about 1% of total damages costing PKR 63 million have been reported in Sindh and only in one of six regions. Whereas in Balochistan damages occurred to dam embankments, spillways/weirs and guide Bunds are 34% of the total cost of damages. The field validation/verification exercise revealed that major damages occurred on embankments of dams and spillways due to flood exceeding the design value. Table 15.7 gives the damages by type of structure for both provinces.

Table-Annex 15.7: Damages to Dams and Appurtenant Structure (PKR million)

S.No.	Sub types	Total
Sindh		
1	Stone Pitching	23
2	Weir	40
	Overall	**63**
Balochistan		
1	Dam Embankments	195
2	Spillways/Weirs	233
3	Guide Bunds	116
4	Others	13
	Overall	**557**

Data Collection and Validation Process

As the process of DNA commenced in early October 2011, a standard format was developed for Irrigation and Flood sector seeking consistency in data capturing and recording. The structured format was flexible enough to capture damages and diversity in subtypes of irrigation infrastructures under six broad categories. The format along with necessary guidelines for filling the same were accordingly sent to provincial Irrigation Department (PIDs) in mid October. 38 operational divisions of SID and 14 of BID sent damage data to Focal Person, which was forwarded to ADB. Earlier a team of consultants was recruited and stationed at Hyderabad to help facilitate data collection from field and data entering into DNA format. As a parallel exercise a comprehensive database was developed for generating customized reports based on deeper analysis. Field data entry in the database continued till revision and finalization of all data i.e. second week of December. This exercise had two distinct functions; first one comprised simply transfer of data from DNA format to database, data cleaning, necessary corrections (categories, subtypes, units etc wrongly placed or reported in DNA format) and filling of blanks (particularly unit cost and measuring units). The second one - being instrumental in field validation process- comprised (i) segregating and arranging data by key parameters (categories /subtypes, administrative regions/divisions); (ii) analyzing data further for indentifying possible anomalies (comparing unit costs across subtypes of infrastructures and regions/divisions, and comparison of total size of infrastructure with size and extent of damages reported); (iii) identifying relatively high damage areas (both by divisions and by infrastructure types); and (iv) spotting evident areas of diversions from mean values.

Physical verification at site was next critical step in validation process. For the purpose ADB further strengthened its already deployed DNA team by increasing number of consultants from 2 to 5 for accomplishing required task at the earliest possible. Thirty eight divisions in Sindh were divided into Priority-I divisions, 20 in total (based on the value of reported damages); and remaining 18 divisions under Priority-II. All of Priority-I divisions were visited by DNA validation team and previously spotted points, through data analysis, were verified/or observed otherwise on sample basis. Damages for another 6 divisions were validated through discussions with concerned field staff. In this way validation exercise covered the divisions that correspond to more than 90% of total reported damages. In Balochistan three divisions reporting maximum damages were visited for field validation, whereas detailed discussion were done with chief engineers, superintending engineers, executive engineers and assistant executive engineers of all divisions. The data inconsistencies were shared with them and subsequently they were advised to submit revised data.

Apart from other observations, DNA validation team made two key observations almost across the board; firstly: extent and magnitude of damages reported was not merely because of intense rains rather appeared a result of long deferred maintenance and rains, particularly in Sindh; secondly: cost basis for reporting damages varied considerably for similar structures across various operational divisions.

Final step of validation process was to get the reported damages rationalized/revised from PIDs on the basis of field observations particularly the ones mentioned above. The cumulative effect of rationalization after field verifications was significant in Sindh, with a net reduction PKR 7,901 million (US$90.8 million) in previously reported damage figures. However, in Balochistan the validation exercise has caused a difference of only PKR 66 million (US$0.8 million), which is nominal. Therefore present figure of PKR 1,654 million (US$ 19 million) may be considered final for Balochistan.

Proposed Sector Recovery and Reconstruction Strategies

The proposed irrigation, drainage and flood protection sector reconstruction strategy is to restore all damaged structures, and strengthen vulnerable and damaged sections before 2012 monsoon. Keeping in view the changing climate patterns affecting intensity and duration of rainfalls, particularly in Sindh province, it is recommended that the Government reviews its (i) current flood management strategy, (ii) disaster management strategy, (iii) disaster preparedness capacity, and (iv) evacuation and flood relief capacities. Main drains in Sindh, particularly Left Bank Outfall Drain (LBOD) drained huge volume of water, which otherwise would have kept inundated the farmlands for a very long period also affecting the cropping in winter season. These drains have been designed to discharge sub-surface water for checking water logging of agricultural land. Their capacity should be enhanced for also draining storm water, after carrying out in-depth analysis and forecasting probable maximum rainfalls in next 20 to 50 years. Proper inlets need to be designed for collecting rain water. Strict monitoring is essential to avoid cutting by the farmers. Annual maintenance, before and after monsoon season, if not carried out would waste whatever investments are made to improve these drains. Preparation of a maintenance manual is strongly recommended.

For small dams, design parameters for estimating reservoir size, dam configuration, spillway capacity, and highest flood levels need to be revisited keeping in view the changing climate patterns, and rainfall intensities and durations. The present hydrological approaches of using historic data to estimate future trends need to be more carefully applied for future dams and flood irrigation projects.