Country Case Studies

1. Bangladesh

1.1 Resilience Overview

Introduction

With a population of 160 million and a GDP growth rate of approximately 6%, Bangladesh aims to achieve high and steady growth, reduce poverty and sustain macroeconomic activity over the coming years.[2] Though Bangladesh is a developing country, the positive impact of close to two decades of nearly 6% growth is visible throughout the country and particularly in its capital Dhaka. Close relationships and collaboration with a number of development partners has helped place the country on track to meeting many of its Millennium Development Goals (MDG). Both economic growth and progress towards the MDGs has helped Bangladesh enhance life expectancy, reduce infant and maternal mortality and increase incomes and living standards.[3]

Bangladesh has the potential to generate 15 million jobs and reach 8% growth in the medium term.[4] Despite such potential, however, over 30% of its population lives in poverty, most of which lives in geographically fragile areas (e.g. river islands, cyclone-prone coastal belts). The country must therefore overcome significant economic, political and natural and climactic challenges in order to sustain or increase its progress.

Top 10 Natural Disasters in Bangladesh for the period 1900 to 2013 by economic damage costs[1]

Disaster	Year	Damage (000 USD)
Flood	1998	4,300,000
Storm	2007	2,300,000
Flood	2004	2,200,000
Flood	1988	2,137,000
Storm	1991	1,780,000
Storm	1995	800,000
Flood	1987	727,500
Flood	1974	579,200
Flood	2000	500,000
Earthquake	2004	500,000

TOTAL (top 10) = USD 15.82 billion

Table 1: Bangladesh country statistics

Indicator	*Result*	*Date*
GDP (purchasing power parity)	USD 305.5 billion	2012 est.
GDP real growth rate	6.1%	2012 est.
GDP per capita	USD 2,000	2012 est.
Population	163,654,860	July 2013 est.
Population growth rate	1.59%	2013 est.
Urban population	28% of total population	2010
Rate of urbanisation	3.1%	2010-2015 est.
Population below poverty line	31.5%	2010 est.
Major cities	Dhaka: 14.25 million Chittagong: 4.82 million Khulna: 1.64 million Rajshahi: 853,000	2009
Area	143,998 sq km (land 130,168 sq km, water 13,830 sq km)	
Coastline	580 km	
Employment		
Labour force	77 million	2012 est.
Labour force occupation	Agriculture 45%; industry 30%; services 25%	2008
Unemployment rate	5%	2012 est.
Economy		
Key agricultural products	rice, jute, tea, wheat, sugarcane, potatoes, tobacco, pulses, oilseeds, spices, fruit; beef, milk, poultry	
Industries	jute, cotton, garments, paper, leather, fertilizer, iron and steel,	

[1] http://www.emdat.be/result-country-profile
[2] http://www.bhclondon.org.uk/Overview.html
[3] http://travel.state.gov/travel/cis_pa_tw/cis/cis_1011.html
[4] World Bank: Bangladesh Development Update: Slower, Yet Healthy Growth With Remarkable Development Progress. <http://www.worldbank.org/en/news/feature/2013/04/13/bangladesh-development-update-slower-yet-healthy-growth-with-remarkable-development-progress>

	cement, petroleum products, tobacco, drugs and pharmaceuticals, ceramic, tea, salt, sugar, edible oils, soap and detergent, fabricated metal products, electricity and natural gas	
Industrial production growth rate	7.4%	2011 est.
Exports	USD 25.79 billion	2012 est.
Key commodities exported	garments, knitwear, agricultural products, frozen food (fish and seafood), jute and jute goods, leather	
Key export partners	US 19.4%, Germany 16.5%, UK 10%, France 7.3%, Italy 4.4%, Spain 4.2%, Netherlands 4.2%	2011
National infrastructure		
Airports (paved/ unpaved runways)	18 (16/2)	2012
Pipelines	gas 2,714 km	2010
Railways	2,622 km	2008
Roadways (paved/unpaved)	21,269 km (1,063 km/20,206 km)	2010
Ports and terminals	Chittagong; Mongla Port	
Energy and telecoms		
Electricity – installed generating capacity	5.819 million kW	2009 est.
Electricity generation type	Fossil fuels 95.8%; hydroelectric plant 4%; other renewable sources 0.3%	2009 est.
Telephones – main lines	977,700	2011
Telephones – mobile cellular	84.369 million	2011
Internet users	617,300	2009

Overview of natural hazards, vulnerability and impacts

Located in a low-lying delta between the Himalayas and the Bay of Bengal, Bangladesh primarily consists of low and flat land with some hilly areas in the northeast and southeast and is one of the most climate vulnerable countries in the world. Manufacturing is the biggest contributor to GDP. However, Bangladesh is an agrarian-based economy on which the majority of the population subsists.

With over 1,000 people per square kilometre, the country has one of the highest population densities in the world and is highly vulnerable to flooding and cyclones. In the past 20 years, 60% of worldwide deaths caused by cyclones have been in Bangladesh. Its average elevation is five meters above sea level while 10% of the country is only one meter above sea level. This leaves one-third of the country at risk of tidal inundation while 70% becomes flooded during the monsoons. Bangladesh's general climate can be described as:[5]

- Mild, cool, and dry winter (November - February)
- Hot, humid summer / pre-monsoon (March - May)
- Humid, warm rainy monsoon / monsoon (June - October)

Table 2 shows what recent trends may indicate for the future.

Table 2: Recent climate trends in Bangladesh

Climate events	*Existing trends*	*Expected climate changes*
Extremes	• Significant increasing trends in the cyclone frequency over the Bay of Bengal have been observed in November and May, which are main months for cyclone activity in the Bay of Bengal.	• The frequency of tropical cyclones in the Bay of Bengal may increase and, according to the Intergovernmental Panel on Climate Change's (IPCC) Third Assessment Report, there is "evidence that the peak intensity may increase by 5% to 10% and precipitation rates may increase by 20% to 30%" (IPCC 2001). Cyclone-induced storm surges are likely to be exacerbated by a potential rise in sea level of

[5] http://sdwebx.worldbank.org/climateportalb/home.cfm?page=country_profile&CCode=BGD&ThisTab=Dashboard

		over 27 cm by 2050.
Rainfall	• The erratic nature of rainfall and temperature has increased in Bangladesh.	• As yet it is difficult to project rainfall changes for the Ganges River flood plain, with some models projecting wetter and others projecting drier conditions.
Temperature	• Average monsoon-season maximum and minimum temperatures show an increasing trend annually at the rate of 0.05°C and 0.03°C, respectively. An increasing trend of about 1°C in May and 0.5°C in November during the 14 year period from 1985 to 1998 has been observed.	• Mean temperatures across Bangladesh are projected to increase between 1.4°C and 2.4°C by 2050 and 2100, respectively. This warming is expected to be more pronounced in the winter months (December-February).
Sea level rise	• n/a	• Sea level rise is projected for Bangladesh, although there is disagreement on what the degree of sea level change will be - one study suggests an increase of 30-100 cm by 2100, while the IPCC gives a global average range with slightly lower values of 9 to 88 cm.

Natural hazards in Bangladesh have an enormous and significant negative impact on the economy and the development of key sectors such as agriculture and infrastructure. A range of hydro-meteorological and geo-physical hazards including cyclones, floods, droughts and earthquakes pose risks to Bangladesh. Some of these hazards (e.g. floods, monsoon, etc.) are predominantly seasonal and occur annually. Other hazards such as earthquakes are rare events but potentially highly destructive.[6]

- The cyclone that hit Bangladesh's coastal areas in 1970 resulted in more than 300,000 deaths and USD 2.5 billion worth of damage to property.
- Flooding and riverbank erosions affect one million people annually in Bangladesh while once in every three to five years, two-thirds of the country is inundated by floods.
- Seasonal droughts, particularly in the northwest, have a significant impact on crops and food security.

Both the 1998 monsoon flood and 2007's Cyclone Sidr have revealed the vulnerability of Bangladesh society and economy to disasters. In 1998 flooding covered over two-thirds of the country, resulting in damage and losses amounting to more than USD 2 billion (4.8% of GDP) across agriculture, infrastructure, and industry. Over 1,000 people were killed and 30 million became homeless. More recently, the 2007 cyclone led to damage and losses of more than USD 1.7 billion (2.6% of GDP) with half of the losses in the housing sector, and the remaining in agriculture and infrastructure.[7] A report by the Government of Bangladesh in 2008 reported that Cyclone Sidr caused over 3,400 deaths and 55,000 injuries, and seriously affected one million households.[8] In both of these events, loss and damage was concentrated in areas with high population density and poverty rates, thereby primarily affecting the poor's living conditions and employment opportunities.

Women also tend to be adversely affected by natural hazards as they have fewer resources and lower capacity than men to prepare for or cope with the losses. Women are more at risk given their traditional roles in caring for cattle, homes and children. They are consequently unable to access information in the face of a disaster. Lack of access to adequate food supplies and clean water can also result in malnutrition, sickness and overall poor health conditions. Many women are landless, single or widowed, and are therefore forced to survive on their own without adequate protection.

[6] http://sdwebx.worldbank.org/climateportalb/home.cfm?page=country_profile&CCode=BGD&ThisTab=NaturalHazards
[7] World Bank: Economics of Adaptation to Climate Change Bangladesh. 2010.
[8] Government of Bangladesh: Cyclone Sidr in Bangladesh. Damage Loss and Needs Assessment For Disaster Recovery and Reconstruction. April 2008.

Despite USD 10 billion in investment by the Government of Bangladesh over the past few decades to increase the country's resilience to climate-related hazards, these events reflect the large economic losses and challenges to development that still result from natural hazards and climate change impacts.[9]

Given the dependence of the country on agriculture (45% of population) and natural resources, Bangladesh is also highly vulnerable to climate change. With nearly 80% of the population living in rural areas, approximately 70 million people are employed in agriculture while another 56 million are employed in the non-farm sector (which is primarily driven by agriculture).[10] Trends in erratic rainfall, flooding, sea level rise and increased salinity, and increasing temperatures therefore directly affect agricultural production and yields, food security and the livelihoods of millions of people. According to the IPCC, Bangladesh could potentially lose 17% of its land and 30% of its food production by 2050 due to the impacts of climate change.[11] Estimated agricultural GDP losses of 3.1% are estimated annually between 2005 and 2050 – amounting to USD 36 billion in lost economic value.[12]

Sensitivity of key economic sectors

A sector sensitivity analysis was carried out to help focus the country analysis in areas where the private sector is particularly exposed or can have a substantive influence on resilience. This assessment included a broad review including the identification of economic trends, each sector's employment and GDP contribution and also the mapping of the major hazards against each sector. The combination of physical risks and economic importance resulted in a prioritised list of sectors.

Bangladesh aspires to be a middle-income country by 2021 and is in the midst of diversifying its economy with industrial development a priority. Despite widespread poverty, frequent natural disasters, and food, fuel, and global economic crisis over the past 10 years, Bangladesh has managed to maintain 6% growth annually and make progress across a number of development indicators. The country has a total labour force of approximately 77 million. Its sector contribution to GDP and labour force participation by sector is as follows:[13]

Table 3: Sector and labour force contribution to GDP in Bangladesh

Sector	*GDP contribution*	*Labour force participation*
Agriculture	17.3%	45%
Industry	28.6%	30%
Services	54.1%	25% (2008)

The table below identifies the key risks presented by natural hazards to Bangladesh's major sectors.[14] It illustrates that flooding, tropical storms, drought and extreme temperature are the most important multi-sector risks to the economy as a whole. Sectors that are most exposed to climate and disaster related risks including agriculture and manufacturing are also evident. All sectors except finance and insurance are either severely or highly exposed.

[9] World Bank: Economics of Adaptation to Climate Change Bangladesh. 2010.
[10] http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/SOUTHASIAEXT/EXTSAREGTOPAGRI/0,,contentMDK:20273763~menuPK:548213~pagePK:34004173~piPK:34003707~theSitePK:452766,00.html
[11] Journal of Ecology and the Natural Environment: Impact of Climate Change in Bangladesh: The Role of Public Administration and Government's Integrity. May 2012.
[12] http://sdwebx.worldbank.org/climateportalb/home.cfm?page=country_profile&CCode=BGD&ThisTab=Dashboard
[13] CIA World Factbook. <https://www.cia.gov/library/publications/the-world-factbook/geos/bg.html>
[14] Source: PwC analysis.

Table 4: Sector - hazard sensitivity assessment

	Agriculture (crops)	*Agriculture (livestock)*	*Manufacturing - textiles*	*Wholesale and retail trade*	*ICT (and transport)*	*Tourism*	*Construction*	*Finance and insurance*	*Mining and quarrying*	*Utilities*
Sector risk rating	Severe	Severe	Severe	High	High	Severe	High	Medium	Severe	High
Tsunami	Medium	Medium	Low	High	High	Severe	High	Medium	Medium	High
Storm surge	Severe	Severe	Medium	High	High	Medium	High	Medium	High	High
Tornado	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Hail storm	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Flood	Severe	Severe	Severe	Severe	Severe	Severe	Severe	High	Severe	Severe
Tropical storm	Severe	Severe	Severe	Severe	Severe	Severe	Severe	High	Severe	Severe
Drought	Severe	Severe	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Frost	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Extreme temperatures	Severe	Severe	Severe	Severe	High	Severe	High	Medium	High	High
Landslide	Medium	Medium	Medium	Medium	Medium	Medium	High	Medium	Severe	High
Earthquake	Medium	Medium	High	High	High	High	Severe	High	Severe	Severe

Severe High Medium Low

With most of the Bangladeshi workforce employed in agriculture and industry, which account for approximately 50% of the GDP, it will be important to build resilience to climate and disaster risks across these sectors. Foreign investors are increasingly focused on channelling investments to the industrial sector including manufacturing. However, like agriculture, manufacturing can be significantly impacted by climate change, variability and extreme weather. Flooding can severely impact small and medium sized enterprises (SME) and the manufacturing sector due to the disruption to communication systems and power supplies, damage to infrastructure and displacement of workers. Cyclones are also detrimental to industry and manufacturing due to damage to buildings, equipment and important assets, as well as important infrastructure and communications network, and adverse livelihoods impacts.

Within manufacturing, the textiles sector in particular plays an important role. As the second largest exporter of clothing in the world, readymade garments in Bangladesh constitute 80% of the country's USD 24 billion in exports annually and 15% of GDP.[15]

[15] Research Journal of Engineering Sciences: Textiles Industries in Bangladesh and Challenges of Growth. February 2013.

To better understand which other sectors are likely to offer best value for money, the sensitivity assessment is contrasted against key economic trends. The analysis presented below further promotes the importance of agriculture as the first priority. It also highlights manufacturing, particularly in textiles, as another sensitive sector. Both sectors have direct links with poor and vulnerable parts of the population.

Table 5: Sector prioritisation

	Climate sensitivity	*GDP Contribution*	*Employment contribution*	*Future GDP contribution*
Agriculture – crops				
Agriculture – livestock				
Manufacturing – textiles				
Wholesale and retail trade				
ICT (and transport)				
Tourism				
Construction				
Finance and insurance				
Mining and quarrying				
Utilities				

Existing national policy landscape and effectiveness

As one of the countries most vulnerable to disaster risks and climate change due to climactic conditions, a high poverty rate and high population density, the Government of Bangladesh has taken significant steps to include these issues within its plans. Since the 1970s, the Government, in collaboration with development partners, has invested over USD 10 billion in flood protection schemes, coastal embankment projects, cyclone shelters, comprehensive disaster management projects, irrigation schemes, agricultural research and coastal 'greenbelt' projects. These investments have helped the country learn how to manage disasters, increase food grain production and rural incomes and decrease fatalities from disasters. One of its first initiatives was the creation of a Climate Change Unit established within the Department of Environment in 2004, which provided a central focus for the Government's climate change work. The Department of Environment sits under Bangladesh's Ministry of Environment and Forests (MOEF). Since its creation, the Climate Change Unit has focused on capacity building, knowledge management and adaptation research.

The MOEF developed a National Adaptation Programme of Action in 2005 to develop, coordinate, and implement a countrywide program to begin addressing its most urgent adaptation needs. One of Bangladesh's first holistic programmes aimed at combating climate change and with 15 priority areas was the National Adaptation Programme of Action (NAPA) which aimed to coordinate with pre-existing regional and national programmes such as the United Nations Development Programme (UNDP) / Department for International Development's (DFID) Comprehensive Disaster Management Programme (CDMP) and all relevant stakeholders. The NAPA was updated in 2009 based on research and consultations carried out in the interim period. Bangladesh has been able to apply some of the lessons learned

through its experience in working with local communities on forest protection and regeneration. The United Nations Framework Convention on Climate Change (UNFCCC) has also recognised that Bangladesh's "NAPA process can be useful for establishing institutional arrangements to address climate change issues in a country."[16]

In 2008, the Government of Bangladesh also took steps to prepare the Bangladesh Climate Change Strategy and Action Plan (BCCSAP), which was subsequently updated in 2009 to ensure that it was streamlined with the priorities of a new government. The 10 year strategy (2009-2018) takes an integrated approach to climate change and sustainable development and focuses on poverty eradiation and the well-being of the country's most vulnerable groups. The strategy also details six broad areas of intervention covering: 1) food security, social protection, and health, 2) comprehensive disaster management, 3) infrastructure, 4) research and knowledge management, 5) mitigation and low-carbon development and 6) capacity building and institutional strengthening. The BCCSAP was developed through a consultative process with civil society, research organisations, development partners and the private sector, and is coordinated by MOEF.[17]

In its efforts to ensure adequate investment in building resilience and managing disasters, the Government established a Climate Change Trust Fund (CCTF) in 2009 and the Bangladesh Climate Change Resilience Fund (BCCF) in 2010. The CCTF has already allocated USD 70 million towards 43 government projects and USD 3.5 million for an additional 30+ NGO projects focused on building resilience. The BBCRF was established with support from development partners, who pledged USD 113.5 million to the fund.[18]

Bangladesh has seen a shift from relief and response to comprehensive disaster risk management. This is reflected both in the integration of disaster risk management with the BCCSAP 2009 as well as through the work of the Government's Department of Disaster Management (DDM) within the Ministry of Disaster Management and Relief. DDM is responsible for undertaking risk reduction activities, responding to disaster events efficiently, and coordinating stakeholders related to disaster risk reduction and management.[19] Its priorities and plans are laid out in Bangladesh's National plan for disaster management 2010-2015.[20] Its Comprehensive Disaster Management Programme (CDMP) is a UNDP and DFID supported programme that was launched in 2003. CDMP sits within the Ministry of Food and Disaster Management and aims to reduce the country's vulnerability to hazards and extreme events through risk management and mainstreaming.[21]

Overall, the private sector is not currently an important feature of disaster and climate risk management planning frameworks. However, in order for the Government to effectively realise its commitment to building greater resilience to climate change risks and managing disasters and to scale existing initiatives and plans, it will be important to take an integrated approach to both planning and implementation.

Country consultation approach

The Bangladesh country case study was developed through consultation with local private sector actors and field and desktop research. Significant efforts were made to reach out to public sector bodies; however, there were no responses. PwC carried out this work with support from Renaissance Consultants, a local project partner and consulting company with access to local businesses and NGOs.

Thirteen separate consultations were held with agricultural, insurance/ financial services, textiles and fast moving consumer goods (FMCG) companies. Wider engagement took place through a workshop held in Dhaka with 28 people in attendance. The table below includes direct one-to-one consultations; the workshop attendee list is appended.

Table 6: Bangladesh primary consultees

Primary consultation list		
Bombay Sweets (national)	D D Ghosal, Head of Marketing	One of the largest agro conglomerates and packaged food

[16] http://unfccc.int/adaptation/knowledge_resources/ldc_portal/bpll/items/6497.php
[17] Government of Bangladesh: Bangladesh's Climate Change Strategy and Action Plan 2009.
[18] http://unfccc.int/adaptation/knowledge_resources/ldc_portal/bpll/items/6497.php
[19] http://www.ddm.gov.bd/
[20] Government of Bangladesh: National Plan for Disaster Management 2010 – 2015.
[21] http://www.cdmp.org.bd/

		producers in Bangladesh.
Green Delta (national)	Shubasish Barua, Vice President	A leading non-life insurance company established in1985.
Interstoff (national)	Naimul Chowdhury, Executive Director	A large scale export oriented RMG company. It currently employs 4500+ people and is based in Gazipur, a district 30 kilometres away from Dhaka.
Standard Chartered Bank (MNC)	Dilara Khan, Cluster Manager, Corporate Real Estate Services	A leading multinational bank with consumer and corporate banking operations.
Unilever Bangladesh Limited (MNC)	Hasan Mazhar, Senior Brand Manger, Foods & Water	A leading fast moving consumer goods company that promotes bottom of the pyramid initiatives.
Nestle Bangladesh (MNC)	Naquib Khan, Corporate Affairs Director	World's largest food group that covers almost every field of nutrition.
Pabna Meat (SME)	Liaquat Ali, Proprietor	International standard meat producing company that supplies quality halal and hygienic meat in Dhaka.
Advanced Chemical Industries (national)	M. Saifullah, ACI Agribusiness Unit Head of Strategy	ACI Agribusiness Unit focuses on crop protection, seeds, fertilizer, agri machinery, and animal health products. It also has strong partnership with national and international research and development (R&D) companies, universities and research institutions.
Mutual Trust Bank (national)	Mohammed Sami-Al Hafiz, Group Chief Communications Officer	A large bank in Bangladesh. Its SME division comprises 8% of its total business and has a high growth rate.
Agricultural Marketing Company Ltd. (AMCL) Pran (national)	Chief Operating Officer	The largest agro food processor and exporter in Bangladesh.
Asha Sweaters (national)	Ashib Hussain, Head of Merchandising	A national export oriented ready-made garments company based in the industrial zone of Gazipur.
DBL Group	Md. Arifur Rahman, Environmental Management System, Executive,	A diversified and integrated knit garments manufacturing and composite company with strong backward linkages and facilities for spinning, knitting, dyeing and finishing, garments, washing, packaging and printing.
Lal Teer Seed Ltd.	Mahbub Anam, Managing Director	The first research-based and largest certified seed company in Bangladesh that engages in developing, producing, processing and marketing high yielding seeds.

1.2 FOCUS SECTOR: Agriculture

Sector hazards and impacts

As a labour-intensive agrarian economy, agriculture is an important sector in Bangladesh, contributing to 24% of GDP and accounting for 45% of the total labour force in the country and 32% of its total exports. [22] The country has arable land area of 53% out of a total land area of nearly 144,000 square kilometres but only 35% of the 144,000 square kilometres is irrigated making the agriculture sector weather dependent.[23] It is reported that Bangladesh has approximately 18.2 million farmers, of which half are large farmers (>3 hectares), 46% are marginal and small farmers (.2 to 1 hectare), and 4% are medium sized farmers (1 to 3 hectares).[24] Overall approximately 60% of the population is employed directly or indirectly by the agriculture sector.[25]

Major crops in Bangladesh include rice, wheat, jute, rape and mustard, lentils, cowpea, sugarcane, and chilli, which constitute more than 90% of the country's crop acreage.[26] As the sixth largest rice producer in the world, Bangladesh remains a staple food and accounts for 77% of agricultural land use in the country.[27] The next major

[22] http://www.fao.org/docrep/003/x8731e/x8731e02.htm
[23] CIA World Factbook. Ibid.
[24] OneWorld South Asia. Bangladesh streamlines agricultural subsidy. February 2010.
[25] TRACE: Assessment of climate change and its impact on major food crops in Bangladesh.
[26] Bangladesh Centre for Advanced Studies: Planning and costing agriculture's adaptation to climate change in the salinity-prone cropping system of Bangladesh. October 2011.
[27] IRRI: Rice in Bangladesh. <http://irri.org/index.php?option=com_k2&view=item&id=10824:rice-in-bangladesh>

crop is wheat, followed by jute which has the highest exports but is third in terms production area.[28] Livestock production and distribution also plays an important role in Bangladesh's agriculture sector with a significant portion of the population directly dependent on livestock. It has therefore remained important given its contribution to food and nutrition, income, and foreign currency earnings (due to exports).[29]

The agriculture sector's importance to the rural population combined with the large portion of people under the poverty line reflects the urgent need to build resilience and reduce vulnerability of the sector to the impacts of climate change and extreme events.

Among different businesses and sectors, farmers and agribusinesses seem to show the most awareness of climate change and natural disaster risks. The major natural and climate change induced hazards affecting crops and livestock in Bangladesh include:

- Severe and prolonged drought conditions.
- Extreme weather events including cyclones, flooding, and drought.
- Sea-level rise leading to higher levels of salinity, sediment imbalance, flooding, and coastal inundation.
- Long-term temperature changes affect both crops and livestock.

These hazards impact the agricultural sector in the following ways:

- Overall production decline and degradation of productive land in the coastal regions.
- Reduced yields in regions impacted by extreme weather events including direct crop damage.
- Lower quality, spoiled crops or outputs from damaged / flooded crops.
- Damage to storage and facilities infrastructure.
- Outbreak of diseases and pests affecting both crops and livestock.
- Livestock can increase discomfort, reduced feed intake and altered nutrient metabolism, leading to loss of energy and productivity.
- Grassland changes resulting in reduced grazing areas for livestock, which can lead to reduction of weight gain in animals and less milk production.[30]
- Higher animal mortality.
- Livelihoods are ruined due to floods, droughts, salinity, storm surges, cyclones, and other natural disasters.

One of the biggest agricultural issues in the country is the limited availability of crop varieties that can overcome short periods of flooding. The majority of plant varieties currently grown are usually of low yields and are not saline-resistant. This results in fallow lands and areas of single crop production. Among farmers, particularly smallholders, the lack of knowledge about the best plant varieties, how seeds should be stored, and the effective use of agricultural inputs, among other farming techniques, make the agriculture sector further vulnerable to the impacts of disasters and climate change.

Damage and losses in the agricultural sector due to climate change and extreme events are expected to reduce agricultural GDP by 3.1% annually between 2005 and 2050. Losses could amount to USD 129 billion when the indirect impacts on complimentary industries are taken into consideration.[31]

Impacts are also evident at sector level.

- **ACI Agribusiness** experiences a rise in cost of production due to the failure of seeds at the flowering stage; this forces ACI to pay the cost of replacing the damaged seeds for farmers.
- **AMCL Pran**, one of Bangladesh's largest conglomerates, faces lower production of raw materials, farmer attrition due to other employment opportunities and disruption to distribution of raw materials and final products to its factory.
- **Bombay Sweets**, a large Bangladeshi conglomerate and packaged food processor, experiences disruption to its supply of raw materials when the harvest of a crop is delayed due to high temperature variability. This leads to difficulty in the planting and production of other crops.

[28] Bangladesh Centre for Advanced Studies. Ibid.
[29] IUCN: Climate change and fisheries and livestock in Bangladesh. Information Brief.
[30] Ibid.
[31] World Bank: Economics of Adaptation to Climate Change Bangladesh. 2010.

- **Pabna Meat**, a meat producing company experiences higher operating costs during flooding and heavy rains due to increased costs of transporting animals. The quality of its meat is also hampered due to irregular and insufficient feeding of cattle.
- **Lal Teer**, a seed producing company, had to develop new varieties of rice for its contract farmers as floods were ruining their rice crops in the coastal areas.

Sector opportunities

Potential resilience building actions

Through workshops and interviews, the following resilience building actions were identified for the agricultural sector:

- Capacity building and farmer training on more resilient cropping methods (e.g. drought / salinity resistant seed), better cropping patterns and post disaster management.
- Co-investment in appropriate infrastructure and facilities (e.g. warehouses) to protect products and people.
- Investment in research and development that helps develop climate-resilience seeds and crops.
- Technological support.
- Development of more appropriate and sufficient insurance schemes.
- Funding for businesses through matched funding, guarantees, grants, equity investments, and loans.
- Monitoring support for farmers.
- Greater governance support for the public sector that would help funding reach appropriate companies.

Agricultural companies consulted through interviews and during the workshop in Bangladesh see some opportunities in helping build resilience; however, most seem to be reacting to the impacts of climate change and extreme events by protecting their own operations.

- **ACI Agribusiness** sees opportunities in increasing its sale of seeds and fertilizers by developing and sourcing more disaster-resilience products.
- **AMCL Pran** is investing significantly in research and development of new crop varieties for areas prone to salinity.
- **Similarly, Lal Teer** has taken advantage of opportunities by investing in new crop varieties that are saline-resistant for the southern region while investing in drought-resistant seeds for the northern areas of the country.

Barriers to sector resilience

The workshop and consultations have contributed towards the analysis of barriers at the sector level presented below. To combine country level analysis into the meta-analysis of barriers in the main report we have presented the outcomes from country level analysis using a similar structure and format.

The main point to note is that although awareness of the impacts is high, the major barrier to progress on resilience within the agricultural sector is knowledge, capacity and skills relating precisely to resilience building actions. Technology barriers, policy, and insurance were also cited as significant barriers to greater private sector engagement.

Table 7: Summary of sector barriers to uptake of private sector action on resilience

Barrier group	*Barrier example*	*Agricultural Sector* ○ Minor barrier ● Major barrier ● Key barrier	*Description/ Local example*
Risk management capability and	Lack of internal buy-in / leadership	○	Buy-in is not usually an issue as private sector risk awareness is high in Bangladesh (e.g. many of the participants at the workshop were executive level

maturity			members from private sector companies).
	Low risk awareness	○	This is not as much of a concern at local and national company levels as extreme weather events (e.g. flooding) are normal in Bangladesh.
	Challenges of decision making under uncertainty	○	The impact of uncertainty is less pronounced in the local and sector context. The risks are very real.
	Limited sharing of good practice and lessons learned from other business approaches	●	There is a considerable appetite for clear information and examples that are relevant at the sector level.
	Limited tools available e.g. risk assessment, scenario and opportunity evaluation tools	●	Risk awareness is not leading to risk assessment due to a lack of analytical approaches and relevant data – or due to a lack of understanding of where information and tools can be accessed.
Technical	Lack of knowledge, capacity and skills in workforce	●	Despite being aware of the risks posed, the agricultural community considered the lack of capacity to respond to be a pressing barrier, particularly at the farmer/ smallholder level.
	Poor communication of useable risk information	○	This was not cited as a particularly large barrier to greater private sector engagement at a company level though smallholders could be better trained and prepared for such risks.
	Lack of access to technology	●	More robust and appropriate technology seems to be critical to greater business engagement. Application of technology for saline or drought resistant crops, access to better irrigation systems and better technology for transport were all cited as critical (e.g. cold storage technology).
	Lack of demonstration projects	○	With many farming practices being passed down through generations, demonstration projects are required to convince farmers to make changes; however capacity building for farmers is a bigger issue.
	Lack of knowledge sharing / collaboration platforms	●	The agricultural community agreed strongly that there is no identifiable reference point for them on this issue. One of the key barriers appears to be the break-down in engagement between the government and the private sector.
	Weak sector and value chain partnerships	●	Interviewees and workshop participants cited both intra-sector and cross-sector partnerships as important to building resilience.
	Lack of access to early stage capital (risk finance)	-	Was not referenced as an issue in the workshop or during consultations.
Financial	Technology risk	-	Was not referenced as an issue by workshop or consultation.
	Access to credit	●	Smallholder farmers do not easily have access to credit, which can pose a problem for companies sourcing from smallholders. This has forced some companies to develop new payment structures (e.g. price premiums, fixed prices).
	Technology cost gaps	-	Was not referenced as an issue during the workshop or in consultations.
	Lack of access to insurance	●	There is demand for insurance at farm level but the insurance sector is not developed in Bangladesh.
	Lack of incentives	●	Financial constraints to develop new crop varieties and technologies seemed to hinder investment by the private sector.
Local enabling environment	Inadequate policy, regulatory and legal environment	●	One of the biggest problems in agriculture cited by workshop participants was that government funding is not always channelled to certain companies (e.g. seed companies struggle as seeds are not eligible for an agricultural loan).
	Domestic infrastructure constraints	●	Inadequate cold chain facilities and warehouses hinder appropriate transport and storage of harvested crops.
	Market and financial sector risks/capacity	-	Was not referenced as an issue by workshop or consultation.
	Local political, governance and security risks	-	Was not referenced as an issue by workshop or consultation.

Public policy action and effectiveness at sector level

Overview of private sector engagement and stimulation efforts

The Government of Bangladesh recognises that climate change will have a significant impact on the agricultural sector; however, there are no specific policies that support private sector engagement. Nevertheless, agriculture is addressed as the first of six pillars in the Bangladesh Climate Change Strategy and Action Plan 2009 under 'Food security, social protection, and health.' Interventions within this pillar are aimed at:

- Development of institutional capacity and dissemination of research on climate resilient cultivars
- Climate resilient cropping systems and technologies
- Adaptation against drought
- Adaptation in the fisheries and livestock sectors
- Water and sanitation in climate vulnerable areas

Various agriculture and food policies have been passed in order to improve food security and nutrition such as the National Agricultural Policy, 1998, the National Food Policy, 2006 and the National Food Policy Plan of Action, 2008. The Ministry of Food and Disaster Management also developed a Bangladesh Country Investment Plan (CIP) in 2010 (updated in 2011), which detailed priority areas for investment.

The Country Investment Plan and National Food Policy are also both consistent with BCCSAP, 2009. CIP actively addresses climate change by incorporating climate related issues such as water, particularly vulnerable areas (e.g. coastal areas and the south), innovation and scaling up (e.g. alternative irrigation techniques, integrated pest management, rice fortification) and climate resilient technology, among other broader resilience building initiatives. The CIP also aims to actively engage the private sector in its consultation and implementation. Opportunities for the private sector in the agriculture sector according to CIP include: agro-processing, the milk and dairy sectors, input supply business and the production and maintenance of farming equipment and technology.[32]

While there are several examples of public sector programmes that have focused on building resilience, active examples of initiatives that encourage private sector involvement in the agriculture sector are limited. In collaboration with development partners, the Government of Bangladesh has invested in initiatives such as: flood management schemes to raise agricultural productivity, coastal embankment projects, irrigation schemes to assist farmers during the dry season and agricultural programs to develop saline, drought and flood-adapted high yielding varieties of crops.[33]

Internationally, various development partners have offered a greater focus on private sector engagement in building resilience in the agriculture sector in Bangladesh. One of Bangladesh's Pilot Program for Climate Resilience focus areas includes agriculture and food security. As such a USD 13.1 million PPCR grant and low interest credit financing will enable the IFC to implement a program in which adaptive agricultural measures will be introduced and climate-resilient varieties of rice and other crops will be scaled up. The grant will also be used for the development of improved early warning weather systems. This project aims to help build resilience against the risk of rising sea levels, which can increase salinity and reduce arable land availability in the country's coastal areas.[34] It is a public-private partnership in that it will work with various government agencies and private sector seed companies during implementation.

The South Asia Enterprise Development Facility was an IFC programme run in partnership with DFID and NORAD and aims to help SMEs access finance, strengthen their value chains, and adapt to the impacts of climate change. In the agriculture sector, SEDF had a focus on food security. Its programme focused on promoting the use of stress-tolerant seeds that were better able to withstand drought and help improve the production and income of farmers.[35]

[32] http://www.nfpcsp.org/agridrupal/sites/default/files/Bangladesh%20Food%20security%20CIP%202011%20Final.pdf
[33] http://www.undpcc.org/docs/Investment%20and%20Financial%20flows/I&FF%20reports%20and%20suppl%20information/Bangladesh/Agriculture%20sector%20report%20September_feedback%20UNDP_input%20Atiq_for%20upload.pdf
[34] CIF – Pilot Program for Climate Resilience: Bangladesh. Fall 2012.
[35] http://www.ifc.org/wps/wcm/connect/region__ext_content/regions/south+asia/advisory+services/sedf

DFID's Business Innovation Facility also encourages private sector engagement in development. Agricultural programmes supported by BIF in Bangladesh have included soil testing for farmers, sustainable contract farming and building capacity in meat supply chains.

Case study: Katalyst – business engagement in the agriculture sector

Katalyst is a jointly funded programme of the Swiss Agency for Development and Cooperation (SDC), DFID, the Canadian International Development Agency, and the Netherlands, and implemented by the Government of Bangladesh and GIZ International Services. It aims to increase the income and competitiveness of farmers and small businesses in rural and urban Bangladesh by reaching 2.3 million farmers and small businesses, and providing employment for 450,000 poor people by the end of 2013. Katalyst's first phase ran from 2002-2007 (when it helped create 200,000 jobs and assisted 700,000 farmers and small businesses) and its second phase ran from 2008-2013. In the agricultural sector, Katalyst aimed to build the capacity of SMEs and create a better enabling environment for private sector actors to engage in helping build resilience in agriculture. In doing so, it has partnered with agro-processors, compost producers, lead farmers, sector associations and local government. Some of its programmes have included:

- **Jigyasha 7676** became a call service launched in partnership with Banglalink to provide agricultural information to hundreds of thousands of farmers.
- **Mono-sex tilapia cultivation** helped ensure greater productivity. This initiative was launched in partnership with a feeds company and offered farmers 25 demonstration plots, five dissemination workshops and exposure visits.
- **Fertiliser Recommendation Software** was developed for farmers based on location-specific soil testing results. Grameenphone and Banglalink became partners to help disseminate information to farmers.
- **PPPs** were developed to channel information and services such as compost fertiliser, seeds, poultry bio-security, soil testing and other government services to farmers.
- **Improved packaging for vegetables,** primarily for tomatoes, helped reduce wastage by 20% per farmer.
- **Service package** including quality seed, cultivation methods, and finance for 2,000 farmers by local maize contractors led to increase in maize yields and average incomes.
- **Credit line to increase maize production** through a contract farming model proved effective and led to Katalyst MOUs with two banks to help in the effort.
- **Enhancing performance of women in seed post harvesting** by partnering with three seed companies and training 2,600 female family members of contract farmers in better post harvesting techniques.

The scheme follows a pro-poor market development approach (making markets work for the poor – M4P).

Source: www.Katalyst.com

There are also examples of corporate philanthropy and public private partnerships involving local companies. Pabna Meat has introduced measures to increase the capacity of the company to process cattle and to also benefit local women who are engaged as contractual suppliers. The company is working with Practical Action, an international NGO, in order to increase its output of high quality, organic meat. The initiative employs a contract farming scheme and seeks to facilitate access to finance for the women.

Similarly, ACI Agribusiness has implemented a contract farming model that engages landless farmers as tomato producers in order to ensure a high quality supply of tomatoes to its business. The company has partnered with Practical Action to work with the farmers. Practical Action helps reduce farmers' vulnerability by helping them lease land, access agricultural inputs such as machinery, seeds, and fertiliser, and adopt more sustainable cropping practices and fertiliser use.

Potential public intervention opportunities for agriculture

The evidence above suggests that there is considerable need and demand for risk reducing products and services. To implement these products and services, Bangladesh will require appropriate partnerships and awareness building of different interventions and opportunities. Intervention will therefore be needed from local or international support to make this happen. Some interventions address specific constraints while some are targeted at multiple private sector development issues. The actions and implementation options identified to address the sector's major constraints are summarised and presented in the table below.

Table 8: Public finance interventions required to support Bangladesh's agricultural sector

Opportunity	*Interventions*	*Implementation options*
Knowledge and capacity: Systematically embed and improve agricultural extension services through capacity building of extension service providers.	• Targeted training of service providers on hazard awareness and responses. • Establish a knowledge hub and distribution channels to make planned additions to existing agricultural communication and engagement systems. • Capacity building among smallholders on stress-resilient crops and planting and harvesting techniques. • Awareness building of information and options available for value chain partnerships and coordination.	• Leverage existing extension services infrastructure operating at provincial government levels. • Support and coordinate between existing NGO programmes. • Collaborate with other donor activities (e.g. World Bank, DFID) to prepare coordinated approach and a separate dedicated knowledge and capacity support facility. • Aim to implement a programme through the government's climate change funds (CCTF or the BCCF)
Technology innovation and deployment: Stimulate private sector innovation and maturation of technologies.	• Conduct market analysis and potential for key technologies including efficient irrigation products, crop types and agricultural techniques. • Incubate key technologies - provide R&D and/ or business model support for new market entrants. • Facilitate implementation through credit support and market solutions that work with the value chain, regulators. • Knowledge dissemination and awareness building around key technologies that could help develop stress-resilient seeds, better irrigation methods, and better transport technology (e.g. cold chains). • Provide TA to smallholders and farmers to assist them with technology adoption.	• New innovation support fund/ programme required.
Access to insurance and financial services: Microinsurance solutions development for weather risk along with access to credit.	• Support the development or implementation of a regulatory framework for weather or micro weather risk insurance. • Support (directly or through a facility) technical development needs including risk information, data analysis and pricing. • Develop a knowledge hub to help insurers understand how to use existing climate data. • Embed support into a national crop insurance scheme to improve the relationship of this with developing private sector solutions. • Develop an awareness raising programme on new insurance options for farmers. • Develop better funding facility for smallholders for working capital/ credit.	• Build upon existing efforts of microfinance institutions or insurance companies. • Leverage existing initiatives for crop insurance (e.g. ADB and Japan Fund for Poverty Reduction). • Create a technical and financial support facility to facilitate development of the sector and maximise access to the poor.
Offer incentives: provide financial incentives for feasible private sector investment.	• Develop specific financial products to promote new technology development, research, etc. These could include grants, no-interest loans, or soft loans. • Develop initiative that helps earmark government funding for certain types of agricultural companies.	• Develop new fund for agriculture for a specific purpose (e.g. research and dissemination of stress-resilient seeds or crops).
Facilitate better regulatory environment and dialogue: help initiate better engagement between farmers, companies, and the government.	• Targeted initiative for facilitating dialogue between private and public sector. • Support to public sector to help develop progressive policies on new crop varieties. • Targeted intervention on better	• Create a new dialogue support facility for private sector to have stronger voice on policy issues.

	governance for public sector.	
Facilitate market based solutions: Combine multiple interventions to support sustainable private markets for agricultural resilience. Provide market facilitation support to concurrently address a range of sector constraints including technology, access to finance and knowledge transfer.	• Design and implement an intervention framework to address complex constraints. • Offer technical assistance and investment support to build better business models and underwrite investment risk.	• Create a new and integrated facility that identifies and supports solutions at market scale working with multiple actors.

There is some consistency between interventions relating to the need for a public-private 'matchmaker' that supported aspects of market development and public services in support of individual projects. It should also be noted that recommendations will need to be considered in the context of a 'market systems approach' (addressing regulatory, market, government and business value chain issues together), and ensuring that the poor and most vulnerable are not excluded from the solutions.

1.3 FOCUS SECTOR: Textiles

Sector hazards and impacts

In aspiring to become a middle-income country, Bangladesh will rely on continued growth of its manufacturing industries, particularly its textiles (garment) sector. As the second largest exporter of clothing in the world, readymade garments and knitwear in Bangladesh constitute 80% of the country's USD 24 billion in exports annually and 15% of GDP.[36] Clothing exports have seen average annual growth rates of approximately 12%. The Bangladesh Export Promotion Bureau estimates that garment exports could reach USD 30 billion by 2015 (from given the present level of growth.[37] The sector employs approximately 3.5 million people, 80% of whom are women.[38]

Bangladesh's textile sector has a range of different sized factories, of which the medium and large factories are export-oriented. Smaller factories serve as sub-contractors for specific products for the medium and large factories. Small textiles factories in Bangladesh typically have less than 500 workers, while medium sized factories have up to 1,000 workers, and large factories have more than 1,000 workers.[39]

Due to the increasing cost of labour and raw materials in other countries such as India, Thailand, and China, Bangladesh is seen as an important market for textile manufacturing. However, it can be a risky sector to enter given the lack of appropriate compliance framework for enforcing building codes and rules. Though not related to a natural hazard, compliance issues urgently came to light during the Savar building collapse in April 2013, which killed over 1,100 people. Since then a survey by engineers in Bangladesh showed that 60% of garment factories across the country are vulnerable to collapse.[40]

The textiles sector is directly influenced by other areas of the economy including agriculture (for inputs such as jute), transportation and construction. Therefore, climate change and extreme weather can affect this sector both directly and indirectly.

The major hazards affecting the textiles industry in Bangladesh include:

- Flash and widespread flooding
- Coastal storm surge
- Extreme heat
- Tropical storms / cyclones
- Earthquake

[36] Research Journal of Engineering Sciences. Ibid.
[37] http://www.bbc.co.uk/news/business-14971258
[38] http://www.bgmea.com.bd/home/pages/AboutGarmentsIndustry#.UeV1f42cdpU
[39] CBI, Ministry of Foreign Affairs of the Netherlands: "Value Chain Analysis – Garment sector Bangladesh." October 2012.
[40] http://www.guardian.co.uk/world/2013/jun/03/bangladesh-garment-factories-vulnerable-collapse

These hazards can impact the textiles sector in the following ways:

- Reduced availability of raw materials (agricultural inputs such as jute, cotton)
- Increased water stress
- Energy shortages
- Disrupted distribution networks (for transport and storage)
- Damaged manufacturing and storage facilities
- Employee heat exhaustion or sickness during high temperature

The economic damage from Bangladesh's 2007 Cyclone Sidr on the apparel industry is difficult to quantify; however, it did make it clear that natural hazards can significantly affect the country's textiles sector. The cyclone, which killed 3,400 people and caused USD 1.7 billion in damage, resulted in a decline in textiles production and export for a few weeks. The storm disrupted logistics and power, damaged infrastructure, and compelled workers from affected areas to return home.[41]

The Savar building collapse in April 2013 also exposed the vulnerability of factories to inadequate construction and compliance. The conditions in which many factories in textiles hubs such as Dhaka, Gazipur, and Chittagong exist will be significantly undermined in the event of a natural disaster. With little adoption or enforcement of design codes, zoning, and construction techniques, both workers and businesses are at severe risk of economic losses. Following the collapse, Scott Nova of the Working Rights Consortium, a pressure group, explained that "audits often covered issues such as working hours and child labour but have not always addressed factories' structural soundness or fire exists." Mr. Nova estimated that it would cost USD 3 billion to make all 5,000 clothing factories in the country safe.[42]

Impacts are also evident at sector level where some businesses have also begun planning for and responding to the impacts. The primary impacts to the business appear to be disruption of distribution routes and reduced worker productivity.

Asha Sweaters, an export oriented RMG company uses generators to ensure they have an alternative source of energy – this way they do not have to rely on the government. During disasters such as flooding, storms, or a long monsoon, the company also looks for alternative transportation methods. In this way, disruption to their receipt of inputs or their shipments is minimised.

Similarly, **Interstoff,** a large scale export oriented RMG company, explained that flooding (a frequent disaster) has not affected factories directly but it does affect distribution routes and worker productivity. The latter manifests itself in two ways: 1) workers tend to leave for their villages or towns to check on their families and homes and 2) during flooding, the region can be cut off from distribution routes, which also results in food inflation. To help manage the situation and encourage its workers to come to work, Interstoff offers a food subsidy programme so that its workers can access food. The company also partners with other textiles companies in the area to build homes for workers. This is part of its disaster management response with 15 different companies in which the companies prepare for different disasters such as flooding, cyclones or fires.

DBL, a diversified and knit garments manufacturing company also experiences disruption to the shipment of raw materials due to heavy rains or cyclones. In the summer months, workers in the material dyeing section are often sick due to extreme heat. DBL responds by providing workers with hydration solutions. The company did not comment on how it deals with delayed receipt of raw materials.

Sector opportunities

Resilience building needs

Businesses that were consulted in Dhaka have suggested that in order to build greater resilience in the textiles sector to the risk of extreme weather and climate change, they need:

Enhanced sector collaboration: At a business to business level, garment factories and textile companies can find more frequent ways to collaborate on building capacity and sharing costs in preparation for disasters or for resilience actions, and to share information and knowledge. Interstoff suggested that co-investment or a public-private partnership in buildings or land would be beneficial to many factories in its area. For example, co-investing in or supporting a nearby trauma centre could lead to fewer fatalities or injuries during a cyclone

[41] http://www.wwd.com/fashion-news/textiles/bangladesh-apparel-industry-recovers-from-cyclone-damage-471332?full=true
[42] Economist: Avoiding the fire next time. May 2013.

or storm. Such a centre could also benefit workers and the business when accidents occur in factories during a normal working day. Textiles companies are also willing to work with the development community including NGOs and donors.

Mainstreaming of more energy efficient technology: The textiles industry is water and energy dependent and can be significantly affected by energy and water shortages. As such, renewable energy or clean technologies could be introduced to help power machinery and factories more efficiently. In order for textiles companies to better understand the need for this however, some training and awareness building on the benefits of such technology is needed along with training on implementation.

Water conservation techniques: Textiles companies require large amounts of water to dye and rinse materials and steam for printing and pressing fabric. Further information on water conservation and more effective waste water treatment could therefore help companies reduce water consumption. In 2011, the DBL Group, one of Bangladesh's largest garment and textile makers, partnered with 17 other factories to upgrade equipment such as dyeing and rinsing machines, and fix insulation and leaks, in order to conserve water. The partnership was supported by DFID, Norway, and the IFC, along with retailers H&M and Tesco. The upgrades enabled DBL to cut the water used per kilogram to make cloth by 50%.[43] Similar to investing and adopting energy efficient technology, however, companies will require training and awareness building on such techniques.

Better regulation and enforcement of building codes, standards, and processes: Companies agree that upgrade of facilities may be unlikely to happen without appropriate regulation and enforcement from the government. Greater support by the government and retailers could help force companies to adhere to the rules. In addition, training and capacity building at the management or middle management level could help companies ensure that workers are safe from disasters within the workplace.

Risk assessment facilities and relevant training: Companies seem unwilling to make individual investments in risk assessment related to climate change and natural disasters. However, they recognise that access to these tools and training on how to use them is important. Asha Sweaters suggested that a shared investment in a risk assessment facility with support from donors could help them better manage disasters. As part of such a facility, training on how to conduct assessments is also needed.

Greater earthquake preparation: Textiles companies recognise that earthquakes do not happen frequently in Bangladesh; however, they would require preparation and response training as that information is currently not available to them.

Insurance schemes for labourers: The insurance market is underdeveloped in Bangladesh and poses a problem to low-income labourers. Local insurance companies do not typically cover the physical accidents of RMG workers, which can result in worker attrition.

- **Access to financing options:** Due to the financial crisis, textiles companies and factories are often unable to access adequate funding to improve their day-to-day operations and competitiveness. This subsequently reduces any incentive for the business to invest in climate or disaster resilient technologies. Financing options and partnerships that could alleviate this issue would be helpful in encouraging businesses to 'climate proof' their operations. The Bangladesh Garment Manufacturers and Export Association (BGMEA) provides a group insurance scheme for garment workers and staff; however, it is unclear how effectively this is managed and whether garment workers are able to easily make claims.

Sector barriers

The consultations undertaken in Dhaka have contributed towards the analysis of barriers at the sector level presented below along with desk-based research. To combine country level analysis into the meta-analysis of barriers in the main report we have presented the outcomes from country level analysis using a similar structure and format.

The main point to note is that although awareness of the impacts is high, the major barrier to progress on resilience within the textiles sector is knowledge, capacity and skills relating precisely to resilience building actions. Policy barriers and technology were also cited as barriers to greater private sector engagement.

[43] The New York Times: Conservation Pays Off for Bangladeshi Factories. March 2013.

Table 9: Summary of sector barriers to uptake of private sector action on resilience

Barrier group	*Barrier example*	*Textiles sector* ○ Minor barrier ● Major barrier ● Key Barrier	*Description/ Local example*
Risk management capability and maturity	Lack of internal buy-in / leadership	●	Most of the companies invested in responding to the risks; however, they seemed hesitant to invest directly in resilience building activities given the higher costs associated with it.
	Low risk awareness	●	While some of the risks are clear, the textiles companies interviewed admitted that they did not have a comprehensive understanding of all the risks for their business that were associated with climate change and natural disasters.
	Challenges of decision making under uncertainty	●	Given the companies lack of knowledge on certain risks, they did not have the incentive to make decisions pre-emptively (though they all had some level of investment in post disaster response).
	Limited sharing of good practice and lessons learned from other business approaches	●	Much like the information available on risk awareness, there is limited information on how textiles companies can build their resilience.
	Limited tools available e.g. risk assessment, scenario and opportunity evaluation tools	●	There is little or no adoption of risk assessment tools in the market.
Technical	Lack of knowledge, capacity and skills in workforce	●	Given that many of the labourers working in textiles companies may be illiterate or have limited education, they often do not have the resources necessary to be resilient in the face of natural disasters.
	Poor communication of useable risk information	●	Access to risk assessment information is severely limited if available at all and is therefore not communicated appropriately.
	Lack of access to technology	●	More energy and water efficient technologies are available but have not penetrated the market due to various factors, primarily cost implications and awareness.
	Lack of demonstration projects	-	Was not referenced as an issue in the workshop or during consultation.
	Lack of knowledge sharing / collaboration platforms	●	Lack of information on best practices has been cited s a problem. However, companies seem willing to collaborate.
	Weak sector and value chain partnerships	●	While textile companies have integrated supply chains and work with a number of partners across the value chain, there seems to be a lack of partnerships specifically focused on addressing climate change issues.
	Lack of access to early stage capital (risk finance)	-	Not referenced.
Financial	Technology risk	-	Not referenced.
	Access to credit	○	This is not a major issue for the textiles companies though they recognise that labourers are often unable to access credit, which affects their livelihoods.
	Technology cost gaps	-	Not referenced.
	Lack of access to insurance	-	Not referenced.
	Lack of incentives	●	While companies have the incentives to respond to disasters, there is much less incentive to comprehensively prepare for disasters.
Local enabling environment	Inadequate policy, regulatory and legal environment	●	The enforcement of new and existing structural design regulations is systemically poor.
	Domestic infrastructure constraints	●	Weak infrastructure across the country can hinder procurement of raw materials or distribution / shipping

		of final products. It may also prevent labourers from coming to work.
Market and financial sector risks/capacity	○	A general issue for the sector rather than one linked to resilience.
Local political, governance and security risks	●	These risks can affect the safety of workers and buildings and play relate directly to lack of proper governance.

Public policy action and effectiveness at sector level

Overview of private sector engagement and stimulation efforts

The Government of Bangladesh recognises the importance of the textiles sector to Bangladesh's economy and has made significant efforts in its promotion. With the liberalisation of Bangladesh's economy since the 1970s, Multi-Fibre Agreement[44] quotas and domestic support measures, the sector has transformed from an infant industry to an important part of the Bangladeshi economy.[45] In order to build capacity in the value chain, the Government allows the import of capital machinery, some spare parts, and dyes chemicals at a concessionary rate; allows duty-free import of cotton; and offers a 5% subsidy for garment exports.[46] The sector now contributes 7.5% of total employment in the country (including informal employment). Given the labour intensity of the sector, Government incentives have helped increase employment and attract domestic and foreign investors.

The Bangladesh Garment Manufacturers and Export Association is the apex body that represents woven knit and sweater garment manufacturers and exporters. Its main responsibilities include trade facilitation to protect and promote the interest of the country's garment industry by working with the government on pro-growth policies and arranging trade fairs with international buyers; WTO, regional, and bilateral trade negotiations; and human resources development. The organisation has set up the BGMEA Institute of Fashion and Technology (BIFT) to develop the country's skills in apparel manufacturing, technology, fashion design, knitwear manufacturing, and other subjects relevant to the RMG sector.

International development organisations such as NGOs are active in the promotion of capacity building and worker's rights in the textiles and apparels sector. An active example includes CARE International, which runs the Global Women's Economic Empowerment Initiative (GWEEI). GWEEI works with the women and middle management in 15 garment factories to offer them life skills development and leadership skills. This program is also supported by the Walmart Foundation.

Private sector retailers have often partnered with international development agencies to build capacity within the textiles and garments sector. In 2007, for example, Gap Inc. launched the P.A.C. E (Personal Advancement & Careen Enhancement) initiative to train female garment workers in technical and social skills. The company partnered with the International Centre for Research on Women (ICRW) to design and evaluate efforts in garment factories.

The IFC is also currently helping Bangladesh's textiles sector overcome water challenges through a USD 10 million water PaCT (a Partnership for Cleaner Textile). The initiative aims to help factories reduce water usage and pollution by catalysing good practices, technologies, finance, market information and business incentives for 200 factories through a PPP model. PaCT has adopted a comprehensive approach to developing clean clusters in Bangladesh by working with 15 global brands on sustainable procurement, sharing knowledge on resource efficiency, working with BGMEA, and building a textile technology sustainability platform for awareness building and experience-sharing. The Embassy of the Netherlands is contributing USD 5.6 million to the program.[47]

[44] The Multi-Fibre Agreement was a quota system used from 1974- 2004 to help developed countries adjust to imports from developing countries. While it was not beneficial for all developing countries, some least developed countries such as Bangladesh did benefit as regional trading blocs such as the EU imposed no restrictions on imports from the country. Once the MFA expired in 2004, textiles were brought under the WTO's General Agreement on Tariffs and Trade in 2005. Despite the reduction of quotas in the GATT, Bangladesh's textile sector still did well given its access to cheap labour. <http://www.ibscdc.org/Case_Studies/International%20Trade%20and%20Finance/ITF0005.htm>

[45] UNCTAD: Policy Reforms and Trade Liberalization in Bangladesh.

[46] UNCTAD: Bangladesh – Sector-specific Investment Strategy and Action Plan. September 2012.

[47] IFC: IFC Helps Bangladesh's Textiles Sector Overcome Water Challenges. November 2012.

One of DFID's broader development programs in Bangladesh, which focuses on the urban poor, includes The Urban Partnerships for Poverty Reduction project (UPPR). Launched in partnership with the UNDP, the partners have made USD 120 million available to improve the livelihoods of millions of urban poor people, particularly women and girls. The program helps poor urban people facilitate representation of urban poor communities, secure improved living environments, acquire resources, knowledge, and skills, and develop and implement pro-poor policies. As part of this initiative, a MoU has been signed with BGMEA to provide training to garment factory workers in order to develop their skills. This initiative therefore aims to leverage donor funding and resources to help develop the skills and capacity within the private sector.[48]

Potential public intervention opportunities for textiles

There is a considerable need and demand for risk reducing design, capacity building and knowledge dissemination, and technology adoption.

Table 10: Public finance interventions required to support to Bangladesh's textile sector

Opportunity	*Interventions*	*Implementation options*
Support technological innovation: Stimulate private sector innovation of low cost energy and water efficient equipment and more resilient buildings.	• Support technology demonstration sites to improve company confidence in new techniques. • Provide grants or low-interest loans for companies to adopt new technologies and provide requisite training in parallel. • Establish a design competition to discover resilient designs for more energy and water efficient technology.	• Develop a technology window within a new program that provides TA and funding. • Partner with existing initiatives i.e. the IFC's PaCT program.
Stimulate market demand: Offer financial or other incentives to support increased commitment to employing resilience equipment and structures.	• Develop a lifecycle business case for adoption of climate-resilient equipment and buildings. • Raise awareness of the financial and legal consequences of inaction and poor preparation by private sector clients.	• Implement in parallel to a knowledge hub through donors. • Leverage existing knowledge hubs and trainings carried out by development agencies and the BGMEA.
Risk information: Improve quality of and access to data on major hazard types and its impact on companies in the textiles value chain.	• Fund the design and hosting of a risk information portal containing all information pertaining to natural hazards and climate change impacts on the textiles sector in Bangladesh. Link with any other existing portals globally.	• Develop stand-alone hub or knowledge sharing platform where such information can be accessed. • Leverage industry groups (e.g. BGMEA) and garment manufacturers associations to disseminate information on risk assessment.
Sector skills and capacity: Build sector capacity in risk assessment and resilient design.	• Targeted training of managers and middle managers on hazard awareness and design responses to different types of hazards. • Improve public sector skill base in regards to regulatory enforcement. • Develop capacity of low-skilled workers through more appropriate and frequent training on how to protect themselves in the face of a disaster.	• Leverage existing industry networks to provide the training (e.g. BGMEA). • Build the existing training capacity of industry associations directly to increase outreach programmes. • Implement programmes in partnership with MNCs conducting CSR campaigns. • Implement donor programs such as the UPPR.
Enhance regulatory capacity: Support the needs of government to more effectively engage with and regulate the private sector.	• Support the revision of regional multi hazard/ climate change resilient design codes for the Bangladesh textiles sector. • Financially support private sector led (e.g. retailers) accredited inspection and validation of building and infrastructure design and completion.	• Work with the BGMEA, which supports new regulation and policy in the sector.

[48] http://www.upprbd.org/Pages.php?TMPID=Q04tMDI4&LTitle=QnJpZWYgRGVzY3JpcHRpb24=

Support improved sector collaboration: The sector has appetite to work together more effectively to driver a private sector led solutions.	• Support established partnerships and consortiums to input new information and capacity building. • Offer finance support to industry led collaborations.	• Work directly through existing industry associations. • Encourage new associations through a new challenge fund structure. • Identify existing private sector alliances that are working on disaster management (e.g. Interstoff's work with Gazipur garment factories) to implement additional interventions.
Support insurance schemes for garment workers: Most low-income labourers do not have appropriate access to insurance though it is critical to their livelihoods.	• Develop a partnership with insurance companies to research and develop most appropriate insurance products for low-income labourers. • Provide grants or low-cost funding that would enable insurance companies to assess the risks and better understand the implications.	• Leverage any existing insurance schemes such as BGMEA's life insurance scheme. • Work with BGMEA to identify labourers to pilot and scale-up such an initiative.

1.4 Dhaka workshop participants list

Table 11: Dhaka workshop participants list

	Name	Designation	Sector
1	Prof. Lutfur Rahman	ACI	Agriculture
2	Adeeba Raihan	ACI	Agriculture
3	M. Saifullah	ACI	Agriculture
4	Asifuddin Khan	Action for Enterprise	Development
5	M. Hasanuzzaman	Auto Crop Care Ltd.	Agriculture
6	Md. Yousuf	Christian Aid	Development
7	Faisal Ibne Shahajat	Dhaka Bank Limited	Banking
8	Arpita Bhattacharjee	Emc BD	Consulting
9	Mahmudul Khan	Grameen Phone	Telecommunications
10	Mr. Shihab Uddin	Green Delta Insurance Co Ltd.	Insurance
11	MAHBUB ANAM	Lal Teer Seed Limited	Agriculture
12	Zunaed Rabbani	Market Development Forum	Development
13	Rafiq Sarkar	MATRIX Business Development Ltd	Consulting
14	Tauhidur Rahman Tarafder	Muslim Aid UK	Development
15	Hasibur Rahman	Nestle	Food and nutrition
16	Liakat Ali	Pabna Meat	Meat processing
17	Asm Alamgir	Shahjalal Islami Bank Ltd	Banking
18	Khan, Dilara	Standard Chartered Bank	Banking
19	Alauddin Al Azad	The City Bank Limited	Banking
20	Ms. Carolien Pronk	VSO	Development
21	Shamim Hossain	Hrlvitas	Development
22	Md. Arif Rabbani	Muslim Aid UK	Development
23	Sujit Das	Sheva	Development
24	Shariar Bin Rasul	ERAS	Agriculture
25	S. M. Sajid	Christian Aid	Development
26	Mahmudul Hossain	Save the children	Development
27	Ehsan	D. Light	Energy
28	Colum Wilson	DFID Bangladesh	Development

2. Kenya

2.1 Resilience Overview

Introduction

Having gained independence in 1963, Kenya has grown to become the largest economy in East Africa. However, Kenya remains a low-income country with multiple development challenges. Its population grew by 35% over the first decade of the 21st Century[49] and now stands at over 44 million individuals. With 46% of the population falling below the poverty line, Kenya's GDP per capita remains lower than its East African neighbours.[50]

Political turmoil and severe droughts have undermined Kenya's economic development in recent years. In addition, the global economic downturn and slow government reforms have compounded matters. GDP growth was approximately 5% in 2012; however, a growing population has meant that this has not yet filtered down to a rapid improvement in living standards. The growing population in combination with a rising frequency of droughts has meant that Kenya's natural resources are increasingly under pressure.

Table 12: Kenya country statistics

Overview	*Results*	
GDP (purchasing power parity)	USD 76.07 billion	2012 est.
GDP real growth rate	5.1%	2012 est.
GDP per capita	USD 1,800	2012 est.
Population	44,037,656	July 2013 est.
Population growth rate	2.444%	2012 est.
Urban population	22% of total population	2010
Rate of urbanisation	4.2%	2010-2015 est.
Population below poverty line	46%	2011
Major cities	Nairobi : 3.375 million Mombasa: 966,000	2009
Area	580,367 sq km (land 569,140 sq km, water 11,227 sq km)	
Coastline	536 km	
Employment		
Labour force	18.89 million	2012 est.
Labour force occupation	Agriculture 75%; industry and services 25%	2007 est.
Unemployment rate	40%	2008 est.
Economy		
Key agricultural products	Tea, coffee, corn, wheat, sugarcane, fruit, vegetables, dairy products, beef, pork, poultry, eggs	
Industries	Small-scale consumer goods (plastic, furniture, batteries, textiles, clothing, soap, cigarettes, flour), agricultural products, horticulture, oil refining; aluminium, steel, lead; cement, commercial ship repair, tourism	
Industrial production growth rate	3.1%	2011 est.
Exports	USD 5.942 billion	2012 est.
Key commodities exported	tea, horticultural products, coffee, petroleum products, fish, cement	
Key export partners	Uganda 9.9%, Tanzania 9.6%, Netherlands 8.4%, UK 8.1%, US 6.2%, Egypt 4.9%, Democratic Republic of the	2011

[49] Kenya official population census 2009
[50] World Bank, 2011

	Congo 4.2%	
National infrastructure		
Airports (paved/unpaved runways)	194 (15/179)	2012
Pipelines	oil 4 km; refined products 928 km	2010
Railways	2,066 km	2008
Roadways (paved/unpaved)	160,886 km (11,197 km/149,689 km)	2008
Ports and terminals	Kisumu (main port with ferry connections to Uganda and Tanzania); Mombasa	
Energy and telecoms		
Electricity – installed generating capacity	1.706 million kW	2009 est.
Electricity generation type	Fossil fuels 43.3%; hydroelectric plant 43.8%; 12.9% other renewable sources	2009 est.
Telephones – main lines	283,500	2011
Telephones – mobile cellular	28.08 million	2011
Internet users	3.996 million	2009

Overview of natural hazards, vulnerability and impacts

Over 89% of Kenya's 570,000 square kilometres of land is made us of arid and semi-arid lands (ASALs). The arid counties alone (Garissa, Mandera, Wajir, Marsabit, Isiolo, Turkana, Samburu, Baringo, and Tana River) make up 70% of the country and are home to 12% of the country's population[51]. The arid counties have several common features. All but one stretch to the Indian Ocean. They all lie to the northern part of Kenya and are thus synonymous with the term "Northern Kenya". In addition, they are predominantly inhabited by pastoralists. Pastoralism has developed as a way of life because of the socioeconomic culture of the inhabitants (mainly Cushites) and the agro-climatic conditions of the region.

In Northern Kenya, rainfall is scarce and temperatures are high throughout the year, with elevated rates of evapo-transpiration. Rainfall in arid areas ranges from 150 mm to 550 mm per year, and in semi-arid areas from 550 mm to 850 mm[52]. These conditions generally do not support cultivation agriculture, but are conducive for livestock keeping. In fact, the ASALs support over 70% of Kenya's livestock. [53] Table 13 shows rainfall distribution across Kenya.

Kenya's economy has already suffered as a result of recent natural disasters. It is estimated that the 1998-2000 drought cost USD 2.8 billion from lost crops and livestock, forest fires, damage to fisheries, reduced hydro-power generation, reduced industrial production and reduced water supply[54]. The more recent droughts between 2004 and 2009 have affected millions of people and have led to major economic costs from restrictions to water and energy. Flooding has also had a significant effect on the economy. The 1997 and 1998 floods affected nearly a million people and were estimated to have cost up to USD 1.2 billion[55]. It is projected that the continued effect of natural disasters on the economy is likely to be as much as the equivalent of a 2% reduction in GDP annually[56].

Top 10 Natural Disasters in Kenya for the period 1900 to 2013 by economic damage costs[57]

Disaster	Year	Damage (000 USD)
Earthquake	2004	100,000
Flood	2012	100,000
Flood	1997	11,800

Top 10 Natural Disasters in Kenya for the period 1900 to 2013 by numbers of total affected people

Disaster	Year	No of total affected
Drought	1999	23,000,000
Epidemic	1994	6,500,000
Drought	2011	4,300,000

[51] Republic of Kenya 2012. Vision 2030: Development Strategy for Northern Kenya and Other Arid Lands
[52] Ibid.
[53] Ibid.
[54] Stockholm Environment Institute, Economy of Climate Change in Kenya, 2009
[55] Ibid.
[56] Ibid.
[57] The International Disaster Database (EM-DAT)

Flood	1977	10,000	Drought	2008	3,800,000
Drought	1971	1,500	Drought	2012	3,750,000
Flood	2005	500	Drought	2005	3,500,000
Flood	1968	50	Drought	1991	2,700,000
Flood	2001	38	Drought	2004	2,300,000
-	-	-	Drought	1997	1,600,000
-	-	-	Drought	1994	1,200,000
TOTAL (top 10) = USD 224 million					

Climate change is already major threat to Kenya, in particular to its dry and hot northern territory. Extreme climate events such as droughts and flash floods afflicting the region only add to the stress the area is already facing. Average temperatures have increased across Kenya over the last half century. For northern Kenya, recorded changes to average minimum (night-time) and maximum (day-time) temperatures range from 0.7 to 1.8 °C and 0.1 to 1.3 °C, respectively[58]. Rainfall is becoming increasingly irregular and unpredictable. The 24-hour intense rainfall volumes have been reducing since measurements started in the 1960s. This has led to the increasing frequency and severity of drought episodes.

Kenya is a chronically food insecure nation; a problem which has been exacerbated by recent droughts. Food insecurity and associated famines have been a critical issue in Kenya in recent years. It is estimated that 10 million people are food insecure with many of them relying on food relief to make up the shortfall.[59] This situation can be ascribed to a number of factors, including: frequent droughts; the high cost of domestic food production inputs, such as fertilisers; displaced farmers following the election violence of 2008; high global food prices; and the low purchasing power of the population. The persistent droughts of recent years have been a significant contributor, and in combination with the other factors mentioned, the country's famines have increased from one every 20 years (over the period 1964- 1984) to almost a yearly occurrence (2007/2008/2009).[60]

The most affected region is Northern Kenya, which recorded 28 major droughts in the last century, four of which were in the last decade.[61] The National Climate Change Action Plan states that "pastoral and marginal agricultural areas are particularly vulnerable to the impacts of climate change. Extended periods of drought erode livelihood opportunities and community resilience in these areas; leading to undesirable coping strategies that damage the environment and impair household nutritional status, further undermining long-term food security". Projections show that droughts are likely to continue, particularly in northern Kenya, in the forthcoming decades. [62]

Table 13: Climate change trends in Kenya

Climate events	*Existing trends*	*Expected climate changes*
Extremes	• Kenya has experienced multiple severe drought episodes over recent years[63]. Major floods have also affected multiple regions.	• Continued increases in temperatures will lead to greater evapotranspiration and further droughts. Increases in heavy rainfall events may also lead to an increased risk of flooding.
Rainfall	• The 24-hour intense rainfall amounts have been decreasing since the 1960s. There has however been an increase in heavy rainfall events	• Heavy rainfall events are expected to increase annually, but mainly in the rainy season leading to a risk of flooding[65].

[58] Republic of Kenya 2010. National Climate Change Response Strategy
[59] Kenya Agricultural Research Institute. Food Security Report "Policy Responses to Food Crisis in Kenya"
[60] Republic of Kenya 2010.
[61] ILRI, 2009: Project Summary: Index Based Livestock Insurance for Northern Kenya's Arid and Semi-Arid Lands: The Marsabit Pilot
[62] Stockholm Environment Institute (Oxford, UK) 2009. Economic impacts of climate change: Kenya, Rwanda, Burundi (Kenya Report)
[63] Fitzgibbon, C. 2012.Economics of Resilience Study – Kenya Country Report, page 3.

	over the coastal parts and northern regions [64].	
Temperature	• Kenya has experienced generally increasing temperatures over vast areas since the 1960s. Over the inland areas, the increase in minimum temperatures has been steeper than that of maximum temperatures. [66] The average temperature rise has been in the order of 1°C. [67]	• Mean temperatures are expected by rise a further 1-2.8°C by 2060[68].

Sensitivity of key economic sectors

A sector sensitivity analysis was carried out to help focus the country analysis in areas where the private sector is particularly exposed or can have a substantive influence on resilience. This assessment included a broad review identifying the key economic trends, each sector's employment and GDP contribution and also the mapping of the major hazards against each sector. The combination of physical risks and economic importance resulted in a prioritised list of sectors.

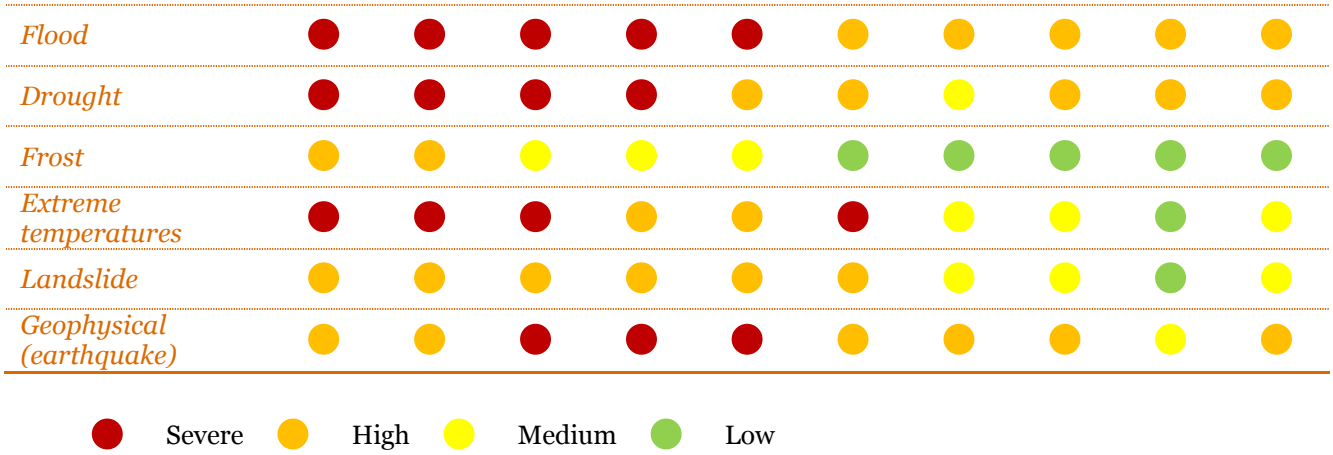
Kenya's economy is heavily dependent on the agricultural sector. Livestock and crop agriculture together contribute to 45% of GDP and employ 32% of the population[69]. Pastoralism, or livestock farming, contributes to half of this and is the dominant economic activity in Northern Kenya. This is primarily due to it being one of the few that the region's harsh climate can support.

With such a large proportion of GDP coming from the agricultural sector, Kenya is highly vulnerable to climate change. With the increasingly arid conditions in North Kenya, the heavy dependence on pastoralism leaves the Kenyan economy very vulnerable to the changing climate. There is little diversification in the rest of the economy. Manufacturing and ICT are the next biggest sectors and each only contributes to around 10% of GDP.

Table 14: Sector - hazard sensitivity assessment[70]

	Agriculture (crops)	*Agriculture (livestock)*	*Manufacturing*	*Wholesale and retail trade*	*ICT (and transport)*	*Tourism*	*Construction*	*Finance and insurance*	*Mining and quarrying*	*Utilities*
Overall vulnerability rating	🔴	🔴	🟠	🟠	🟠	🟡	🟡	🟢	🟢	🟡
Tsunami	🟡	🟡	🟡	🟡	🟡	🟠	🟡	🟢	🟢	🟢
Storm surge	🟡	🟡	🟡	🟡	🟡	🟠	🟡	🟢	🟢	🟢
Tornado	🟠	🟠	🟠	🟠	🟠	🟠	🟡	🟡	🟢	🟡
Hail storm	🔴	🔴	🟠	🟠	🟠	🟡	🟡	🟡	🟢	🟡

[65] IPCC, Fourth Assessment Report
[64] Christy J. R., Norris W. B., and McNider R. T. 2009. Surface Temperature Variations in East Africa and Possible Causes. J. Climate
[66] Christy J. R., Norris W. B., and McNider R. T. 2009. *Ibid*
[67] IPCC, *Ibid*
[68] IPCC, *Ibid*
[69] Kenya National Bureau of Statistics – Kenya Facts and Figures 2012
[70] Source: PwC analysis



The sensitivity assessment illustrates the agricultural sector's is high exposure to natural hazards. Flooding, drought, extreme temperatures and hail all present severe risks for the sector. Manufacturing, trade and ICT also have a high level of vulnerability, with flooding and drought posing the most significant threats.

Table 15: Kenya sector prioritisation

	Contribution to national GDP	*Contribution to national employment*	*Identified high priority sector for future growth*
Agriculture – crops	●	●	●
Agriculture – livestock	●	●	●
Manufacturing	●	●	●
Wholesale and retail trade	●	●	●
ICT (and transport)	●	●	●
Tourism	●	●	●
Construction	●	●	●
Finance and insurance	●	●	●
Mining and quarrying	●	●	●
Utilities	●	●	●

Existing national policy landscape and effectiveness

More than 70% of natural disasters in Kenya are related to extreme climate events[71]. Therefore addressing disaster risk management is deeply interlinked with addressing climate change adaptation. The conventional approach to handling disasters in the country is emergency response / management. This is often spearheaded by the government and relief agencies (development partners, international non-governmental organisations (NGOs), local NGOs, and community-based organisations in particular) and involves the provision of humanitarian assistance to those affected by disasters such as drought.

[71] Ministry of State for Special Programmes, Office of the President. 2009. National Policy for Disaster Management in Kenya. Nairobi: Government of Kenya. page 30.

Government and other stakeholders have learnt from recent droughts and there has been a paradigm shift in disaster risk reduction (DRR). The establishment of the National Drought Management Authority (NDMA), a statutory body established in 2011, and its proposed National Drought and Disaster Contingency Fund (NDDCF), encapsulates this paradigm shift. The function of the Authority is to support the national & county governments and communities to prepare for and react to drought and their impacts.

The government and other actors working in Northern Kenya increasingly recognise the importance of using sustainable development to address long-term disaster issues. The Strategy for the Development of Northern Kenya and Other Arid Lands 2012 recognises that "drought is not essentially a humanitarian problem On the contrary, a drought emergency represents a failure of development. Despite substantial drought management experience within both government and NGOs, drought response is still not timely or appropriate enough". The new approach focuses on addressing the "foundations of development", while recognising that there will always be situations that necessitate relief assistance. For climate change adaptation, this is an important direction. Empowering communities economically enhances their adaptive capacity both at the societal and individual level. Economic wealth, technology, information, skills, infrastructure, institutions and equity are the key factors of adaptive capacity. Enhancing any of these factors thus enhances a people's adaptive capacity.

The Ending Drought Emergencies in Kenya Campaign of March 2011 to February 2013 (figure 1 below) captures this new thinking[72]. The campaign has prioritised the need for sustainable interventions that builds resilience to drought in Kenya. One of its themes is the support to pastoral-livestock production by providing water, establishing disease-free zones, improving breeding services and promoting an efficient marketing system. The campaign has noted that whilst the severity of the 2010/2011 drought was equal to that of 2008 and 2006, the impact was smaller. This was mainly due to the long-term sustainable interventions that were put in place, which were the basis for the adoption of the campaign.

Figure 1: Conceptual diagram of the Ending Drought Emergencies in Kenya Campaign and Strategy

Since drought is a regional challenge afflicting the entire Horn of Africa, the campaign has been adopted by the Intergovernmental Authority on Development (IGAD), which brings together Kenya, Djibouti, Ethiopia, Uganda, Eritrea, Somalia, Sudan and South Sudan.

[72] http://www.preventionweb.net/files/18959_18893endingdroughtemergenciesinkeny.pdf Accessed on April 16th 2013

Engagement in private sector markets (investments in the foundations for development) is being seen as a powerful potential force for poverty alleviation and sustainable development in the arid lands. For development partners, such as the United Nations Development Organisation (UNDP) and NGOs who have been active in Northern Kenya for a considerable amount of time, using private sector markets to address the challenges affecting the region is not an entirely new thing. Some of these actors have been pursuing this avenue for at least the last 10 years.

For instance, Care International's Livestock Marketing and Enterprise (LIME) Project worked to link livestock farmers/herders with markets and in the process increase herders' incomes from the sale of livestock. It was financed by Australian Aid (AusAID). Care organised herders into Pastoralists Production Groups (PPGs), and partnered with Equity Bank to establish a Livestock Purchasing Fund (LipFund). The LipFund provides short-term lines of credit for traders and ranchers for working capital and to finance the purchase of livestock, feed and veterinary services. In order to ensure LipFund benefitted poor pastoralists, access to LipFund was contingent on traders and ranchers purchasing cattle from pastoralist groups that CARE had organized. As of October 2009, LipFund had disbursed eight loans to brokers and traders totalling almost USD 5,000[73].

Country consultation approach

The Kenyan case study development began with an interview with the ASAL Secretariat under the then Ministry of the Development of Northern Kenya and Other Arid Lands. As a key player in Northern Kenya, the meeting was instrumental in deciding on the focus the study. Questionnaires were used to collect information from stakeholders. In most cases, the questionnaires were filled out through face-to-face interviews.

In total, eight companies/individuals were involved in the consultation. A number of other stakeholders were consulted through email and other more informal channels. A report on the findings from the questionnaires was drafted and used as the basis of a focus group discussion. This brought together the stakeholders who had been consulted to agree on priority areas for action. In total, 16 individuals were involved in the consultation, coming from the private and public sectors.

2.2 FOCUS SECTOR – Agriculture - livestock

Sector hazards and impacts

Agriculture is Kenya's largest economic sector, contributing to almost half of GDP. In Northern Kenya, pastoralism is the dominant economic activity and the sector a whole makes up 24% of GDP[74]. The ASALs of the North mean that this type of livestock farming is one of the few economic activities that are viable in the region. Already dry and hot, Northern Kenya is at present experiencing the effects of a changing climate.

Northern Kenya is experiencing the worst effects of climate change. With already low levels of rainfall annually, climate change has meant that the region has experienced numerous droughts in recent years. These are set to get worse in the future[75].

Climate change is a major challenge for the companies and individuals working in the agricultural sector. It was clear during the consultation process that the private sector players, including those with no background in environmental issues, were aware of climate change and its threat to their operations. This generally high level of awareness underscores the wide coverage of climate change in Kenya. This is particularly so in the northern part of the country, where its impact is an everyday reality that the communities have to live with. Some of the impacts noted by the stakeholders consulted were:

- Loss of livestock to drought. Figures of between 8% nationally (quoting Mike Harrison of the Northern Rangelands Trust (NRT)) to 40% loss of livestock for individual farmers, as in the case of the 2006 drought (quoting Hussein Haji Abdulahi, a camel keeper and livestock trader from Isiolo). This greatly affects pastoral communities in Northern Kenya, whose main source of income and livelihoods is livestock.

[73] Care International undated. Livestock Marketing and Enterprise Project and Livestock Purchasing Fund in Kenya: How to Make Markets Work for the Poor. ELMT-RELPA
[74] Kenya National Bureau of Statistics – Kenya Facts and Figures 2012
[75] ILRI, 2009: Project Summary: Index Based Livestock Insurance for Northern Kenya's Arid and Semi-Arid Lands: The Marsabit Pilot

- Drought-induced livestock losses have led to increased pressure on the operations of the companies and/or organisations involved in the industry. As a result, the Kenya Livestock Marketing Council has tried to link pastoralists with markets during droughts to avert higher percentage losses. The same case applies to individuals and organisations involved in the livestock value chain, such as the NRT and its members (Ol Pejeta Conservancy, etc).

- Floods have been associated with increased incidences of livestock diseases. The Kenya Camel Association (KCA) for instance, mentioned a Rift Valley Fever (RVF) outbreak during the 2006-2007 flash floods. This observation agrees with Kenya's National Climate Change Response Strategy (GoK, 2010) which notes that the "outbreak of RVF is known to occur during periods of high humidity that follow abnormally long rains especially those associated with (El Niño Southern Oscillation) ENSO events".

Existing adaptation activities

Amongst the consultees

All of the companies, individuals and associations that were consulted had some form of preparedness for climate change impact. For some, climate change adaptation and disaster risk reduction is actually their core mandate. Examples are the NRT's livestock processing business, which aims to offset the losses incurred by pastoralists during drought and other related weather and climate vagaries. The organisation's livestock processing business is one that has attracted interest from various quarters including the Government of Kenya. The following table lists some of the actions undertaken in the agricultural sector to address climate change adaptation and disaster risk reduction:

Table 16: Existing DRM and CCA activities amongst the consultees

CCA and DRR Actions	*Companies or Associations involved*
Livestock off-take programme before and during droughts including provision of market linkages, livestock holding grounds and structures	NRT and its individual members such as Ol Pejeta Conservancy, Ishaqbini Hirola Conservancy; Livestock Trading Agency in Isiolo; Kenya Livestock Marketing Council, and individuals
Capacity building in livestock management such as disease control and improved husbandry	Kenya Livestock Marketing Council; KCA; NRT
Community peace initiatives and training in sustainable natural resource management and utilisation	NRT and its individual members such as Ol Pejeta Conservancy, Ishaqbini Hirola Conservancy; Livestock Trading Agency in Isiolo; Kenya Livestock Marketing Council, and individuals
Capacity building programmes involving communities in livestock management, e.g. cultivation and storage of fodder, water harvesting and storage	Livestock Marketing Council, and individuals; NRT and its individual member conservancies
Support to communities to re-stock following a drought period (e.g. through donors'/development partners' support)	Livestock Marketing Council
Establishment of strategic feed reserves, fodder banks, and conservation of grass for use during drought periods	Livestock Marketing Council (e.g. in Mandera with an aim of covering 13 counties) and NRT (fodder banks and hay making with Ol Pejeta Conservancy)
Propagation and dissemination of more drought tolerant livestock species or varieties, e.g. camels, cattle, goats, etc	The Kenya Camel Association, Kenya Livestock Marketing Council (drought tolerant species such as the Borana bull, Galla goat, etc); individual/sole proprietors in the camel business
Value addition in the livestock value chain (e.g. processing of milk), making of artefacts from bones for sale, introduction and take up of ranches by traditionally pastoral communities	The Kenya Camel Association, Kenya Livestock Marketing Council, NRT and its member conservancies
Livelihood diversification among pastoralists, e.g., making of artefacts from bones for sale; honey business; wild silk and oils, etc	NRT; Kenya Livestock Marketing Council; women groups and individuals; Bees Abroad/Susie Wren
Index based livestock insurance (IBLI) or some form of insurance	Banks such as Kenya Commercial Bank (KCB) offering agri-business related loans have insured these products against climate related risks. This is made possible through risk guarantee funds such as the African Guarantee Fund, without

	which the bank indicates it would be difficult for it to offer such products to small scale private sector players and individuals in the agriculture/livestock business
	None of the players consulted indicated use or uptake of IBLI products, although the NRT mentioned it was aware of such a pilot project in Marsabit. KCB also mentioned the Syngenta/USP/Swiss Re Corporate Solutions insurance products (*Kilimo Salama and Kilimo Salama Plus*)
Planning for disaster risk reduction before execution of a project	KCB considers ecological and climatic conditions of a region in the design of agribusiness loans and related products

Insurance and financial products

There have been a number of pilot insurance and microfinance initiatives in Kenya. These innovative financial products have been tested over recent years, mostly in the Northern regions.

1. Index-based weather insurance

Index-based weather insurance offers a powerful new way to tackle the risks associated with climate sensitive economic activities such as rain-fed agriculture and pastoralism, on which the livelihoods of so many African smallholder farmers depend[76].

The Financial Sector Deepening (FSD) Kenya programme, which was established in 2005 and is supported by the Rockefeller Foundation, is working to support the development of inclusive financial markets in Kenya as a means to stimulate wealth creation and reduce poverty. The FSD Kenya programme has been supporting index-based weather insurance projects in Kenya since 2008. When the rainfall index falls below a certain level over a predefined period then an insurance payment is triggered. The project is currently supporting development and piloting of insurance products targeted at both livestock and crops. A number of private-public partnership (PPPs) pilot projects have come up in several sectors that need to be up-scaled. Companies are already developing special livestock and crop insurance schemes for risk-sharing aimed at making access to products and services more universal[77] [78].

The weather index-based livestock insurance (IBLI) pilot project is being implemented in Marsabit by the International Livestock Research Institute (ILRI) with support from UK's Department for International Development (DfID) through the FSD. Equity Bank and UAP Insurance are administering the scheme. These insurance products cover pastoralists against livestock mortality due to drought using the normalised data vegetative index (NDVI) derived from satellite images. Payouts are triggered when satellite images show that grazing lands in the region have deteriorated to a point that herders are expected to lose more than 15 percent of their herd. The first payouts were made during the drought of 2011 during which herders lost between 18 and 38 percent of their livestock[79] [80].

2. Risk-guaranteed microfinance/banking products

In Kenya, commercial banks, through a government directive, are required to allocate 10 percent of their portfolio to agriculture[81]. A number of the major commercial banks offer agricultural related products, but none of these specifically addresses pastoralism. In particular, there is nothing to address the special requirements of predominantly Muslim communities of North Kenya. Equity Bank, one of the largest microfinance lenders in Kenya, for instance, has six agricultural loan products, but only one of these ("Kilimo Supa") targets livestock farmers.

The findings of this study show that most of the microfinance products currently available for livestock farmers/herders are risk guaranteed. This is the model that major traditional banks in Kenya such as Equity Bank and Family Bank seem to operate. Similar to the index-based weather insurance products discussed above, it involves provision of a risk sharing component by a third party (development partners, international NGOs) in order to increase the risk appetite of the financial institution (banks, microfinance institutions such as

[76] Financial Sector Deepening: Index-based Weather Insurance Project Briefing Note. Available at http://www.rockefellerfoundation.org/uploads/files/9a11989a-f75b-4b85-82e6-2f67808f52aa-jan_18-10-01.pdf

[77] Financial Sector Deepening: Index-based Weather Insurance Project Briefing Note

[78] Republic of Kenya 2012. National Climate Change Action Plan Adaptation Technical Report 4: Climate Change and the Private Sector

[79] Republic of Kenya 2012. National Climate Change Action Plan Adaptation Technical Report 4: Climate Change and the Private Sector

[80] http://www.ilri.org/ilrinews/index.php/archives/tag/uap-insurance

[81] Republic of Kenya 2012. National Climate Change Action Plan Adaptation Technical Report 4: Climate Change and the Private Sector

savings and credit cooperatives (SACCOs)). The IBLI pilot project in Marsabit operates this model. The risk guarantor is DfID.

Another example is Equity Bank's "Mifugo Biashara" loan product, where the risk guarantors are the Alliance for a Green Revolution in Africa (AGRA), International Fund for Agricultural Development (IFAD), the Government of Kenya, and Amiran Kenya. The partnership is still in its early stages but Equity Bank has started giving loans under this initiative through its local branches. Each partner provided USD 2.5 million in loan guarantee funds. In addition, Equity Bank will administer the programme credit and contribute USD 50 million for low interest loans, while the government through the Ministry of Agriculture, will help administer the credit. To mitigate the high risks of farming, the plan includes insurance products designed to offset risks such as adverse weather and disease. The product's inadequacy in respect to northern Kenya is that it is targeted mainly at the crops sub-sector. In addition, it is not Sharia-compliant, a key requirement for Muslim farmers[82].

The Kenya Drylands Livestock Development Program (KDLDP), which is helping pastoralist households in northeast Kenya overcome the many existing obstacles to achieving both economic and food security in the region. KDLDP is a CNFA's project funded through a USAID Farmer-to-Farmer Leader with Associates award and is focused on connecting farmers to vital inputs, services, and local partners. By improving livestock productivity and competitiveness, enhancing trade and marketing, adding value to livestock products, influencing policy, and promoting strategies for mitigating drought, the project is increasing incomes and food security for at least 50,000 households. This has created 600 new jobs and facilitated access to credit to catalyze trade, production, and value-adding activities[83].

The Community Owned Finance Institution (COFI), a new microfinance institution operating the SACCO model, is a product of the KDLDP and the Kenya Livestock Marketing Council. It is Sharia compliant, and is thus suitable for pastoralists, SME's and the Muslim community. COFI will allow pastoralists the financial opportunities to build their businesses. It is also expected that, on the medium-term, COFI will transform into a formal financial institution (regulated and supervised deposit-taking SACCO). The SACCO shall thus mobilize significant community savings through financial intermediation and therefore allow the constitution of individually and collectively-owned and managed capital. The financial institution will therefore promote the development of the private sector in northern Kenya and act as a vector for sustainable local development.

The First Community Bank (FCB) of Kenya is already offering a Sharia compliant product and has physical presence in Northern Kenya (Garissa Town). The bank itself is a fully Sharia-compliant banking institution. It operates a livestock financing and market access product called "Boresha Mifugo", which was developed in onjunction with the Kenya Meat Commission and with support from the USAID. The product is meant to benefit individuals and organised groups in the livestock industry. It provides easy, affordable micro-credit facilities to enable small and emerging livestock producers and traders to access the necessary funding for their growth and marketing[84]. The main difference between this product and the others discussed above is its Sharia law-compliance. In addition, proof of title deeds and other forms of collateral are not required for one to access the loan. First Community Bank prides itself on trust and brotherhood, which are the fundamental underpinnings of the Islamic faith. Instead, it requires reference letters signed in honour as opposed to being notarised[85].

In addition, First Community Bank offers a Sharia compliant insurance product. The FCB Takaful (Insurance) Company Ltd., a wholly owned subsidiary of the bank, is a Sharia-compliant insurance company. It is however, not clear at this stage whether the product's coverage extends to the livestock sector.

Sector opportunities

A number of commercial investments in the livestock sector are currently taking place in Northern Kenya. In addition to its large livestock population, one important advantage of Northern Kenya is its location near the livestock markets in the Middle East and North Africa (MENA). Furthermore, the region serves as a route for livestock movement from Somalia and Ethiopia to Nairobi and other markets that serve as a potential source of income for local people through value addition. Kenya is a meat –deficit country. Up to 30% of Kenyan beef comes from illegally imported cattle, indicating a large deficit in local production to meet

[82] Care International undated. Livestock Marketing and Enterprise Project and Livestock Purchasing Fund in Kenya: How to Make Markets Work for the Poor. ELMT-RELPA
[83] http://www.cnfa.org/wp-content/uploads/2012/12/KDLDP-Media-Advisory3.pdf
[84] http://www.firstcommunitybank.co.ke/index.php?option=com_content&view=article&id=62&Itemid=124
[85] Care International undated. Livestock Marketing and Enterprise Project and Livestock Purchasing Fund in Kenya: How to Make Markets Work for the Poor. ELMT-RELPA

demand[86]. Furthermore, consumption of beef is growing at an annual rate of 4%, buoyed by a rising urban middle class. These are important factors for setting up of ranches, which currently supply only about 3% of beef consumed in Kenya. Overall, there is a low degree of commercialization in Kenya's livestock production sector, indicating there is much room for private sector expansion.

The government is supporting the development of new livestock investment models. Ol Pejeta Conservancy, a wildlife conservation area with 90,000 acres of land holdings operates a livestock business model in which it purchases cattle from pastoralists. The cattle are then grass-fed and fattened on a holding ground, before passing through an abattoir and being delivered to end markets. In 2009, the conservancy traded 5000 head of cattle, and planned to double the figure in 2010[87]. The government sees this as a viable livestock investment model for Northern Kenya and has consequently put forward an investment proposal to interested private sector players[88]. One study suggests that 400,000 jobs could be created if 50% of the beef deficit in Kenya alone were to be met by increased livestock production from Northern Kenya[89]. In another example, which illustrates the hidden wealth in the livestock trade, revenue collection by Samburu County Council increased ten-fold, to an average of Kshs. 1m (about USD 14,000) per year, after it started a partnership with the Livestock Marketing Association to run a sales yard on a revenue-sharing basis[90].

In respect to setting up of ranches, the Strategy for the Development of Northern Kenya and Other Arid Lands (Republic of Kenya, 2012) sees the implementation of the National Land Policy and National Spatial Plan as providing adequate framework to address many of the land challenges facing the ASALs; the same challenges that would hinder establishment of ranches.

The government has expressed interest in working with the private sector to scale up microfinance and other risk sharing products. One common thread among the microfinance products analysed earlier in this case study is that they are all operating a risk guarantee scheme. It would be interesting to know whether the private entities participating in the initiatives would now voluntarily invest in these products/initiatives based on their experience from the pilot programmes. The government appears keen to work with the private sector in these areas. The Strategy for the Development of Northern Kenya and Other Arid Lands (Republic of Kenya, 2012) states the following policies, among others, with respect to banking and insurance products for the livestock sector:

- Work with financial services institutions to allow moveable assets such as livestock to be used as collateral
- Work with the Insurance Regulatory Authority to introduce insurance products appropriate to the context of the region
- Reform the commercial justice system so that it better supports financial institutions such as Sharia-compliant banking
- Introduce Guaranteed Minimum Returns for livestock producers on a similar basis to those available to crop producers through the Agricultural Finance Corporation (AFC)
- Establish a Livestock Enterprise Fund which meets the needs of livestock producers and traders, administered through commercial banks
- Promote models of financial service provision that are culturally acceptable in the context of the region, and explore how national funds (such as those for women and youth) could be channelled through these mechanisms
- Support the development of financial services products relevant to the needs of the region (such as index-based insurance).

[86] Republic of Kenya 2012. Kenya's LAPSSET Corridor Livestock Investment Opportunity

[87] Pipal and Reformconsult 2010. Expanding Investment Finance in Northern Kenya and Other Arid Lands (Sector Profiles). A report for Ministry of the Development of Northern Kenya and Other Arid Lands and Care International

[88] Republic of Kenya 2012. Kenya's LAPSSET Corridor Livestock Investment Opportunity

[89] ReSAKSS, 2008: Investment Opportunities for Livestock in the North Eastern Province of Kenya: A Synthesis of Existing Knowledge. In Republic of Kenya 2012. Strategy for the Development of Northern Kenya and Other Arid Lands

[90] SNV, 2008: Process Report on the National Conference on Public Private Partnership in the Development and Management of Livestock Marketing in the ASALs, Silver Springs Hotel, Nairobi, 18 November 2008. In Republic of Kenya 2012. Strategy for the Development of Northern Kenya and Other Arid Lands

Barriers to sector resilience

Governance risks such as political instability and conflict are significant barriers to action. For the NRT, political instability plays out in the form of politicians pushing ethnic agendas, especially during dialogue with communities in the setting up of conservancies. This has however, been fading of late as communities are able to see the benefit of conservancies in places where they have been set up. Conflict, especially over water and pasture resources and insecurity in general is a challenge in Northern Kenya. Insecurity was cited as a challenge by all the organisations and individuals that were interviewed.

Regulatory and legal frameworks do not provide the certainty required for investment. Kenya's Constitution, promulgated in 2010, was cited by some private sector players as posing uncertainty in future investment especially in areas pertaining to land and land use. This, plus the fact that land in Northern Kenya has generally not been adjudicated and title deeds provided to individuals and groups were cited as some of the challenges to investment in conservancies and ranches that requires large areas of land.

Poor state of infrastructure is responsible for high cost of doing business in the region. One livestock trader mentioned the high cost of transportation of cattle from remote places, which translates to relatively low prices offered to pastoralists for the traders to be able to make appreciable mark-ups when transportation costs are factored. Poor state of infrastructure was also blamed for the high level of banditry in the region because of the inaccessibility of the region to security personnel.

Lack of markets for livestock and livestock products, as well as the prohibitively low prices offered by intermediaries are the main reasons many pastoralists do not sell their livestock even during droughts.

Table 17: Summary of sector barriers to uptake of private sector action on resilience

Barrier group	*Barrier example*	*Livestock Sector* ○ Minor barrier ● Major barrier ● Key barrier	*Description/ Local example*
Risk management capability and maturity	Lack of internal buy-in / leadership	○	Buy-in is not usually an issue as businesses and individuals are already aware of the impact that climate change is having on their operations.
	Low risk awareness	○	This is not so much of a concern at smallholder, local and national company level. Large MNCs tend to reference this barrier more often.
	Challenges of decision making under uncertainty	-	The impact of uncertainty is less pronounced in the local and sector context. The risks are very real.
	Limited sharing of good practice and lessons learned from other business approaches	●	There have been a number of pilot and test programmes in Kenya however the dissemination of best practice is not widespread
	Limited tools available e.g. risk assessment, scenario and opportunity evaluation tools	○	The risks are very real and present, hence there is less need in Kenya for special tools to determine the level or risk and then spur action.
Technical	Lack of knowledge, capacity and skills in workforce	●	Despite being aware of the risk posed, individual livestock farmers do not necessarily have the skills to address the issues. Capacity building is required to improve livestock management knowledge.
	Poor communication of useable risk information	●	The availability and communication of better local information on the likelihood, magnitude and timing of events, such as drought and flooding, would be of benefit. There is a need to improve the accuracy of weather information in order to build confidence amongst users
	Lack of access to technology	○	Access to technology solutions, with the exception of access to drought-tolerant species, is not so relevant

			for livestock farmers. Disease and pest control technologies are also critical. The use of ICT based technologies for market information provision was also highlighted as being important.
	Lack of demonstration projects	○	There have been a number of successful pilot projects in Kenya. These need to be rolled out.
	Lack of knowledge sharing / collaboration platforms	●	More could be done to share best practice and information amongst the livestock farming community.
	Weak sector and value chain partnerships	●	Some existing projects have shown the importance of collaboration. As yet there is little collaboration across the value chain.
	Lack of access to early stage capital (risk finance)	●	Lack of finance is a main challenge. Many of the proposed resilience action require large financial outlays that are beyond the reach of individual pastoralists.
Financial	Technology risk	○	Was not referenced as an issue in workshop or consultation Mobile money is increasingly becoming a means of transactions even in Northern Kenya. There are several risks associated with it, primarily system failures.
	Access to credit	●	There are a number of microfinance products available to the agricultural sector but they are not always suitable for livestock farmers or those who require them to be Sharia compliant. Small scale traders that would like to grow often cannot get access to credit.
	Technology cost gaps	○	There are obvious constraints regarding the affordability of expensive technologies but this was not cited as a barrier. Technologies will have to be largely cost neutral or beneficial with a low capital outlay.
	Lack of access to insurance	●	There is demand for insurance at farm level. Microinsurance schemes have been piloted to reach the poor and vulnerable communities. Wide-scale dissemination is required.
	Lack of incentives	-	The incentive to adapt is very high because farmers are already experience severe losses.
Local enabling environment	Inadequate policy, regulatory and legal environment	●	Policies and regulations (especially in the land use sector) are not strong enough or consistent enough to encourage investment.
	Domestic infrastructure constraints	●	Transport issues were cited as a major issue for farmers getting their livestock to market.
	Market and financial sector risks/capacity	●	The livestock market itself is not well developed and farmers are often unable to access markets even when they have livestock to sell.
	Local political, governance and security risks	●	Banditry and increasing cases of terrorism pose major challenges to investment in Northern Kenya.

Opportunities for public sector intervention

The following actions were identified as necessary measures to respond to respond to drought in the livestock sector.

Table 18: Public finance interventions required to support to Kenya's agricultural sector

Opportunity	*Interventions*	*Implementation options*
Actions to respond to drought	• Multi-year food and cash mechanisms based on early warning and food security data • Emergency water supply	• Co-ordinate response between existing NGO programmes • Collaborate with existing donor activities

	• Early responses in the livestock sector: Destocking – or purchase of animals by the government for a fixed price, with animals slaughtered and meat distributed among needy families; animal health campaigns; and animal feeding	
Actions to recover from drought	• Reconstruction of destroyed assets with improved, climate-resilient standards • Establishing resilient community-based water and sanitation systems • Rehabilitation of the resource-base in rangelands through reseeding and water development • For agriculture, the provision of seeds for drought tolerant crops, fertilizer subsidies, water harvesting, and the construction of water pans, among others	• Build upon existing microfinance initiative to provide credit to farmers for climate resilient crops • Expand existing insurance penetration • Provide technical assistance to government to improve standards
Actions to build resilience to drought	• Monitoring systems – Quality, credible early warning and food security monitoring systems that make effective use of advances in meteorological monitoring information technology. • Livestock –developing and expanding livestock markets, improving animal health, smaller healthier herds, livestock insurance schemes (where feasible), livestock diversification, establishment of comprehensive animal health care facilities. • Education – Expanding the provision of schools and teachers in the ASALs to meet the national average. • On-going peace-building and conflict resolution work. • Climate proofed infrastructure development – Investing in roads, ICT infrastructure, multipurpose dams and renewable energy capabilities • Livelihoods diversification- Moving to livelihoods that are more adaptive to climate change: investment in community-based livestock systems, crop farming (both irrigated and rain fed), dryland forestry and forest products, fisheries and other alternative livelihoods. • Water management – Developing effective and environmentally appropriate systems of water harvesting, management and irrigation.	• Support technology innovation through a new fund a new fund • Embed resilience windows into existing initiatives • Subsidise access to IT for farmers
Knowledge and capacity	• Integrate local knowledge with scientific information • Improve access to weather stations • Improve access to technology that supports resilience building initiatives	• Support and co-ordinate between existing NGO programmes • Support technology innovation through a new fund
Access to insurance and financial services	• Raise awareness of insurance – education is required to help people understand the role of insurance • Financial support needs to be extended to small traders and individuals looking to expand and build resilience.	• Scale-up existing insurance and microfinance pilots

Local knowledge could be integrated with scientific information to provide better weather prediction services. Currently, private sector actors in Northern Kenya (pastoralists, livestock traders,

associations and companies) rely on weather information from poorly defined sources. Some big ranches such as the Northern Rangelands Trust and its members alluded to using scientific information (e.g., from the KMD) for its planning, but at the same time, acknowledged that it wasn't sure of the source of its weather information. Many people rely on indigenous knowledge in weather prediction (e.g. the expectation that drought hits after every 4 years, and so if the drought fails to occur in the 3rd year, it is expected that it would occur on the 4th year). There is need to integrate indigenous knowledge with modern/scientific knowledge. In addition, there is need to improve weather information dissemination through increasing number of weather stations in the region.

Livestock market information is needed to enhance livestock trade. There is a popular opinion that pastoralists keep livestock for cultural prestige, even during times of drought. This myth is as a result of farmers being unable to access markets and refusing to sell through middle-men who do not offer sufficiently high prices. For example, they may only offer as low as Ksh. 1000 (USD 13) for a bull that would normally fetch around Ksh. 50,000 or more (USD 600) during droughts. Farmers would be willing to sell, but with such demoralising prices, pastoralists would rather have their livestock die than "sell them for nothing". Linking pastoralists with markets where they can fetch better prices would help them to sell when they need to, rather than let their assets go to waste.

M-Shamba, an online market information platform mainly applied in the crops sector was mentioned as local innovation that could be used for disseminating livestock market information. It was also understood that there were several such initiatives. To access M-Shamba information, one needs to pay a Ksh. 5 fee. Subsidising this fee for those who may not be able to afford it could be an avenue for support.

Awareness raising and education of how insurance works is required. Several microinsurance products have been launched in the region, although their uptake has been quite low, making insurance investment less attractive for private sector players to venture into. The low uptake is due to several factors but the two main ones that were pointed out were low understanding of how insurance works and government's (politicians') involvement in popularising insurance through messages that are often politically inclined. Currently, many people in Northern Kenya understand insurance to be some form of guaranteed payment irrespective of the outcome of the risk against which insurance is taken. In other words, whether drought hits or not, those who have insured their livestock against it expect payment to be made to them in spite of having incurred no losses. In addition, a one-time involvement of the government (or politicians) in popularising insurance created an impression that this was a government initiative and that pastoralists would be paid massive amounts of money after a certain period of time.

These misunderstandings need to be rectified. Equity Bank, for instance, emphasised that under-writing is not the main challenge to the bank. The challenge is creating an environment that is conducive and would enhance uptake of insurance products. This revolves around awareness and education among the target group. Other elements of awareness could include methods of valuation of livestock to determine premiums and therefore expected pay-outs. This is currently a grey area.

Financial support to small-scale traders, groups and individual pastoralists. Financial support is expectedly, the main impediment to climate change adaptation and disaster risk reduction in the livestock sector. Several small traders would like to venture into livestock trade, which could create healthy competition and reduce the exploitation by the intermediaries. They are constrained by finance and the stringent conditions placed by several local banks for loans. The other challenge is that land, which would traditionally be used for collateral, has generally not been adjudicated in Northern Kenya. Therefore, many people do not have title deeds. Financial support is also needed for organisations and individuals whose supports the livestock sector in various ways such as fostering skills in value addition to livestock and livestock products, and livelihood diversification programmes.

2.3 FOCUS SECTOR – ICT

The opportunity for ICT to respond to climate change

The ICT sector has an important role to play in responding to climate change. The ICT sector itself and the operation of technology contributes to over 2% of global carbon emissions, and this is growing[91]. ICT

[91] Milosevic, F. 2011.*ICT Carbon Credit Programme (ICCP) for Telecom Operators*. Presentation at Innovation Africa Digital Summit, Mombasa, 22-24 March.

companies, however, can play an important role – through "smart" applications – in reducing the carbon footprint of the sectors contributing to the other 98 percent of emissions.

Of particular interest to Kenya, and especially Northern Kenya, is the role of ICT in DRM and CCA as well as being a tool for development. The following is a summary of projects, programmes and/or initiatives in which ICTs have been involved to address CCA and DRM in the ASALs of Kenya:

1) Kilimo Salama[92], a partnership between Syngenta Foundation for Sustainable Agriculture, UAP Insurance and Safaricom. It offers insurance policies to farmers who plant on as little as one acre to shield them from significant financial losses when drought or excess rain negatively impacts their harvests. Payments to farmers are made through the Safaricom's MPesa platform.

2) Vodafone Foundation's Instant Network, a portable mobile phone network which helps people connect with their relatives in situations of natural disasters. The ultra-portable mobile network (weighs less than 100kg) can provide coverage of three to five kilometres and the GSM base station can transmit and receive thousands of text messages and dozens of calls simultaneously. It has been used in an emergency disaster situation, where it provided communications during severe droughts in Kaikor, Northern Kenya in February 2012. It won the Groupe Spéciale Mobile Association (GSMA) Humanitarian Award at the Mobile World Congress held in Barcelona in March 2013[93] [94].

3) Social protection programmes are increasingly leveraging advances in ICT to enhance their efficiency and overall performance. A number of safety net programmes are already or are planning to use the agency banking network and smart card technology to make transfers to beneficiaries. At present, 29 percent of safety net benefits are channelled through banks, 6 percent through banking agents, and 4 percent through e-wallet (e-wallet refers to the 'agency banking model' in which a biometric smart-card is used and mobile network platforms, such as M-Pesa)[95]. See the case study below.

The Hunger Safety Net Programme (HSNP), funded by Department for International Development (DFID) and implemented by the Ministry for the Development of Northern Kenya and Other Arid Lands, targets the poorest, most food-insecure districts in northern Kenya. The area presents three key challenges for the delivery of cash payments: poor security, poor infrastructure, and low population densities. These factors make the physical delivery of cash transfers very expensive and expose recipients to the risk of theft. To address these constraints, the programme adopted an agency banking model for the delivery of its cash payments. To establish this model, the Equity Bank interviewed merchants in local communities to find those with a strong reputation for propriety and liquidity in their businesses to provide payments to recipients. Once recruited, these agents were given a point of sale device (POS) and a solar panel if no other power was available to recharge the device, and were trained in how to use it. Beneficiaries of the programme were then given a personalised smart card with their name and photo printed on the card and electronic biometrics of their fingerprints embedded in the card's chip. Under the new system, they take this card to their nearest agent who insets it in the POS which verifies their identity. The agent then gives the cash to the recipient from the till. An electronic record is used to credit the agent's account at the Equity Bank branch with the funds that he has disbursed as well as a commission for providing the service. In areas with no mobile network coverage, agents are allowed to make "offline" payments, which are then recorded in the system once the agent moves to a location with mobile network coverage.
Source: Government of the Republic of Kenya 2012. Kenya Social Protection Sector Review (Executive Report)

The following table lists some of the other actions undertaken in the ICT sector in Kenya to address climate change adaptation and disaster risk reduction:

Table 19: ICT actions undertaken in Kenya

CCA and DRR Actions	*Companies or Associations involved*
Planning for disaster risk reduction before execution of a project	Safaricom (e.g. the Strategy team considers potential environmental and climatic hazards in the setting up of communication infrastructure/equipment such as the BTS)
Investment in alternative/renewable	Safaricom:

[92] See http://kilimosalama.wordpress.com/about/
[93] http://www.vodafone.com/content/index/about/foundation/news/instantnetwork_kenya.html
[94] http://www.independent.com.mt/articles/2013-03-13/company-news/vodafone-foundations-instant-network-wins-gsma-humanitarian-award-1162739713/
[95] Government of the Republic of Kenya 2012. Kenya Social Protection Sector Review (Executive Report)

energy as a form of energy diversification	• The conceived General Electric (GE)-Safaricom Green Energy Initiative and others such as the Power Cube (hybrid system with solar, batteries and fossil generator) are meant to safeguard the company against power outages • Small scale wind projects: the majority of the BTS in Northern Kenya are run hybrid systems (wind, solar, and grid
Innovation and investment in transmission systems not susceptible to climate vagaries	Countrywide deployment of fibre optic technology by Safaricom and other telecom players in the country

Recommended Actions for the ICT Sector

Despite its importance, the ICT sector has not yet become effectively integrated into adaptation planning. The National Climate Change Action Plan (NCCAP) refers to an ICT-enabled, climate change knowledge management system, but the potential of ICT-related interventions could be further explored. The following interventional points for mainstreaming ICTs into climate change adaptation, which build on a study by the International Institute for Sustainable Development, should be considered[96].

ICT-relevant investments - concerned with frameworks, policies and planning such as:

- *Embedding ICT planning in adaptation planning processes*–Implementation of the NCCAP should be seen as a window of opportunity for the inclusion of ICT-relevant interventions. Preparation of the National Adaptation Plan could include a capacity building program to review where and how investments in ICTs might be best integrated in the Kenya's adaptation response.
- *Investment in open data* –Making environmental and meteorological data accessible and open to all interested stakeholders (public, academic and private).

ICT investments - concerned with ICT tools and monitoring infrastructure. These include:

- *Early warning systems / weather management / meteorological systems / satellite and remote sensing systems* – with a specific focus on investment in working weather stations and in strengthening meteorological services in general, to improve data collection and technical capacity and improve the availability, accuracy and timeliness of weather and climate information.
- *Smart systems and sensor networks* – with a focus on investment in new infrastructure for sensor networks to assist in monitoring ecosystem impacts.
- *Geographic information systems / modelling / planning and decision-making tools*– requiring investment in strengthening technical aspects of data sharing, in particular:
  - Data-sharing between countries, to ensure more consistent monitoring and assessment of climate change across regions; and
  - The integration of data that are generated from large-scale systems with those that are collected at the local level.
- *Knowledge management systems / information sharing systems / planning and decision-making tools*– including investment in partnerships between the government, universities and the private sector for research and development, effective management and integration of data generated from large-scale systems and those collected at the local level.
- *Mobile phone applications / General Packet Radio Service (GPRS)* – including exploring the potential for wider application of mobile phone-based applications and tools in most vulnerable sectors such as agriculture, water and health (such as the one described above). These tools often the use of sensors to generate climate data and transmit the resulting information to a central hub where it is analysed, thus enabling both evidence-based decisions at a national level and alerts that can be received by end-users on their mobile phones in local languages.

ICT-enabled interventions - concerned with knowledge sharing and its role in adaptation action. Adaptation policy makers and planners need to be able to connect with and learn from one another about what is working and what is not. This exchange of information and knowledge must to be informed by real experience on the ground.

- The government and its development partners should invest in mechanisms for sharing information between platforms, along with mechanisms for meta-level search-and-retrieval access across all platforms. The specifics of such information sharing platforms have been detailed in the NCCAP.

[96] Ben Akoh*et al.,* 2011.

- The government and its development partners should invest in mechanisms for managing, sharing and developing flows of communication with vulnerable communities, which involve them in determining the responses that affect their lives.
- The government and its development partners should explore the potential for using crowd-sourcing techniques, particularly those that are enabled by mobile phones, to generate real-time data on both acute and chronic impacts of climate change. This could be of real value in targeting resources during crises. It could also supplement the long-term data generated by sensor and other systems described above with local information that supports the design and implementation of local adaptation practice.

The ICT sector offers innovative options to help Northern Kenya adapt to climate change, helping to disseminate information and facilitating knowledge integration. Mobile phone applications have particular promise because of the high number of users. Knowledge management and sharing of the information in the country and regionally can help planners to understand what works and to learn from one another.

2.4 Kenya consultee list

Table 20: Kenya consultee list

	Name	Designation	Organisation
1	Victor Orindi	ASAL Secretariat	Ministry of Devolution and Planning
2	Martha Wamukoya	ASAL Secretariat	Ministry of Devolution and Planning
3	Esther Muiruri	Head of Agribusiness Department	International Relief and Development (IRD)
4	Adan Ali	Partnerships Advisor	ANOLEI Camel Milk Cooperative Ltd.
5	Safia Kulow	Advisor Sales	ANOLEI Camel Milk Cooperative Ltd.
6	Qalicha Wario	Group Brands Manager	Kenya Livestock Marketing Council
7	Isack Yussuf	Senior Management Executive	Businessman
8	Khalif A. Abey	Head CDM cell	Kenya Camel Association
9	Henry P. Sekalpo	NAMA Officer	Kenya Livestock Marketing Council/Livestock Trader
12	Clarisse Aduma	SME Unit-Agribusiness/Retail Department	Kenya Commercial Bank--- SME Unit-Agribusiness/Retail Department
13	Mike Harrison	Managing Director	Northern Rangelands Trust
14	Hussein Haji Abdulahi	Camel farmer	n/a
15	Benson Ojwang	Manager	Ishaqbini Hirola Community Conservancy
16	Michael Koech	Principal Environment and Sustainability Officer	Safaricom

3. Mozambique

3.1 Resilience overview

Introduction

Mozambique has considerable development potential with a large land area and significant natural resources. Mozambique is a low-income country which to date has remained heavily dependent upon agriculture for GDP, employment and rural livelihoods. Large areas of land, as yet, remain undeveloped but multiple opportunities exist to increase incomes and reduce current levels of poverty. The country has vast untapped natural resources (e.g. coal, natural gas, and mineral resources) and has a strategically important location on the east coast of southern Africa providing access to potentially large trading opportunities for a number of export commodities.

The private sector in Mozambique is relatively limited in size and scope; international donors and NGOs have been highly involved in the country's development post-civil war in 1992. Mozambique faces considerable economic and governance challenges to achieving sustainable and long-term development outcomes. The persistence of donor grants has limited market creation and economic development to date. Mozambique also faces significant impacts from natural disasters including severe droughts and floods such as those in 2000 and earlier this year, with detrimental effects on the country's economy.

Top 10 Natural Disasters in Mozambique for the period 1900 to 2013 by economic damage costs[97]

Disaster	Year	Damage ('000 USD)
Flood	2000	419,200
Flood	1967	180,000
Flood	2007	100,000
Storm	1984	75,000
Flood	2007	71,000
Flood	1978	63,000
Flood	1977	55,500
Drought	1991	50,000
Flood	2001	36,000
Flood	2013	30,000

TOTAL (top 10) = USD 1.08 billion

Table 21: Mozambique country statistics

Indicator	*Result*	*Date*
GDP (purchasing power parity)	USD 26.22 billion	2012 est.
GDP real growth rate	7.5%	2012 est.
GDP per capita	USD 1,200	2012 est.
Population	24,096,669	July 2013 est.
Population growth rate	2.44%	2013 est.
Urban population	38% of total population	2010
Rate of urbanisation	4%	2010-2015 est.
Poverty rate	55%	2009
Major cities	Maputo: 1.59 million Matola: 761,000	2009
Area	799,380 sq km (land 786,380 sq km, water 13,000 sq km)	
Coastline	2,470 km	
Employment		
Labour force	10.1 million	2012 est.
Labour force occupation	Agriculture 81%; industry 6%; services 13%	1997 est.
Unemployment rate	17%	2007 est.
Economy		
Key agricultural products	Cotton, cashew nuts, sugarcane, tea, cassava (tapioca), corn, coconuts, sisal, citrus and tropical fruits, potatoes, sunflowers; beef, poultry	
Industries	Aluminium, petroleum products, chemicals (fertilizer, soap, paints),	

[97] Source: http://www.emdat.be/result-country-profile (top 10 disasters table)

	textiles, cement, glass, asbestos, tobacco, food, beverages	
Industrial production growth rate	8%	2010 est.
Exports	USD 3.516 billion	2012 est.
Key commodities exported	aluminium, prawns, cashews, cotton, sugar, citrus, timber; bulk electricity	
Key export partners	South Africa 28.9%, Belgium 15.1%, Italy 11.8%, Spain 8.5%, China 6.6%	2011
National infrastructure		
Airports (paved/ unpaved runways)	100 (21/79)	2012
Pipelines	gas 918 km; refined products 278 km	2010
Railways	4,787 km	2008
Roadways (paved/unpaved)	30,331 km (6,303 km/24,028 km)	2000
Ports and terminals	Beira; Maputo; Nacala	
Energy and telecoms		
Electricity – installed generating capacity	2.28 million kW	2012 est.
Electricity generation type	Fossil fuels 0.1%; hydroelectric plant 99.9%	2012 est.
Telephones – main lines	88,100	2011
Telephones – mobile cellular	7.855 million	2011
Internet users	613,600	2009

Overview of natural hazards, vulnerability and impacts

Mozambique is a vast country occupying approximately 800,000 square kilometres of land and with a 2,500 kilometres of coastline. The country is characterised by a range of topography, ecosystems, socioeconomic and climate zones. The country appears to be rich in natural resources e.g. coal, natural gas reserves and mineral deposits, although these are relatively newly discovered and as yet largely untapped. A low-income country, Mozambique is still a primarily agricultural based economy.

The majority of Mozambique's relatively small population of 24 million people live in rural areas along the coastline; higher mountains further inland and to the north support relatively small populations.

The general climate can be described as:

- Dry season (June to October) characterised by cool temperatures and low humidity
- Wet season (December to March) characterised by high humidity and periods of rainfall
- November is relatively unpredictable during the transition from dry to wet season

Mozambique is recognised as one of the most climate vulnerable countries in Africa, especially along its coastline. Natural hazards already have a significant detrimental impact on the development of key sectors of the economy, particularly agriculture, infrastructure and housing. Significant longer term impacts, particularly on rural communities on wider issues including health and education are also apparent. Rural populations are highly dependent upon climate sensitive local resources e.g. rain-fed agricultural production, fish stocks and local transport and communication infrastructure which is often already weak or limited.

A range of hydro-meteorological hazards including tropical cyclones, droughts and floods pose risks to Mozambique. These are predominantly seasonal and occur to varying severity on an annual to decadal basis. Flooding in Mozambique is due in part to the country's geographical location downstream of nine major international river basins. [98] Health hazards, notably epidemics also pose risks to the population. Coastal

[98] http://reliefweb.int/map/mozambique/flood-waters-over-chokwe-guika-bilene-and-xai-xai-districts-gaza-province-mozambique

populations are also highly vulnerable to tropical cyclones formed in the Indian Ocean and in future, sea level rise and increasingly severe tropical cyclones.

Hazard exposure by land area, assets and population all show different trends. Analysis by Munich Re indicates that when looking spatially at hazard distribution, the country is exposed to the greatest degree to earthquake and hailstorm risks but that the most severe risks are those from floods, hailstorms and earthquakes. It is estimated that 58% of the population of Mozambique is at risk of water related hazards.[99] Analysis of the International Disaster Database (EM-DAT) shows that the greatest economic losses experienced in Mozambique to date are from flooding events. This is verified by the impacts that were noted from in-country consultations with stakeholders noting the effects in the Chokwe valley and province. Although flood events cause high economic damage, EM-DAT reveals that drought events have had a more devastating effect on the country's population with these events resulting in the highest death tolls and total number of people affected.[100]

The 2000 and 2013 floods have highlighted the high vulnerability of Mozambique's population and economy to natural disasters. In 2000, Mozambique experienced its worst floods in 50 years, killing about 100 people and displacing 540,000. In 2013, floods in the Limpopo river basin and the northern province of Nampula affected more than 200,000 people and destroyed 2,000 homes and acres of crops and agricultural lands were damaged with major soil erosion happening in some areas[101]. Aftersurge of flood waters along the Limpopo River as waters flowed towards the coast completely submerged the city of Chokwe with residents having to remain in temporary shelters. Xai—Xai, the provincial capital, was also heavily affected, with farmers experiencing heavy crop damage. [102] Local infrastructure was significantly affected with large sections of road and railway damaged or destroyed and significant damage to flood protection dykes. [103] Key power lines were also damaged reducing the power supply exports to South Africa from 1,500 Megawatts to 650 Megawatts. In the Maputo Municipality, damage to infrastructure was estimated at USD 29 million; mostly to housing and drainage. It is estimated that GDP growth is reduced by 1.1% annually (USD 105 million) due to flooding - the third most vulnerable GDP in Africa to disasters.[104]

The Government of Mozambique led the coordination and full mobilisation of resources at its disposal to respond to the floods, however, those mobilised were not sufficient to meet the needs of the post-disaster situation. Mozambique has a relatively low institutional capacity with limited appropriate skills and financial resources limiting the effectiveness of disaster risk management activities. The government requested immediate assistance from national and international humanitarian partners, in accordance with the National Contingency Plan for Rain and Cyclone Season of 2012-2013. It has been estimated by some that the cost to rebuild and repair all affected areas from the Limpopo floods this year could be as large as USD400-500 million. Due to the large costs associated with repairing flood damaged infrastructure, for example dykes, this work is often not completed. Dykes that could have protected Chokwe earlier this year had been partly destroyed by the floods in 2000 and had not been fully restored leading to greater impacts this year than necessary. Reliance on reactive public financing sources and donor assistance has led to liquidity shortfalls in the immediate aftermath of floods and proved insufficient to cover important recovery and reconstruction needs, leaving some key infrastructure such as flood protection dykes in disrepair and communities less resilient.

Mozambique's exposure to natural disaster risk appears likely to increase significantly in the coming 20 years and beyond. Climate change projections suggest that the intensity and severity of natural disasters could increase, as illustrated in Table 22.

[99] https://www.gfdrr.org/node/2122
[100] Queface 2009 in INGC report
[101] http://www.ingc.4u.co.mz/
[102] https://www.gfdrr.org/node/2122
[103] http://reliefweb.int/map/mozambique/flood-waters-over-chokwe-guika-bilene-and-xai-xai-districts-gaza-province-mozambique
[104] https://www.gfdrr.org/node/2122

Table 22: How Mozambique's risk profile might change as a result of climate change[105]

Hazard	*Current risk*	*Future risk*
Tropical cyclones	Tropical cyclones mainly affect the centre of the country. Out of 56 tropical cyclones that entered the Mozambique channel in the period 1980-2007 25% made landfall on the coast with 11 occurring in the period 1994-2007. Observations suggest a recent southward shift in their trajectories and landfall locations.	Models suggest that for the Indian Ocean there is an overall tendency toward decreasing frequency of tropical cyclones but increasing cyclone intensity and associated precipitation (Emanual, 2008). There is a high risk of increased intensity storm surges along soft coastlines which are already vulnerable to coastal erosion especially during tropical cyclones.
Precipitation	Significant past trends in rainfall are not readily apparent due to the high inter-annual variability of rains over different seasons. There are indications recently of a later start to the rainfall season and an increase in dry day persistence and dry spell length in the northeast of the country during March-May and September-November.	Changes are not consistently simulated in the same way as temperature and projections vary by region. Both dry and wet season rainfall is expected to increase across the country with higher increases suggested towards the coastal regions. Over the entire country an increase in variability is projected during June-August. The rainy season is expected to start earlier over most of the country, though it is also expected to end earlier in the south and later in the far north, leading to longer rainy seasons in the north and southern regions towards the coast, but decreases in seasonal duration over the central regions and Zambezi valley. This could have significant implications for agriculture.
Floods	During the period 1950-2008 floods have occurred on average every 2.8 years in the Maputo basin, 2.6 years in the Umbeluzi, 4.8 years in the Incomati, 1.6 years in the Limpopo, 1.6 years in the Pungue and 2.6 years in the Licungo. On average Mozambican rivers are currently expected to exceed the flood alert level every 2-3 years. Flooding is most common in the centre of the country with the potential magnitude of floods and resulting damage being very high. Salt water intrusion into river systems is already affecting the water supply to cities such as Beira and Dondo.	The proportion of rainfall that falls in heavy events annually is expected to increase by 15% (an 18% increase int he wet season and a small decrease in the dry season – June to November). Hydrological modelling indicates that some areas in the north will experience floods more frequently. There is also a projected further loss of agricultural suitable land resulting from increased saltwater intrusion.
Droughts	During the period 1960-2005 the number of hot nights and hot days has increased over the whole of the country and is most notable in the north. Droughts are therefore increasingly marked b y higher mean maximum temperatures which in turn increase evaporation. Droughts are common in the south of the country with its tropical dry savannah climate.	It is projected that the dry season will become drier across the country by around 2055 and even more so by 2090, with the most notable effects being witnessed in the centre of the country. The interior areas of the country are projected to see greater evapotranspiration increases than those nearer the coast with the largest increases occurring during the September-November period particularly in the Limpopo and Zambezi river valleys. This suggests that evaporation will increase significantly in these areas before the onset of the wet season, which, depending on changes in rainfall could result in decreases in soil moisture before the main cropping season starts.
Earthquakes	The country lies on the southern end of the East African Rift Valley, although seismic activity is not frequent in this area. An earthquake, measuring 7.0 on the Richter Scale, affected Manica Province in February 2006. 4 people were killed, 27 injured and at least 160 buildings damaged in Espungabera, Beira and the Chimoio area.	No impact from climate change.
Landslides	Landslide risks are relatively low and focused only in the high plateaus in the northwest of the country and the mountainous regions in the west.	No noted effects from climate change.

[105] Sources: http://sdwebx.worldbank.org/climateportalb/home.cfm?page=country_profile&CCode=MOZ&ThisTab=ClimateFuture, http://www.undp.org.mz/waterswindsfires/Country-profiles/Mozambique/Earthquakes and INGC report 2009

Temperature	During the period 1960-2005 significant positive trends in temperature have been observed across the country and across all seasons. Annual mean maximum temperatures in the North pre-1990 were often below 30°C and post-1990 consistently above 30°C. An increase of nine days in the duration of the longest heat waves during the September-November period has been observed.	Maximum temperatures are projected to increase between 2.5-3°C by 2046-2065 with the highest increases projected in the country interior and during the September-November period. By 2081-2100increases in temperature are projected to increase by as much as 5-6°C in the centre of the country during the September-November period. Increases in the likelihood of extreme maximum daily temperatures above 35°C are simulated for all regions (Tadross, 2009).
Sea level rise	Very little SL data available for period 1960-2001 of the quality needed for SL rise analysis. Records from Maputo are not inconsistent with estimates of regional trends and identified global trends. These global rates have risen since 1961 at an average rate of 1.8mm per year and since 1993 at an accelerated average rate of 3.1mm per year.	There are two sea level rise scenarios. A low sea level rise scenario suggests a 10cm increase by 2030, 20cm increase by 2060 and 30cm increase by 2100. The high sea level rise scenario suggests a 10cm increase by 2030, 100cm increase by 2060 and 500cm increase by 2100. This scenario is likely to be catastrophic to Mozambique.

Sensitivity of key economic sectors

A sector sensitivity analysis was carried out to help focus the country analysis in areas where the private sector is particularly exposed or can have a substantive influence on resilience. This assessment included a broad review covering the identification of economic trends, each sector's employment, GDP contribution and also the mapping of the major hazards against each sector. The combination of physical risks and economic importance resulted in a prioritised list of sectors.

Mozambique remains one of the poorest countries in the world with half of the population living in poverty and an economy still heavily reliant on agriculture. The country's agricultural sector constitutes 81% of the country's gross domestic product and approximately 10% of export earnings. The high dependency on rain-fed agriculture makes Mozambique highly vulnerable to natural disasters and climate change. Productivity of major crops is already very low with average household yields over the period 1986-2007 for the major cereal crops (maize, rice, sorghum) and other commodities including cassava, groundnuts and beans, at approximately 1 ton/ha. The current gap between actual and potential yields in Mozambique is large and there have been no signs of it closing in recent years. The need to increase yields and productivity will be increasingly difficult to meet with projected impacts from climate change; increasing temperatures and rainfall variation resulting in increased soil degradation and loss of fertility.

There are encouraging signs for the Mozambique economy nevertheless, with high growth rates now being experienced across a number of sectors. The GDP growth for 2010-11 was projected to be 6.7% (as per the Economic and Social Plan) but this was exceeded with GDP growth registered at 7.2%.[106] This growth was due to the positive performance of the following sectors: finance, transport and communications, fisheries, restaurants and hotels, electricity and water, and the extractive industry. High growth continued in 2012 with a real GDP growth rate of 7.4%.

There has been little significant structural change in Mozambique's economy despite previous high and sustained economic growth. The country remains dependent largely on natural resources, concentrated in a few megaprojects, specifically coal, gas and aluminium. These large projects have brought in large FDI inflows, driving economic growth but having minimal impact on employment creation, economic diversification and poverty reduction to meet development goals.

The table below identifies the key risks presented by natural hazards to the major sectors of the Mozambique economy. It illustrates that flood, drought and extreme temperatures are the most important multi-sector risks to the economy as a whole, and that agriculture is the most exposed sector to disaster and climate related risks. Significant challenges are also faced by manufacturing, livestock, ICT and transport, construction and utilities.

[106] KPMG report top 100 companies in Mozambique

Table 23: Sector - hazard sensitivity assessment[107]

	Agriculture (crops)	Agriculture (livestock)	Manufacturing	ICT (and transport)	Tourism	Construction	Finance and insurance	Mining and quarrying	Utilities
Sector risk rating	Severe	Severe	High	High	Low	Severe	Medium	Medium	High
Storm surge	Medium	Medium	Medium	Medium	Low	High	Low	Low	Medium
Tornado	Severe	High	High	High	Low	High	Medium	Medium	High
Hail storm	Severe	High	High	Medium	Low	High	Medium	Medium	High
Flood	Severe	Severe	Severe	Severe	Medium	Severe	High	Severe	Severe
Tropical storm	High	High	High	High	Low	Severe	Medium	Medium	Medium
Drought	Severe	Severe	High	High	Medium	High	Medium	High	High
Frost	High	Medium	Low	Medium	Low	Low	Low	Low	Medium
Extreme temperatures	Severe	Severe	High	High	High	High	Medium	High	High
Landslide	Low	Low	Low	Low	Low	Medium	Low	Medium	Low
Earthquake	Medium	Medium	High	Medium	Low	High	Low	High	High

Severe High Medium Low

Agriculture is Mozambique's key economic sector. It provides export earnings and food products and accounts for the majority of GDP and employment. Despite the need to diversify the economy, it is likely to remain a priority sector for the foreseeable future and a source of employment, income and livelihood for the country's most vulnerable communities.

Manufacturing, telecoms and transport contribute relatively large proportions of the remaining GDP but these sectors are likely to be joined and potentially eclipsed in coming years by the extractives, utilities and construction sectors. The government expects Mozambique's real GDP to grow by 7.9% during 2013-15 driven by agriculture, the extractive industries, electricity and water, construction, and transportation and communications. In Mozambique's Poverty Reduction Strategy Paper (PARP), the government proposes to support stronger growth in these labour intensive sectors.[108] According to the World Bank, the emerging extractive industry could provide the means for Mozambique to reach the status of a middle-income country by 2025. Large future public and private investments in extractive industries (coal,

[107] Source: PwC analysis
[108] http://www.trademarksa.org/news/mozambique-first-agriculture-development-policy-operation

natural gas, mineral resources) are expected to transform the country's currently limited infrastructure.[109] It is hoped that the improved business environment may act as a catalyst for the diversification of economic activities and the development and growth of the private sector in Mozambique.

The finance and insurance sector is relatively underdeveloped but there is pipeline action to address this. The Bank of Mozambique has imposed challenges on banks and businesses to increase the impact of banking and spread financial services to the rural and semi-urban zones to which there continues to be positive responses.

The sector sensitivity assessment is contrasted against key economic trends. The analysis presented below further promotes the importance of agriculture as the first priority. It also highlights construction as another sensitive sector. Considering the limited size of the private sector in Mozambique, however, and the rising importance of the extractives industry and transport infrastructure networks, the second focus sector is a blended mix of findings from the construction, transport and extractives sectors. The indirect exposure of the finance and insurance sector has also been considered and although its size is currently limited, this sector has a high potential to support private sector growth and resilience in the future. The potential for financial and insurance sector involvement has therefore been considered across the two sectors.

Table 24: Mozambique sector prioritisation

	Climate sensitivity	*GDP Contribution*	*Employment contribution*	*Future GDP contribution*
Agriculture – crops				
Agriculture – livestock				
Construction				
Manufacturing				
ICT (and transport)				
Utilities				
Finance and insurance				
Mining and quarrying				
Tourism				

Existing national policy landscape and effectiveness

The government of Mozambique has showed increasing commitment in recent years to the issues of climate change adaptation and disaster risk management. The country's NAPA was approved in December 2007 and outlined four priority actions: the strengthening of early warning systems, strengthening of adaptation capacity of farmers, reduction of impacts in coastal areas and water management in relation to climate change. Mozambique is one of the signatories of the UN Hyogo Framework for Action (HFA) 2005-2015: Building the Resilience of Nations and Communities to Disasters. At the core of the HFA lies the integration of risk reduction as an essential component of national development policies and programs. To date however, private sector involvement in these planning processes has been negligible.

[109] http://www.afdb.org/en/countries/southern-africa/mozambique/mozambique-economic-outlook/

The Ministry of Cultural and Environmental Affairs (MICOA) has recently developed the **National Climate Change Strategy (Estratégia Nacional de Adaptação e Mitigação de Mudanças Climáticas, ENAMMC)**. A key objective is to make Mozambique resilient to the impacts of climate change, while minimizing climate risks to people and property and restoring and ensuring the rational use and protection of natural and built capital. The strategy presents a vision to expand low carbon development for the period 2013-2025 and recommends the creation of a national Climate Change Unit (Unidade de Mudanças Climáticas) to ensure intersectoral coordination and implementation by the public and private sector and civil society, a centre for knowledge management on climate change (CGCMC) and a central climate change fund to raise private finance from companies and individuals.

The strategy contains reference to the private sector as a key stakeholder and recognises the impacts to the private sector from natural hazards and climate change. There is recognition that "the private sector is not particularly aware of the risks of exposure to climate change, and has not identified the imperative for adaptation and building resilience among its activities" (MICOA, 2012, p26, *translation*), and that there is a need to build businesses' awareness and capacity to address disaster and climate change impacts. An adaptation implementation plan has not yet been developed.

The **National Disaster Management Institute (*Instituto Nacional de Gestão de Calamidades*, INGC)**, established in 1999 is the lead agency at the national level to deal with the full spectrum of disaster management activities. In 2009, the INGC published the results of a comprehensive report assessing the impacts of climate change on disaster risk in Mozambique (INGC, 2009). The report concluded that Mozambique's exposure to natural disasters will increase significantly as a result of climate change. The INGC's second phase of research is now focusing on identifying solutions for coastal impacts of natural hazards, water management in cities and private sector investment. The Phase 2 reports focus on building resilience with the agriculture, forestry and tourism sectors in Cabo Delgado province in the north of Mozambique (Cammaer et al, 2012) and feasible investment options for private sector actors operating in Mozambique (Arthur D Little, 2012). In addition to specific research, INGC staff report that a number of private sector companies were among those contributing ad hoc monetary and in-kind donations during the 2012-13 rainy season. Staff report that, as yet, there are no long-term coordinated relationships between INGC and private companies around disaster risk management in Mozambique and no nationally driven private sector programme as yet.

The INGC's focus has previously tended to remain on reactive post-disaster action (e.g. emergency action, post-emergency reconstruction), to a greater extent than proactive disaster risk management activity. In the event of a disaster the INGC acts as the focal point for all stakeholders. In the 2013 floods INGC led the response effort with support from UN agencies (to which USD 5.13 million was donated from the UN Central Emergency Response Fund). At the request of the Mozambique government, the World Bank continues to work with the INGC to better assist with recovery and reconstruction needs. As part of an ongoing grant from the GFDRR and funds from the PPCR and the International Development Association, the World Bank is already supporting Mozambique with extensive interventions in disaster risk management and climate change adaptation. Technical assistance includes a detailed remote sensing technique survey in critically affected areas which helps to provide early warning. The rehabilitation of two early warning radar systems in the areas of Beira and Inhambane are also considered to be essential for improved flood warnings. This is coupled with assistance to the national hydro-meteorological network.[110]

The Ministry for Planning and Development is responsible for private sector development. There appears to be limited dialogue and a lack of coordination between the relevant ministries and poor clarification of the different ministries' roles and responsibilities with overlapping mandates. Some ministries also appear to be less aware of the consequences of climate change for Mozambique and the implications for policies and programmes under their remit. The technical and human capacity at the different ministries and institutions can be limited.

Overall, the private sector is not a major feature of disaster and climate risk management planning frameworks as yet. There are no specific initiatives targeting the involvement of the private sector within key economic sectors, or at provincial or local levels. There is however recognition that the private sector needs to be engaged to a greater extent, both in the planning and implementation of adaptation and resilience building.

[110] https://www.gfdrr.org/node/2122

Whilst Mozambique has many bi- and multi-lateral donors, and development banks, supporting the development of the private sector, and many operating in the climate change arena, very few are involved with the private sector and adaptation and disaster risk management. Early stage projects engaging the private sector are starting to emerge (e.g. GIZ is forming a public-private partnership with a forest enterprise and a PPCR project aiming to build resilience in the agricultural and peri-urban water sectors through provision of credit lines from Mozambique banks). An IFC mission took place earlier in 2013 to identify enterprises potentially interested in applying for loans for climate resilient activities and financial mechanisms to allow SME access to credit for climate-resilient-related investments.

There remain limited financing opportunities available for businesses across a range of sectors looking to engage in climate resilient activities: the Africa Enterprise Challenge Fund (see Chapter 4) offers grants and loans to business ideas that demonstrate positive impacts on the rural poor through increased incomes, employment and productivity, or reduced costs. The CTI PFAN Pilot programme for Financing Adaptation-related Climate Change projects offers technical assistance for project development and connects projects with investment through CTI PFAN's global investment networks, for proposals that are financially and technically viable, environmentally beneficial, socially responsible and meet the CTI PFAN adaptation criteria.

Country consultation approach

The Mozambique country case study was developed through consultation with local private and public sector actors, site visits and field and desktop research. The work was carried out by PwC with support from PwC Mozambique and Kulima Integrated Solutions, a local consultant, who provided access to local stakeholders.

Consultations were held with agricultural, forestry, construction, extractives and financial services companies. There was also consultation with important public sector and NGO players. Wider engagement with smallholder farmers was gained through a site visit to Cleanstar Mozambique's operations and smallholder cassava growers.

3.2 FOCUS SECTOR – Agriculture

Sector hazards and impacts

Agriculture is Mozambique's largest economic sector and is responsible for over 80% of Mozambique's GDP. More than 70% of the country's labour force is involved in the sector. The sector provides a vital food source as well as income source for the majority of the population. Although its relative importance as an export sector is declining with export growth in mining and industry it still makes up approximately 10% of export earnings. [111]

The sector is made up by a relatively small number of large commercial farms growing market orientated food crops such as vegetables and fruits e.g. bananas, and a far larger number of subsistence level smallholder farmers. Important staple crops include cereals (maize, rice and sorghum), cassava, groundnuts, beans and peas.

Irrigation is limited and agricultural commodity yields are poor. Over 95% of the food crops in the country are produced under rain-fed conditions (IIAM, 2008). Current agricultural yields across the country are very low (approx 1 ton/ha) and show no signs of improving. The current gap between actual and potential yields in Mozambique is large. Only a third of land in Mozambique is currently cultivated but there are limits to cultivating new areas; other land use and susceptibility to flooding or drought are issues. The total irrigated area decreased significantly (120,000 to 40,000 hectares) following the war, and little has been done since then to rehabilitate existing irrigation systems. There are currently only around 50,000 hectares irrigated, of which 60% is used for sugarcane production. Only 8.8% of family sector farmers use some form of irrigation (TIA, 2008).

The major natural and climate change induced hazards affecting crops and forestry in Mozambique include:

- Increased unpredictability of water supplies

[111] http://voicesofmozambique.com/news-articles/mozambique-s-agricultural-investment-policy

- Severe and prolonged drought conditions
- Extreme weather events including flood, drought and heat

Where agricultural production is already focused there is significant risk from extreme flooding events. Some 25% of cultivated soils are located in low-lying plains which, during flood events, are largely inundated. The greatest increase (47%) in area cultivated took place in the fertile floodplains notably in the centre of the country. This is reinforced by significant impacts on farmers and agribusinesses from the 2013 floods.

Drought is also suppressing growth in the agricultural sector. The single most important source of risk for crop failure nationwide is drought. According to a study by IIAM (2006) on maize, rice, sorghum and groundnut, drought constitutes between 48-73% of the risk of crop failure in Mozambique. [112] Increasing temperatures and prolonged periods of extreme heat will increasingly limit growth of certain agricultural commodities.

These hazards impact the agricultural sector in the following ways:

- Reduced yields in regions impacted by extreme weather events (predominantly flooding) including direct crop damage
- Reduced yields of maize with increasing temperatures and prolonged periods of extreme heat; maize grows poorly above 30°C
- Propagation of disease (e.g. mosaic virus in cassava crops), over wider areas as temperatures increase and the spread of the white fly vector increases

Soil degradation and deforestation are resulting from the demand for charcoal production which increases vulnerability to flooding events. When crop yields are poor and households cannot generate any excess to sell for income, local communities look to produce charcoal for sale for income. Rural smallholders use charcoal for cooking and also to sell to generate income, leading to the 'slash burn degrade move' practice. This increases soil erosion and leaches nutrients from soils eventually leading to desertification and increased vulnerability to extreme events including flooding.

Large commercial farms and agribusinesses are generally aware of the risks that natural hazards and climate change pose to their operations. They recognise the importance of irrigation but face significant financing barriers to implementation.

Smallholder farmers operating at subsistence level are already experiencing direct impacts to their livelihoods but have limited awareness and understanding of potential solutions. Mozambican farmers operating as individual producers have little knowledge of advanced production techniques and commercial practices that are more climate resilient. A large proportion of farmers are illiterate and have little way of learning new farming techniques unless through demonstration or via radio alerts or programmes.

Farms and agribusinesses in the Beira Agricultural Growth Corridor initiative around Chimoio have had their crop yields affected by prolonged periods of drought in the middle of the wet season. This was followed by torrential downpours early in 2013 which have led to flooding and further damage to crops. In Inhambane, farmers had to manage semi-drought conditions with approximately 700mm rainfall falling in the year, after which followed 2 days where 750mm rain fell leading to high crop damage. Increasing unpredictability as to the start and length of the wet season is becoming an increasing concern for these businesses considering their dependence on rain-fed agriculture. **AusMoz Farm Holdings** in Manica province, faced crop failures with late and mid season droughts affecting yields of bananas and lychees.

Agrifocus is a large company set up in 1998 selling and distributing pesticides, fertilisers, spray equipment, seeds, and agricultural clothing, with branches across the country (Maputo, Chokwe, Nampula and Beira). Their storage warehouse in Chokwe was damaged by the heavy flooding this year and much of their stock was lost. They were covered by insurance which paid out on the claim but the insurance company has refused to renew their cover. They do not want to move their warehouse to a new location as they need to store products in this area close to where there is a sizeable market. There was recognition that opportunities also exist from climate risk, with the potential spread of pests and crop disease opening new markets for their products.

[112] INGC 2009

Local farmers in the Chokwe region were not insured. International insurance companies will not insure at this small scale with only large businesses being covered. Even large businesses have been significantly impacted however. An international company producing rice and maize in the Chokwe valley with operations worth USD 4 million is in the process of closing down due to significant losses from the floods. This sends a negative signal to other companies and discourages investment in the area.

It was suggested through consultations that the impacts of the floods around Chokwe were intensified by poor dam management further upstream. Multiple dams were opened at one time which resulted in higher flows than necessary downstream in Chokwe. Early warning systems were late in informing the local population and people did not want to leave their land until the last minute. Although larger companies are now leaving the area, smallholders return to their homes, rebuild and replant.

In **Sofala province** (in the central coastal region of the country) smallholders are increasingly finding that they are unable to grow maize. Smallholder farmers engaged by Cleanstar Mozambique are already experiencing reduced yields from maize and impacts on cassava crops from mosaic virus. Extreme (high) temperatures have limited maize growth and caused the spread of mosaic virus as the white fly prevalent region is increasing. Farmers continue with these crops and the same techniques however due to their traditional knowledge handed down from older family members.

Current adaptation action in the sector

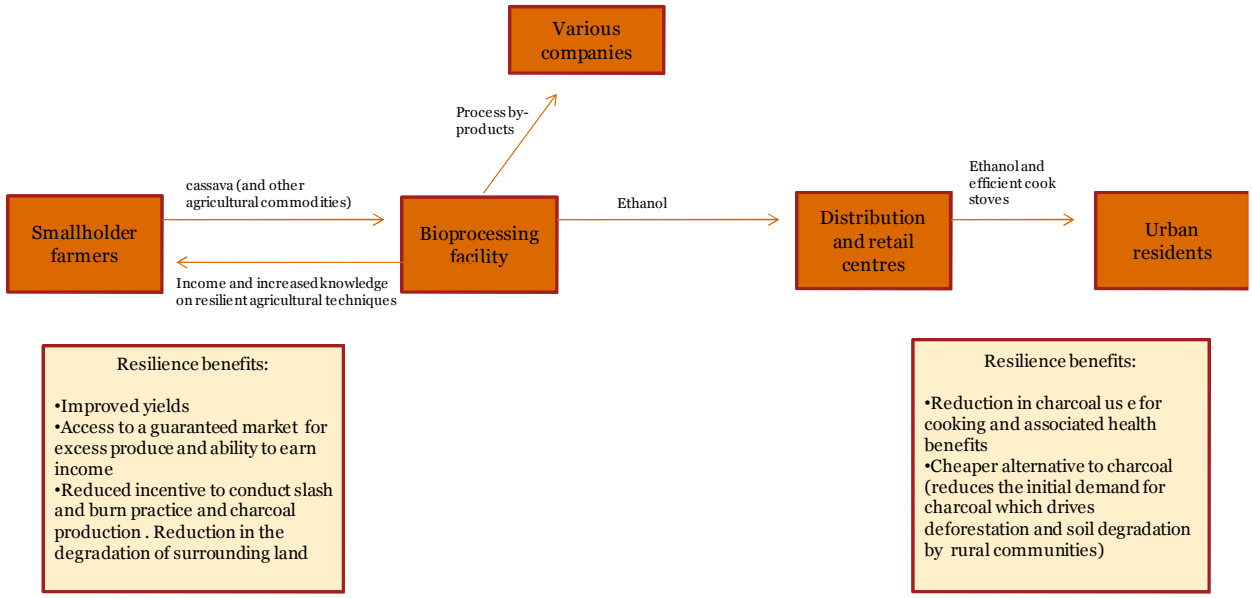
Agrifocus has a team of agronomists who teach and engage local farmer communities in rural regions on methods to increase yields and issues such as high salinity, soil degradation and water logging. Every year they select farmers and conduct demonstrations on how and when to apply products to increase yield and invite other farmers to see the benefits (i.e. increased yield). Their main objective is to increase sales of their products and build their market but this action also has resilience co-benefits for local farmers. The company recognises the importance of building demand for the longer term and the farmers having the capacity and understanding of how to increase their crop yields.

AgDevCo, an agricultural development company, investing in farms and agribusinesses in the Beira Agricultural Growth Corridor has conducted an initial weather insurance pilot in collaboration with the Agricultural Polytechnic in Manica (ISPM). With financial support from Kiva and working with commercial farmers operating outgrower models, weather index insurance was included alongside loans (at 15% interest) disbursed to smallholders farming 5-10 hectares each. The weather index insurance product only pays out after 24 days of no rain. In January the farmers experienced 18 days of no rain and so did not receive a payout but managed to still achieve half of the yield that they would normally produce. Tweaking the insurance product to pay out after 18 days of no rain would add around 20% to the cost. The product would be highly expensive for the farmers to purchase and would only provide support if the crop was completely wiped out. It was noted that smallholders would be unlikely to purchase this insurance product in the future unless it could be sold at lower cost. The cost is currently around 20-25% of the amount insured. It was suggested that this cost would need to be reduced significantly for uptake of the product. Satellite data is available however and it is easy to identify the farmers who would benefit most from this insurance.

Bio-ethanol projects have been implemented. One production cluster project by EcoEnergia de Mozambique, is intended to form a critical mass of production and know-how large enough to tap into the international market and offer spin-off effects for services and suppliers.

Another ethanol project has been developed by Cleanstar Mozambique, an interesting social enterprise which is working throughout the whole value chain and consequently building resilience throughout. A detailed case study is illustrated below.

Case study: Cleanstar Mozambique – an innovative business model integrating the food and energy value chains



Cleanstar Mozambique is operating an innovative business model that integrates the food and energy value chains to de-incentivise the production of charcoal and 'slash burn degrade move' practices which degrade land and increase vulnerability to natural hazards such as flood events.

Smallholder farmers at the BOP have a guaranteed market to which they can sell climate resilient cassava crop. They also benefit from improved knowledge on resilient agroforestry and conservation agriculture techniques which are demonstrated on local plots i.e. they can directly see the benefits of increased yields and are incentivised to change their practices. Increased yields, income from cassava and higher yielding trees for charcoal production are more attractive options than deforestation of local trees through slash and burn practices.

Lead farmers running demonstration plots build their skills and knowledge through hands on support from Cleanstar Mozambique staff.

The sale of a cheaper alternative to charcoal in urban markets such as Maputo reduces demand for charcoal (an important driver for rural charcoal production). There are also significant health benefits to reducing charcoal use for cooking.

What additional support could Cleanstar Mozambique benefit from?

- Improved access to hybrid and resilient seed and crop varieties
- Technical assistance to identify suitable markets for ethanol and cookstoves in local cities (i.e. Beira) rather than Maputo alone
- Knowledge sharing and collaboration opportunities with other companies who can use by-products of the ethanol bioprocessing
- Improved pre-existing skills and capacity (with regards to agricultural techniques) of the local workforce

Source: local site visit and consultations

Sector opportunities

Potential resilience building actions

Through interviews and site visits, the following resilience building actions were identified for the agricultural sector:

- Irrigation systems for medium and large scale agriculture
- Development of outgrower models (as part of commercial farms) through which increased income, capacity build and skills in agricultural techniques can be shared with smallholder farmers
- Focus on the start of the value chain, improving the availability of more resilient seed and crop varieties

- Development and increased penetration of financial and insurance products, including weather index insurance
- Building knowledge and improved 'climate smart' agricultural and other techniques (e.g. rainwater harvesting) through farmer training and demonstration plots and radio alerts
- Building capacity and skills for local agronomists through improved agricultural college courses

Irrigation was repeatedly highlighted as a major requirement. The market opportunity for manufacturing, installing and maintaining irrigation systems is large but there are major barriers around the financing. Less feasible at the smallholder level but at the larger commercial farm level AgDevCo noted the importance of developing irrigation across the clustered projects in the Beira Agricultural Growth Corridor.

Outgrower models with a commercial farm forming agreements with local smallholders. The company provides seeds, fertiliser and other inputs as well as extension services, and guarantees to buy the crop and in return the smallholder farmer sells their crop to the main farm. This reduces the farmers' risk as their market is guaranteed and if their crop is wiped out by flooding they do not have to pay the commercial farm for inputs. To date this has predominantly occurred in the tobacco and cotton industries.

Cleanstar Mozambique's model works in a similar manner whereby the company provides inputs but also advice on more sustainable or climate-smart agricultural techniques to local smallholders through demonstration plots with a 'lead farmer' (e.g. showing the benefits of planting crops that return important nutrients such as potassium back to the soil to build organic matter). Cleanstar Mozambique (and others, including food and beverage companies) has also identified the need for farmers to focus on growing more resilient crop varieties (e.g. cassava and move away from total dependence on less resilient types such as maize). These companies are identifying new potential opportunities for turning these more resilient commodities into high value products through processing.

Attracting new seed suppliers into Mozambique. There are currently a limited number of seed suppliers due to a current lack of incentives for them, resulting from the legislative environment in Mozambique. Increased availability of more resilient seed varieties would generate greater opportunities for smallholder farmers to increase yields and produce excess crops to generate income.

The development of new finance and insurance related products and services tailored to the agricultural sector or rural smallholder communities has already been identified as an emerging opportunity. A Mozambique bank has identified that offering credit lines to SMEs in rural areas (through the support of the USAID DCA) is an emerging opportunity where they can build market share and expand into new rural markets. M-PESA, the mobile money transfer service has also recently started operating in Mozambique.

Barriers to sector resilience

The barriers facing commercial farms, smallholder farmers and those more generally are different.

At the commercial farm scale:

- **The lack/poor quality of rural infrastructure (power and transport) increases the vulnerability of the business and adds to costs.** Limited connectivity to the electricity network leads to a reliance on diesel generators for power which increases costs and prevents investments in cold storage facilities, irrigation systems and ripening rooms which could add to productivity. Poor transport infrastructure increases costs and ability to access larger markets and potential export markets in some cases. Access to the larger city markets for fruit and other temperature controlled goods is a problem. Without being able to expand their own operations, commercial farms struggle to engage with more local smallholders to build greater community resilience through increased employment and education on improved agricultural techniques.
- **High costs of technologies, for example irrigation systems.** It was suggested that out of an example USD 50 million needed to build out a large project involving a local farmer outgrower model, around USD 20 million would be financing irrigation needs. These costs are not financial viable and farmers cannot afford the up front CAPEX.

At the smallholder scale:

- **Limited awareness and understanding of improved climate resilient agricultural techniques.** Smallholders continue using traditional techniques from their elder family members and often are unwilling to change their practices unless they directly see the benefits of increased yields from demonstration plots.

- **Limited skills and capacity in the rural workforce on agriculture, finance and business.** Lead farmers and agronomy trained individuals chosen for leading and managing groups of smallholders still have limited skills and knowledge. Financial knowledge and awareness and understanding of banking and credit is minimal with limited money exchange in rural communities.

- **Limited financial assets and lack of access to credit.** Smallholder farmers earn limited cash and are unwilling to risk their limited income on better quality, more resilient inputs and expensive insurance products.

General:

- **Limited number of medium sized agro processors.** The full agricultural sector value chain in Mozambique is weak in places. The processing industry in the country is limited meaning that there is little value add to primary agricultural products. In country consultations revealed that the government had previously closed down a number of large cashew processing factories and others are operating with obsolete technologies and struggling to be competitive. This limits collaboration and partnerships along the sector value chain.

- The finance and insurance markets outside the major cities are minimal and cater only for larger companies.

The consultations and site visits have contributed towards the summary analysis at sector level presented below. It is important to note that the barriers table is an amalgamation of barriers noted across different actors (e.g. commercial farmers, input suppliers, smallholder farmers) in the value chain and therefore provides a relatively coarse analysis.

The main point to note is that although there is awareness of the impacts, there exist barriers to progress on resilience within the agricultural sector such as knowledge, capacity and skills relating precisely to resilience building actions and potential solutions, particularly evident at the smallholder level. A weak enabling environment including seed supply and infrastructure and incomplete value chains are key barriers. Perhaps more so at larger commercial farm level.

Table 25: Summary of sector barriers to uptake of private sector action on resilience

Barrier group	***Barrier example***	***Agricultural Sector*** ○ Minor barrier ● Major barrier ● Key barrier	***Description/ Local example***
Risk management capability and maturity	Lack of internal buy-in / leadership	○	Direct impacts are already being witnessed with associated financial or livelihood implications which reinforces disaster and climate risk as an issue.
	Low risk awareness	○	Direct impacts are witnessed (as above) so risks are known. Awareness of the magnitude of future risk is more limited, particularly for SMEs and smallholders
	Challenges of decision making under uncertainty	●	Smallholders are unwilling to change their traditional practices to reduce risk unless direct

			benefits are seen, despite facing major risks currently.
	Limited sharing of good practice and lessons learned from other business approaches	●	A number of projects engaging outgrowers/ smallholders and building capacity through training are occurring in a relatively sporadic nature. There appears to be little sharing of lessons learned and best practice.
	Limited tools available e.g. risk assessment, scenario and opportunity evaluation tools	-	Not referenced specifically.
Technical	Lack of knowledge, capacity and skills in workforce	●	Limited knowledge of potential solutions despite awareness of the high risks. Knowledge of climate smart agricultural techniques is limited in the local workforce.
	Poor communication of useable risk information	●	Early warning systems are available and in place but could be improved. 2013 floods showed that warnings to nearby communities were delivered too late.
	Lack of access to technology	●	Limited access to hybrid and resilient seeds.
	Lack of demonstration projects	○	A number of demonstration projects have been run, (e.g. demo plots for new agricultural techniques, weather index insurance).
	Lack of knowledge sharing / collaboration platforms	●	Limited awareness and sharing from demonstration projects and no apparent platform for businesses engaged in similar operations to share knowledge and potentially collaborate.
	Weak sector and value chain partnerships	●	Incomplete / weak areas of value chain; no apparent formal space for developing potential collaborations
	Lack of access to early stage capital (risk finance)	●	Lack of patient capital for irrigation investments.
Financial	Technology risk	-	Not referenced.
	Access to credit	●	Limited access to credit/ microfinance opportunities. Financial products are limited in rural areas.
	Technology cost gaps	●	For larger scale companies irrigation is too expensive to invest in as a technology to improve productivity.
	Lack of access to insurance	●	Microinsurance schemes have been piloted to reach the poor and vulnerable communities but broader initiatives yet to be seen.
	Lack of incentives	-	Not referenced.
Local enabling environment	Inadequate policy, regulatory and legal environment	●	Legislation for example on seed multiplication and policies hinders the presence of large seed companies in the country.
	Domestic infrastructure constraints	●	Transport and power infrastructure is limited in rural areas.
	Market and financial sector risks/capacity	●	The financial sector and markets more generally are relatively undeveloped and penetration in rural areas is poor.
	Local political, governance and security risks	-	No specific references were made to political, governance or security risks.

Public policy action at sector level

Overview of existing private sector engagement and stimulation efforts

The Government of Mozambique has developed a Strategic Plan for the Development of the Agricultural Sector (PEDSA) for the period 2011-2020 which recognises the impact of natural hazards and climate change on the sector and the role of the private sector. There is increasing movement to focus on the importance of food security with the PEDSA being an inter-ministerial approach with the strategic objective to "contribute to food security and producer income in a competitive and sustainable

manner that guarantees social and gender equity".[113] The PEDSA aims to increase cultivated land area and productivity through the creation of an enabling environment conducive to stronger private sector participation with a focus on three priority development corridors (including Beira and Zambezi). It recognises climate change and the private sector within its objectives and strategy but plans for implementation remain unknown. The World Bank has funded the Agriculture Development Operation (AgDPO) series which is designed to support the government's strategy and promote private sector led agricultural growth in order to achieve improved food and nutrition security.

The Mozambican government's national irrigation policy prioritizes the rehabilitation of existing irrigation perimeters. It seems that most of the works in rehabilitating irrigation schemes are likely to be occurring in the context of donor-funded operations rather than the private sector (e.g., the IDA funded PROIRRI project).

In parallel to PEDSA, Mozambique has developed a National Investment Plan for Agricultural and Food Security (PNISA), part of the larger Comprehensive Africa Agriculture Development Program (CAADP) alliance adopted by the G8. Alongside wider actions targeted at strengthening the enabling environment, a number of private sector actors (e.g. international and national agribusinesses) have been engaged by the Mozambican government and the G8. The first proposed project will support the grain trader Cargill to develop 40,000 hectares of farmland, including smallholder contract farming, supported by G8 financing.

Potential public intervention opportunities for agriculture

The agricultural sector in Mozambique appears to be the least developed relative to our other focus case study countries. There is a need to still develop the private sector and address weak points in the value chain, for example, in agro-processing. The clustering approach used to date in the growth corridor projects, for example, around Beira and in the Zambezi valley appears to have showed some initial success in linking the value chain. For example, within the Beira Agricultural Growth Corridor, one project (Empresa de Comercialização Agrícola Milling) has developed an outgrower program where an attached milling operation will be capable of supplying grits to SAB Miller to satisfy the needs of Mozambique breweries with small holder sourced maize.

The evidence above suggests that there is considerable need for creating the correct enabling environment, with additional support on seed legislation and development of rural infrastructure. Some of the greatest barriers noted are based on insufficient and low quality rural infrastructure. This is a key issue which needs to be addressed above and beyond the actions and implementation options identified to address other constraints within the sector. The interventions suggested below target both commercial and smallholder farmers along the value chain.

Often these initiatives are working in different regions and there is lack of knowledge sharing between them; unfortunately they tend to work in isolation, rarely getting the opportunity to come together, share their experience and learn from each other. Innovations are not shared or expanded and there are large gaps between research at the WB /FAO / IFAD levels and on the ground knowledge and dissemination. This needs to be via word of mouth and radio for example, methods by which to communicate at local level.

Table 26: Public finance interventions required to support to Mozambique's agricultural sector

Opportunity	*Interventions*	*Implementation options*
Information and knowledge sharing within the sector: Improve and embed knowledge on more resilient agricultural practices at smallholder level	• Ensure that all outgrower model commercial farms are aware of more resilient techniques and they share these with smallholders through demonstration plots and education. • Use of radio broadcasting to reach remote areas on more resilient techniques e.g. local rainwater harvesting and methods of planting. • Provide incentives for 'lead' farmers with demo plots to teach and share	• Work with the new CAADP programme and its proposed private sector portfolio to ensure that this knowledge sharing approach is streamlined into all new outgrower model projects. • Work with the Instituto de Investigação Agrária de Moçambique (IIAM), Ministry of Agriculture and the INGC to develop radio programme alerts of key messages for smallholder farmers.

[113] Republic of Mozambique Ministry of Agriculture: Strategic Plan for Agricultural Development PESDA 2010-2019. October 2020.

Improve knowledge sharing of lessons learned and best practice between commercial farms	knowledge with local farmers. • Establish a knowledge hub for commercial farms to share lessons learned and best practice on technologies and techniques and create the network for potential collaboration.	• Collaborate with other donor activities to prepare a coordinated and local knowledge hub for climate smart/resilient techniques and approaches that are relevant to Mozambique.
Sector skills and capacity: Build sector capacity in climate resilient agricultural techniques and practices.	• Targeted training of the local farmer champions on improved agricultural techniques (conservation agriculture, agroforestry, CSA) and higher quality training on issues and new techniques at local agronomy schools. • Targeted training on financial and business skills..	• Build resources of local agriculture colleges in rural provinces. • Strengthen the capacity of the IIAM to offer internships to local farmer champions and students.
Specific interventions to develop key projects along the value chain: Focus on incentivising seed suppliers and agro-processors	• Reform of government seed policies and legislation to create an attractive environment for international seed companies to enter. • Incentivise agro-processors into cluster growth areas.	• Work with IIAM and the Ministry of Agriculture to strengthen current legislation and seed policies. • Work with BAGC and other growth corridor initiatives to build agro-processing projects.
Support agricultural innovation: Stimulate private sector innovation for use of more resilient agricultural commodities and de-incentivise charcoal production	• Establish a design competition to discover new business models and companies that can use more resilient commodities (e.g. cassava) in their value chain.	• More focused/specific objectives could be set for an existing fund such as the AECF in the aim of stimulating innovation in the use of more resilient crops.
Support irrigation at large scale for corridor projects: Patient capital for irrigation in growth corridor clustering investments	• Patient capital for irrigation to run alongside investments in clustered projects.	• Coordination with AgDevCo and other agricultural developers and irrigation specialists (e.g. Jain Irrigation).
Access to insurance and financial services: Microinsurance solutions development for weather risk.	• Support R&D into development of new microinsurance and weather index insurance products to develop lower cost alternatives to those currently available.	• Create a technical and financial support facility to facilitate development of the insurance sector and maximise access to the poor.
Encourage collaboration along the value chain and cross-sector: Collaboration and partnerships for cross-sector collaboration	• Build local level platforms for collaboration between sectors and actors e.g. mining, commercial agriculture, agro-processors, to develop multi-use infrastructure (e.g. dams, transport).	• Work with local level government actors to develop locally focused collaboration space for MNCs, national companies and SMEs in multiple sectors to work together on multiple uses for local infrastructure.

3.3 Wider private sector actors: extractives, construction and energy sectors

The private sector in Mozambique is relatively limited in nature. There is a large divide between large international companies in the extractives and construction industries and small scale SMEs and entrepreneurs, with only a relatively limited number of medium and small Mozambican companies. The relative youth of the private sector in Mozambique likely comes in part from its socialist history and the recent recovery from the end of the country's civil war in the 1990s.

Due to the relatively small size of the private sector in Mozambique, a range of private sector actors were consulted across a number of sectors to gain a broader view of perceptions towards the risks presented and

impacts faced from natural hazards and climate change and the potential opportunities that businesses could capitalise upon.

Hazards and impacts to business

Extractives, construction and energy are growing sectors in Mozambique and are expected to play a major role in the country's future economic growth. The government expects Mozambique's real GDP to grow by 7.9% during 2013-15 driven by agriculture, the extractive industries, electricity and water, construction and transportation and communications. In Mozambique's Poverty Reduction Strategy Paper (PARP), the government proposes to support stronger growth in these labour intensive sectors. [114] The progressive increase in coal production, the implementation of large infrastructure projects, coupled with credit expansion are expected to continue to drive growth to 8.5% in 2013 and 8% in 2014. The construction sector has one of the strongest growth outlooks across the Sub-Saharan Africa region, driven by the pledged investments for infrastructure improvements designed to support the rapidly developing oil and gas and mining sectors.[115] Currently, there is more than USD 25 billion worth of projects planned or underway. [116] Rural electrification in Mozambique remains low with only approximately 1 out of 5 million households on the electricity grid. The current grid infrastructure and distribution network is poor. There are therefore potential opportunities for off grid renewable technologies to improve access to power to rural populations, along with further opportunities for renewable technologies e.g. solar powered phone chargers and water pumps.

The major hazards affecting the construction, extractives and energy sectors in Mozambique include:

- Flash and widespread flooding
- Extreme heat
- Tropical cyclones and associated heavy rains

The 2013 floods exposed the vulnerability of buildings and rural infrastructure to natural hazards. A number of roads, railways, bridges, schools and hospitals were damaged or destroyed by the floods. A number of new buildings needed to be built to replace unsafe structures. Damage has also occurred through heavy winds and rains, with more than 1,000 houses and 12 schools damaged in Manica in the space of two months in 2011.

The quality of housing and infrastructure in Mozambique is often poor, leaving residents highly vulnerable to impacts from natural hazards. In Beira, a number of residents informed us that they had been warned that their buildings were structurally unsafe and had been encouraged to move out. Despite huge needs and very high demand, formal housing construction is currently limited to the very high end of the market. The rest of housing construction consists mostly of informal construction in slums (75% of the urban population live in "bairros" which are very basic concrete block houses) and manufacturing of traditional straw and mud huts in rural areas, which still account for the vast majority of housing in the country. [117] These structures are highly unlikely to withstand major flooding events. National building regulations require that houses be built with brick or cement block walls and reinforced concrete beams thereby limiting formal housing to the relatively wealthy. [118]

Businesses in multiple sectors have already faced significant impacts from natural hazards in Mozambique. Vale, the Brazilian mining company with operations in the Tete province did not meet its 2013 target for coal exports, due in part to heavy flooding which prevented transportation of coal along its railway line to the port at Nacala. Heavy rains and flooding in the Zambezi Valley closed the Sena railway line in February for two weeks causing significant disruption to operations.

Agro-Alfa, a Mozambican steel processing and industrial maintenance company contracted to build schools in Inhambane for the Ministry of Education could not access their sites due to the flooding in early 2013 and a

[114] http://www.trademarksa.org/news/mozambique-first-agriculture-development-policy-operation
[115] http://www.afdb.org/en/countries/southern-africa/mozambique/mozambique-economic-outlook/
[116] http://www.thebusinessyear.com/publication/article/16/1906/mozambique-2013/a-structured-approach
[117] World Bank: Mozambique – CEM – Construction sector - draft
[118] Ibid.

number of their staff were stranded. It was noted however that there also exist opportunities in the reconstruction period post-disaster to supply construction companies with the materials needed to rebuild bridges and vital infrastructure.

The Maputo Port Development Company (MPDC) has been impacted by tropical storms, both through the need to shut down the port, with vessels unable to enter or leave due to dangerous sea conditions, and through issues associated with insufficient drainage capacity during periods of storm water runoff. The MPDC aims to increase the movement of cargo and expand the port's operations and there is recognition that the storm water drainage issues already facing the port need to be addressed.

Current adaptation action in the sector

Donor and government led action in developing resilient structures is occurring but lessons learned and information does not appear to be shared or transferred to the private sector. UN Habitat has been involved in a number of initiatives in the resilient construction and infrastructure space. Though the **Cities and Climate Change Initiative (CCCI)** high risk coastal zones have been mapped to understand the potential financial value at risk from climate change in the Maputo area. Hazard risk maps and environmental management system tools have been developed to assist the municipality in their planning processes for the Maputo city plan however private sector engagement appears to have been relatively limited.

UN Habitat with the Ministry of Education and the Ministry of Public Works has also been involved in building demonstration resilient structures in Vilanculos, Inhambane and Chibuto. Demonstration schools have been designed with raised floor levels and reinforced roofs on which children can shelter from high water levels during flood events. These designs appear to be limited to donor funded public sector infrastructure projects with limited lessons learned being shared with the private sector.

The level of awareness and understanding of disaster and climate risk is highly variable between private sector actors. Large multinational corporations with operations and fixed assets in Mozambique (e.g. Vale, Rio Tinto) often have well developed enterprise risk management systems and climate change departments with assigned resources. Conversely, climate change and adaptation are relatively new concepts for smaller national companies and SMEs in Mozambique and there is limited awareness and understanding of the implications of disasters and climate change on their business. There is also often confusion by businesses as to the difference between mitigation and adaptation.

Large multinational companies have already taken action to reduce their risks from natural disaster and climate change. Vale, the Brazilian mining company, is investing in water efficient technologies across their operations, including in Mozambique and has taken action in building resilience along their value chain. Collaborating with a competitor, Rio Tinto and the Mozambique government the partnership has invested in improved export infrastructure (a railway from Tete to Nacala and a new port in Nacala bay). Flood risk was considered when the railway was planned to ensure that the most suitable and least exposed location was chosen. A desalination plant is also planned at the port to reduce the company's' vulnerability to water shortages. This example highlights the potential for sector collaboration and the activities that can be planned when there is pre-existing information, skills and capacity within the business. This is not typical more broadly of smaller companies within Mozambique.

Vale has also provided finance and technical assistance to local communities for constructing small dams in order to improve their water access to increase their crop yields and protect their livelihoods during periods of extended droughts. There is extensive dialogue with other mining companies operating in the region and with MICOA regarding water infrastructure and transport investments that would build their resilience to disaster and climate risks.

After the 2013 floods, Vale also donated USD 500 million to the INGC on a materials basis in the form of water purification tablets, mosquito nets, construction materials for disbursal to affected communities.

Adaptation and resilience actions are more limited at the national and SME level with those considering disaster and climate risk appearing to be the exception rather than the rule. Increasingly, large and medium national companies are contracting consultancies to undertake environmental

feasibility assessments for major projects, which will include consideration of potential risks (e.g. flood risk) although future climate change impacts are considered to a lesser extent. Whilst recommendations can be made as to the location and considerations for a major investment, these may not be enacted due to limited financial resources and technical understanding within these companies.

The MPDC is currently in the early stages of developing a master plan for Maputo port with the assistance of international consultants conducting a full risk assessment for the port. There is recognition that in order for the port to increase the quantity of cargo it can handle there is a need to improve the transportation links, drainage capabilities and access to water and to take into account potential risks from sea level rise. Although there is limited internal capacity to assess these risks, there is awareness of the risks and understanding of the need to act.

Entrepreneurs have identified opportunities to develop and distribute products and services that have potential resilience co-benefits. Smaller companies and entrepreneurs are looking to disseminate off grid renewable energy (predominantly solar) technologies. These products, although not designed to reduce risk, build resilience of rural vulnerable communities in a wider sense (e.g. through improved access to telecoms networks and access to water).

Sector opportunities

Resilience building needs

The following resilience building actions have been identified within these sectors:

- **Increased awareness raising and education to national medium and small companies on the risks and opportunities presented by natural disasters and climate change and the potential implications for business:** MICOA and the INGC in collaboration with other relevant ministries should develop an education and engagement programme for national companies to understand the hazards they face and the importance of considering natural hazards and climate change as a business risk and also opportunity (i.e. building the business case for action).
- **Sharing of adaptation interventions undertaken to date and facilitated B2B and sector collaboration**. Some private sector representatives stated that there was a limited level of knowledge on potential solutions that could increase their resilience. Evidence was found in-country of innovative building design in donor funded work, the knowledge from which should be shared with private sector actors in the construction sector. Limited information and knowledge sharing was also noted between businesses. For example, the lessons learned from the risk assessment work being conducted for Maputo port will likely provide useful information when considering the risks facing Beira port. There is also a need for entrepreneurs with innovative new products that support risk reduction to build opportunities for collaboration along the value chain (e.g. with rural distribution networks). The development of a platform for businesses from large MNCs to national SMEs to discuss multi-use infrastructure developments was also considered.
- **A central and free sharing data repository for hazard risk maps and climate risk information:** There should be a central repository that holds risk information in a useable format. Information collated by the INGC, UN Habitat and other institutions should be included. Developers, consultants and companies should be able to access these for free at all locations when planning construction projects and potential actions to build resilience.
- **Review of building codes and legal enforcement of these codes:** The country's building codes could be better adapted to low cost (currently informal) housing construction and promote the use of local materials. Stronger regulation through legally enforcement of standards is needed and potential financial incentives to promote more climate resilient designs.
- **Increased awareness-raising by national and local government at local community level (e.g. through radio programmes) to build understanding of risks from natural hazards and awareness of potential solutions available.** Current dissemination of knowledge is poor and consequently there is limited demand for resilience building products and services (e.g. solar powered water pumps and mobile phone chargers). Increased awareness of these products and others at the local level will help to stimulate demand and develop rural markets.
- **Focused R&D efforts and mainstreaming innovative technologies:** Improved design techniques already exist in the government and university arena but have not yet been adopted by private companies. Resilient structures have been designed for schools but there appears to be no drive to develop low cost

resilient innovations for low cost housing. Offer incentives for construction companies to innovate and implement new design methods and techniques (feeding in information learnt from public sector donor funded projects) and enforce these codes and regulations. Reform of import duties for renewable technologies and the creation of a more favourable environment for renewable energy products could encourage greater uptake of these technologies.

Sector barriers

Raising private sector interest, even in potential business opportunities, is difficult. In part, this may be due to Mozambique's socialist past and the impact it has had on competitive drive. There appears to be a general lack of awareness and interest in climate change adaptation and resilience building activities. Climate change does not appear to be considered a major business risk in Mozambican companies (although a somewhat different picture emerges when considering large international companies). The emerging picture from national and small companies is one of business driven by profits and unwilling to take adaptation action unless the commercial benefits are clearly defined and evident. Business opportunities in this space are not necessarily evident to Mozambican private sector actors currently.

Until there is a more widespread appreciation by the private sector of the risks and opportunities, the main barrier is awareness. Awareness of climate change issues among many national level public sector actors has increased rapidly in recent years following concerted efforts by UN agencies (e.g. UNDP with the Africa Adaptation Programme), bilateral donors (e.g. GIZ), and NGOs, such as the Africa Climate Change Resilience Alliance consortium. There is no reason to think that private sector awareness would not increase similarly rapidly if comparable efforts were applied. It should also be noted that awareness-raising should also be targeted at Mozambican civil society more broadly, particularly in rural areas in order to build demand for products and services that support risk reduction.

For those companies that are aware of the risks posed by disasters and climate change there is limited in house skill and capacity to assess these risks and low understanding of potential adaptation actions and solutions that could be implemented to manage these risks. There appears to be relatively little information from reports undertaken by government e.g. the INGC 2009 report on disaster and climate risks, which is shared widely with private sector actors. Access to risk and hazard information and sharing of demonstration projects and best practice appear to be limited.

The majority of the workforce has a relatively low skills base. Dissemination of renewable technology products and construction of resilient building designs requires certain skills in key workers which are currently limited. Greater knowledge sharing and training is required, particularly in rural areas outside the main hub of Maputo.

Lack of accessible credit for small scale SMEs and entrepreneurs outside of the agricultural sector. Small scale companies and entrepreneurs in the early stages of a business concept can face cash flow issues and find it difficult to access credit. While there are a number of initiatives that offer large scale financing through concessional loans (e.g. the AECF REACT window), these do not target early stage project ideas where the ability to co-finance and repay large loans is relatively limited. Guarantee funds predominantly focus on supporting local banks to offer credit lines to agribusinesses and the food sector (e.g. cashews and cotton) rather than other sectors more broadly. This leaves a gap in the ability for a number of small enterprises to access the credit they require.

Table 27 provides a high level overview of barriers facing the private sector in Mozambique. Note that this table illustrates barriers facing all size and scale of business from large MNCs to start-up entrepreneurs across multiple sectors (extractives, construction and energy) and therefore the resolution provided is relatively coarse.

Table 27: Summary of sector barriers to uptake of private sector action on resilience

Barrier group	*Barrier example*	○ Minor barrier ● Major barrier ● Key Barrier	*Description/ Local example*
Risk management capability and maturity	Lack of internal buy-in / leadership	●	The business case for action is not well defined for national and small companies (although this is less of a barrier with regard to MNCs).
	Low risk awareness	●	Awareness is generally low at all levels with the exception of MNCs.
	Challenges of decision making under uncertainty	-	Not referenced.
	Limited sharing of good practice and lessons learned from other business approaches	●	Limited B2B links or dialogue with government where good practice and lessons learned are shared.
	Limited tools available e.g. risk assessment, scenario and opportunity evaluation tools	○	Yes, but this is overshadowed by lack of technical skills and capacity to use such tools.
Technical	Lack of knowledge, capacity and skills in workforce	●	Specialist skills in construction and renewable energy are limited, especially outside of Maputo.
	Poor communication of useable risk information	●	Risk information is difficult to access, but a number of companies are not yet aware of the need for this information.
	Lack of access to technology	○	Technologies are available but have not penetrated the markets due to price and limited awareness of their existence.
	Lack of demonstration projects	●	There are limited demonstration projects in low cost resilient infrastructure (e.g. low cost housing).
	Lack of knowledge sharing/ collaboration platforms	●	Mozambican construction industry operators are dispersed and poorly connected with other firms. The port concessions also do not share knowledge or collaborate.
	Weak sector and value chain partnerships	●	Suppliers and developers of new products and services have found that distribution networks are difficult to develop.
	Lack of access to early stage capital (risk finance)	-	Not referenced.
Financial	Technology risk	-	Not referenced.
	Access to credit	●	Referenced by smaller companies and entrepreneurs in non-agricultural sectors.
	Technology cost gaps	●	Referenced by smaller companies and entrepreneurs (linked to low access to suitable credit).
	Lack of access to insurance	-	Not referenced.
	Lack of incentives	●	No incentives for construction companies to integrate resilient design and for renewable energy providers to deliver off grid solutions.
Local enabling environment	Inadequate policy, regulatory and legal environment	●	The enforcement of building design regulations is poor and regulations only relate to formal housing which is a small proportion of the total built.
	Domestic infrastructure constraints	●	Limited infrastructure constraints were noted by a number of companies, including MNCs.
	Market and financial sector risks/capacity	●	Referenced by smaller companies and entrepreneurs that the financial sector is currently focusing on agribusiness and food business SMEs.
	Local political, governance and security risks	-	Not referenced.

Potential public intervention opportunities

There is a considerable need for building the awareness of the private sector (and civil society) of the risks and opportunities posed by natural hazards and climate change and the potential adaptation actions that could be undertaken to reduce risk and capitalise on opportunities.

The local enabling environment requires strengthening through improved enforcement of regulations and improved rural infrastructure networks. There is a skills and knowledge deficit across a number of sectors to understand and interpret hazards and climate risk information and a poor financial appetite to adopt and implement new practices.

Table 28 outlines actions that were identified as potential measures that public finance could support

Table 28: Public finance interventions required to support private sector actors in Mozambique

Opportunity	*Interventions*	*Implementation options*
Awareness raising: Support national and local programmes to highlight disaster and climate risk and potential solutions to business and civil society	• Sector focused workshops targeted directly at the private sector to convey the business case for action i.e. the financial impact of reducing risk and capitalising on opportunities • B2B and sector networking and knowledge sharing opportunities • Offer finance support to industry led collaborations e.g. the CTA chamber of commerce, to also build awareness through focus programmes	• Sector focused workshop series implemented by MICOA or the soon to be established Climate Change Unit (CCU) • Implementation at provincial/ district level with additional outreach in cities and towns outside of Maputo • Build links between the INGC, MICOA, CCU and business association (CTA)
Access to information: Improve access to data on major hazard types and hazard mapping already undertaken	• Fund the design of a disaster and climate change information portal containing all information pertaining to natural hazards and climate change impacts in Mozambique e.g. including much of the work and research conducted by the INGC to date • Create appropriate communication channels with appropriate formats of simplified data (e.g. printed) • Develop training courses for business representatives to learn how to effectively use these information resources	• INGC, MICOA or the soon to be established Climate Change Unit could host an information portal and distribute printed risk information
Enabling environment: Develop the capacity of government institutions to enable reform of building codes and improved enforcement	• Support the updating of Mozambique's building codes to be better adapted to low cost (currently informal) housing construction, promote the use of local materials and synthesise/simplify the current codes • Build human and technical capacity in the necessary ministries to increase the likelihood of improved enforcement of codes	• Reform and simplify existing standards and codes. • Increase technical and human capacity at the Ministry of Planning and Development
Support the dissemination of low cost technologies: Encourage the development of SMEs and entrepreneurs with the agricultural sector	• Build access to credit for MSMEs in non-agricultural sectors • To build market demand, support pilot demonstration projects in rural provinces to build awareness of new products and services	• Broaden the scope/objectives of current credit guarantee facilities to ensure that non agricultural MSMEs can access credit

3.4 Mozambique consultation list

Table 29: Mozambique consultee list

	Name	Designation	Organisation
1	Stephen Dils	-	Solarkom
2	Bilal Juma Amade	Engineering Director	Agro-Alfa
3	Joao Carrilho	Manager	Millennium Challenge Corporation – Agriculture (former Deputy Minister of Agriculture)
4	Boaventura Cuamba	Associate Professor, Renewable Energies Research and Training Programme	UEM
5	Mario Falcão	Faculty of Agriculture	UEM
6	James Falzon	Policy Studies	ECN
7	Elisa Paulino	-	MPDC (Port of Maputo)
8	Mario Rassul	Environmental Consultant	MPDC (Port of Maputo)
9	Paulo Mole	Director of International Development Advisory Services (IDAS)	KPMG Advisory Services
10	Ricardo Sequeira	Director Executivo	Agrifocus
11	Valdir Jetha / José Sousa Pinto	Director Coordenador	National bank (anonymised)
12	Jake Walter	Mozambique Country Director	Technoserve
13	Gareth Weir	Private Sector Lead / Especialista para o Sector Privado	DFID
14	Alicia Calane	Managing Director	Kwest
15	Luciana Couto	Consultant	Impacto
16	Carolina Coutinho	Sustainability Manager	Vale
17	Anjali Saini	Adviser, REACT Funding Window	AECF Africa
18	Bill Rustrick	Director of Agriculture	Cleanstar Mozambique
19	Rahul Barua	Partner	CleanStar Ventures
20	Anselmo Cani	Architect Lecturer	Archi&Focus Lda UEM
21	Paulo Junior	Project Contributor	United Nations Human Settlements Programme
22	Ana Meyer	Senior Carbon Associate	Green Resources
23	Joana Mendes Godinho	Project Development Manager	Green Resources
24	Chris Isaac	Director – Business Development	AgDevCo
25	Andrew Macpherson	Director	AusMoz Farm Holdings

4. Pakistan

4.1 Resilience overview

Introduction

With considerable natural assets and a large population, Pakistan has considerable development potential. Pakistan is a lower middle income country that lies at a strategically important location. With a vast, reasonably well educated and motivated population, and substantial and diverse natural resources, the benefits of increased trade remain largely untapped.

In June 2013, Pakistan announced that economic policy was to refocus on improving the enabling environment for the private sector. However, Pakistan faces significant economic, governance and security challenges to achieving durable development outcomes. The persistence of conflict in the border areas and security challenges throughout the country is a reality that affects all aspects of life in Pakistan and impedes development. It also faces significant economic challenges. Any significant rise in international oil and food prices, combined with recurring natural disasters like the 2005 Kashmir earthquake and both the 2010 and 2011 floods, can have a substantial impact on the economy.

Top 10 Natural Disasters in Pakistan for the period 1900 to 2013 by economic damage costs[119]

Disaster	Year	Damage ('000 USD)
Flood	2010	9,500,000
Earthquake	2005	5,200,000
Flood	2012	2,500,000
Flood	2011	2,500,000
Storm	2007	1,620,000
Flood	1992	1,000,000
Flood	1973	661,500
Flood	1976	505,000
Flood	2007	327,118
Drought	1999	247,000

TOTAL (top 10) = USD 24.06 billion

Table 30: Pakistan country statistics

Indicator	*Result*	*Date*
GDP (purchasing power parity)	USD 514.6 billion	2012 est.
GDP real growth rate	3.7%	2012 est.
GDP per capita	USD 2,900	2012 est.
Population	193,238,868	July 2013 est.
Population growth rate	1.52%	2013 est.
Urban population	36% of total population	2010
Rate of urbanisation	3.1%	2010-2015 est.
Poverty rate	33%	
Major cities	Karachi: 13.1 million Lahore: 7.1 million Faisalabad: 2.8 million Rawalpindi 2.0 million Islamabad: 832,000	2009
Area	796,095 sq km (land 770,875 sq km, water 25,220 sq km)	
Coastline	1,046 km	
Employment		
Labour force	60.4 million	2012 est.
Labour force occupation	Agriculture 45.1%; industry 20.7%; services 34.2%	2010 est.
Unemployment rate	5.6%	2012 est.
Economy		
Key agricultural products	Cotton, wheat, rice, sugarcane, fruits, vegetables; milk, beef, mutton, eggs	
Industries	textiles and apparel, food processing, pharmaceuticals, construction materials, paper products, fertiliser, shrimp	

[119] http://www.emdat.be/result-country-profile

Industrial production growth rate	3%	2011 est.
Exports	USD 24.66 billion	2012 est.
Key commodities exported	textiles (garments, bed linen, cotton cloth, yarn), rice, leather goods, sports goods, chemicals, manufactures, carpets and rugs	
Key export partners	US 15%, UAE 9.7%, Afghanistan 9.5%, China 9.2%, UK 5%, Germany 4.5%	2012 est.
National infrastructure		
Airports (paved/ unpaved runways)	151 (107/44)	2012
Pipelines	gas 10,514 km; oil 2,013 km; refined products 787 km	2010
Railways	7,791 km	2008
Roadways (paved/unpaved)	260,760 km (180,910 km/79,850 km)	2000
Ports and terminals	Karachi; Port Muhammad Bin Qasim	
Energy and telecoms		
Electricity – installed generating capacity	20.2 million kW	2009 est.
Electricity generation type	Fossil fuels 65.2%; nuclear 2.3%; hydroelectric plant 32.5%	2009 est.
Telephones – main lines	5.7 million	2011
Telephones – mobile cellular	111 million	2011
Internet users	20.4 million	2009

Overview of natural hazards, vulnerability and impacts

A vast and diverse country occupying approximately 800,000 square kilometres of land and with 1,000 kilometres of coastline, Pakistan is characterised by a wide range of topography, ecosystems, socioeconomic and climate zones. It is rich in natural resources such as fertile lands, natural gas reserves and mineral deposits. A semi-industrialized country, Pakistan has grown from a primarily agricultural based economy to more diverse blend of industry and services.

The majority of Pakistan's 190+ million people live along the Indus River that is prone to severe flooding (most recently in 2010). Major earthquakes are also frequent in the mountainous northern and western regions. The general climate can be described as:

- Cool, dry winter (Dec - Feb)
- Hot, dry spring from (March - May)
- Southwest monsoon period (June - Sept)
- Retreating monsoons (Oct - Nov)
- Generally dry and hot near the coast
- Progressively cooler in the northern uplands

Natural hazards in Pakistan have an enormous and significant negative impact on the development of key sectors of the economy like agriculture, infrastructure, housing, health and education. A range of hydro-meteorological, geo-physical and biological hazards including avalanches, cyclones and storms, droughts, floods, glacial lake outburst floods, earthquakes, landslides, tsunamis and epidemic pose risks to Pakistan. [120] Some of these hazards (e.g. floods, landslides etc.) are predominantly seasonal and occur on an annual basis, whereas other hazards such as earthquakes and tsunamis are rare events but potentially highly destructive.

Hazard exposure by land area, assets and population all show different trends. The first is that the highest risk geographical zones are also the poorest. [121] Analysis by Munich Re indicates that when looking spatially at

[120] NDMA (2012) National Disaster Risk Management Policy
[121] Pakistan Poverty Alleviation Fund (2012) Disaster Management Strategy 2012-15

hazard distribution, earthquake and drought risks are the most challenging perils that Pakistan faces. However, simple analysis of the International Disaster Database (EM-DAT) confirms that the greatest economic losses experienced are from flooding events. This is verified by businesses that were consulted in-country with the Kashmir Earthquake also being cited on a regular basis. Observation confirms that the exposure of assets and population along the Indus River is the particular driver of these losses.

Both the 2005 earthquake and the 2010 and 2011 floods have revealed the vulnerability of Pakistani society and economy to disasters. Pakistan incurred a loss of USD 10.1 billion on account of the floods of 2010 alone, 70% of which were borne by poor households and small farmers. This amounts to 5.8% of the Pakistani 2009/10 GDP, making it more costly – in relative terms – than the 2011 Japanese Tsunami (4.6%). 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 following year the Sindh province experienced further flooding resulting in damage and costs of USD 3 billion and 9.6 million people being affected, with 520 reported deaths and 1,180 injured.[122]

Rapid urbanisation with poor spatial planning and construction standards leads to both rural and urban populations, particularly low income households, being vulnerable to natural hazards. In addition, a reliance on "ex post" or reactive public financing sources and donor assistance has led to liquidity shortfalls in the immediate aftermath of floods and proved insufficient to cover important recovery and reconstruction needs, leaving some key infrastructure in disrepair and communities less resilient.[123] Pakistan has low but improving institutional capacity although a lack of skills and financial resources are limiting effectiveness.

A high dependency on agriculture and natural resources means that Pakistan is also highly vulnerable to climate change. Productivity of major crops is already at risk of decline because of increasing desertification, rising temperatures and loss of soil fertility. Climate change is also therefore a risk to food security. In Pakistan wheat is a major crop and is exposed to all types of climatic factors. Government intervention has also sustained inefficient production systems. The government procures the bulk of the wheat harvest at a high price but sells to consumers at a loss (in order that they can purchase wheat flour at a low price). This system has sustained inefficient wheat production which could likely have significant implications for the country's food security. Inefficient and wasteful water use in the agricultural sector is also sustained by a lack of water pricing in Pakistan.

Measures to improve cultivation outputs and resilience to climate variation have long been underway, but a substantial push is still needed as amply demonstrated by the 2010 devastating floods. Priority areas for research and adaptation measures include the water, infrastructure, energy and agriculture sectors, with particular attention being paid to reducing vulnerability to flooding and improving water management in the Indus River Basin.

Table 31: How Pakistan's risk profile might change as a result of climate change[124]

Hazard	*Current risk*	*Future risk*
Tropical storms	The lowland plains of the southern regions of Sindh and Baluchistan, which include the urban regions of Karachi and Hyderabad are vulnerable to the impacts of cyclones. In June 2007 two super cyclones namely Gonu and Yemyin developed in the Arabian Sea. No	Projected increase in frequency of occurrence and severity of cyclones. The expected increase in tropical cyclone activity in the Arabian Sea is an issue of serious concern due to a large proportion of the country's industrial infrastructure being located in the coastal city of Karachi, which is highly

[122] World Bank/ADB – Preliminary Post Disaster Needs Assessment. 2011 Pakistani Floods.
[123] NDMA *ibid*; and also meeting with World Bank Disaster Risk Financing team.
[124] (1): http://sdwebx.worldbank.org/climateportalb/home.cfm?page=country_profile&CCode=PAK&ThisTab=ClimateFuture
(2): Planning Commission Government of Pakistan: Task Force on Climate Change Final Report. February 2010.

	record of super cyclones developing twice in one month over the Arabian Sea has been noted in the last century.	vulnerable (due to poorly designed city infrastructure and structures) to tropical cyclones generated in the Arabian Sea. The low income and sparsely populated Sindh coastal belt to the south east of Karachi is also highly vulnerable.
Precipitation	Precipitation over Pakistan increased on average by about 25% during the last century. Increased intensity of major precipitation events been observed in most regions. The number of heavy rainfall events (defined as a daily rainfall total which exceeds the threshold that is exceeded on 5% of rainy days in the current climate of that region or season) has increased, with the nine heaviest rains recorded in 24 hours recorded in 2010. Mean rainfall in the arid plains of central region and the southern coastal belt has decreased by 10-15 since 1960; mean rainfall over the same time period in northern regions has increased.	Global Circulation Model (GCM) based precipitation projections remain uncertain due to limitations of current GCMs in modelling precipitation. Although there is much variation in projections by different GCMs, analysis using outputs of multiple GCMs for the A2 and A1B scenarios indicates that precipitation is likely to increase in summer and decrease in winter in both Northern and Southern Pakistan, with no significant change in annual precipitation (GCISC 2009).
Floods	The country experiences frequent and severe flooding in the Indus River Basin, mostly as a result of monsoon rains in July-September. Monsoon precipitation increased throughout the country except in coastal regions (where there was a significant drop) and the Western Balochistan Plateau during 1951-2000. Heavy precipitation events leading to floods appear to be on the increase.	It is projected that climate change will increase the variability of monsoon rains and enhance the frequency and severity of extreme events such as floods. This is a serious concern due to the country's dependence on agriculture. The behaviour of the Karakoram glaciers is uncertain leading to unpredictability of the country's future water resources.
Droughts	In the arid southern and central regions of Pakistan, sparse and often erratic rainfall patterns from February to March can alter reservoir and river levels. Extended periods of high temperature and droughts are becoming more common.	It is projected that climate change will enhance the frequency and severity of extreme events such as droughts. This is a serious concern due to the country's dependence on agriculture and livestock farming.
Earthquakes	Major earthquakes are frequent in the mountainous northern and western regions. The Kashmir earthquake of 2005 caused a national catastrophe.	No impact from climate change.
Landslides	The northern regions of the country, particularly those connected to Azad Jammu Kashmir (AJK) province are severely affected by frequent landslides, which often constrain transportation and evacuation routes.	Landslides are likely to be more common if the projected impacts on precipitation events and glacial melting continue.
Temperature	Average annual temperatures have increased by 0.6 °C. Temperature increase over northern regions being higher than over the south (0.8 °C versus 0.5 °C) over the last century. The number of hot days (defined as the temperature exceeded on 10% of days or nights in current climate of that region and season) per year has increased by 20 days and the number of cold nights (defined as the temperature below which 10% of days or nights are recorded in current climate of that region or season) per year has decreased by 9.7 nights.	The expected temperature increase in Pakistan is higher than the expected global average temperature increase. Studies based on the ensemble outputs of several GCMs project that the average temperature over Pakistan will increase in the range 1.3-1.5°C by 2020s, 2.5-2.8 °C by 2050s, and 3.9-4.4 °C by 2080s, corresponding to an increase in average global surface temperature by 2.8-3.4 °C by 2100. The projected temperature increase in the north is higher than in the south of the country, in line with the IPCC global scenarios which show higher temperature increase over Central Asia than that over Southern Asia, and winter temperatures are expected to increase to a greater extent that summer temperatures.
Sea level rise	Low lying coastal regions of Pakistan, including the city of Karachi, are at significant risk from tropical cyclones. In 2008 it was determined that a CAT I-III cyclone would create a minimum of a 12-15 meter storm surge 5km into the city directly affecting nearly 700,000 people and indirectly affecting 5 million.	The low lying coastal regions of Pakistan, including the city of Karachi, are at significant risk from projected sea level rise, which even under conservative scenarios suggest a 40cm rise by 2100, much of which is set to occur in South Asia.

Sensitivity of key economic sectors

A sector sensitivity analysis was carried out to help focus the country analysis in areas where the private sector is particularly exposed or can have a substantive influence on resilience. This assessment included a broad review covering the identification of economic trends, each sector's employment, GDP contribution and also the mapping of the major hazards against each sector. The combination of physical risks and economic importance resulted in a prioritised list of sectors.

Pakistan's economy can be characterised as semi-industrialised; it is a lower-middle-income country with extensive poverty but also huge potential. The country's industrial sector constitutes 24.3% of the country's gross domestic product. Pakistan has a total labour force of almost 60 million. The largest industries are textiles, cement, agriculture, fertiliser, steel, tobacco, edible oil, pharmaceuticals, construction materials, shrimp, sugar, food processing, chemicals and machinery.

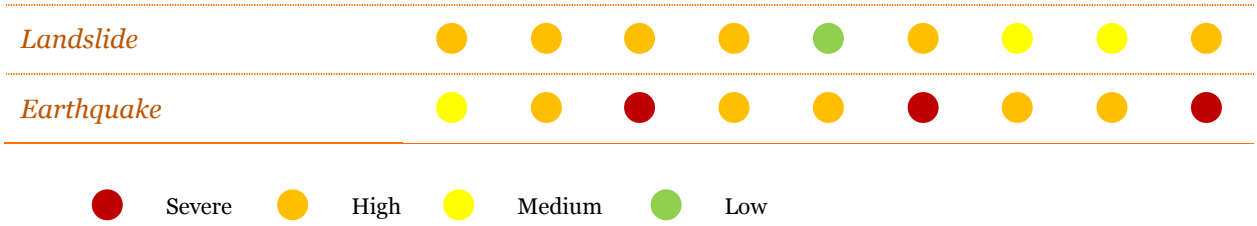
The GDP growth for 2011-12 was projected to be 4.2% on the back of 3.4% growth in agriculture, 2% growth in large scale manufacturing (LSM) and 5% in the services sectors. However, the torrential rains in Sindh province during August 2011 compelled the government to revise its GDP growth target to 3.6% on the basis of a reduction to 2.5& growth in agriculture, 1.5% in LSM, and 4.4% growth in services sector. Pakistan's industrial sector experienced tremendous growth between 2004 and 2006 despite the acute shortages of electricity that are currently plaguing economic growth.

The table below identifies the key risks presented by natural hazards to the major sectors of the Pakistani economy. It illustrates that flood, earthquake and drought are the most important multi-sector risks to the economy as a whole, and that agriculture and construction are the most exposed sectors to disaster and climate related risks. Significant challenges are also faced by utilities and manufacturing.

Table 32: Sector - hazard sensitivity assessment[125]

	Agriculture (crops)	*Agriculture (livestock)*	*Manufacturing*	*ICT (and transport)*	*Tourism*	*Construction*	*Finance and insurance*	*Mining and quarrying*	*Utilities*
Sector risk rating	🔴	🔴	🟠	🟡	🟢	🔴	🟡	🟢	🟠
Tsunami	🟢	🟢	🟡	🟡	🟢	🔴	🟢	🟢	🟡
Storm surge	🟡	🟡	🟠	🟡	🟢	🟠	🟢	🟢	🟡
Tornado	🟠	🟠	🟠	🟠	🟢	🟠	🟡	🟢	🟡
Hail storm	🔴	🟠	🟠	🟡	🟢	🟠	🟡	🟡	🟡
Flood	🔴	🔴	🔴	🟠	🟡	🔴	🟠	🟠	🟠
Tropical storm	🟠	🟠	🟠	🟡	🟢	🔴	🟠	🟢	🟡
Drought	🔴	🔴	🔴	🟠	🟡	🟠	🟠	🟠	🟠
Frost	🔴	🔴	🟠	🟢	🟢	🟡	🟡	🟢	🟡
Extreme temperatures	🔴	🔴	🔴	🟠	🟠	🟠	🟡	🟠	🟠

[125] PwC analysis



Agriculture is a key sector of the economy. It provides food items and raw materials for industrial processes and accounts for 21% of GDP, 45% of employment and 60% of exports. Despite the fact that its share of GDP is declining, it is the single largest sector of Pakistan's economy. Moreover, an overwhelming majority of the population depends directly or indirectly on income generated by this sector. As a result its growth has a larger impact on the overall economic performance.

The manufacturing sector contributes much to the progress of the economy. The manufacturing sector has remained under stress for the last several years due to energy shortages and the more general security situation. The heavy floods also depressed the supply chain and affected market demand. The share of the manufacturing sector in GDP was 17.7% in 2001-02. This has increased in 2011-12 to 18.6% of GDP. Manufacturing has been hard hit by international and domestic factors, which slowed its output.

To better understand which other sectors are likely to offer best value for money to donors, the sensitivity assessment is contrasted against key economic trends. The analysis presented below further promotes the importance of agriculture as the first priority. It also highlights construction and manufacturing as other sensitive sectors. Of the two, construction has a larger informal sector and has more direct links with the poor and vulnerable parts of the population. It also plays a major role in the vulnerability of the manufacturing sector and was therefore selected as a second focus. Although this analysis does not directly highlight finance and insurance due to its relatively small size, its indirect exposure across all sectors plus its potential to support private sector growth and resilience in the future supported its inclusion. Insurance has therefore been considered as an embedded elements of each of the two primary sectors and were consulted as a separate focus group at the Islamabad workshop.

Table 33: Pakistan sector prioritisation

Sector	*Climate sensitivity*	*GDP Contribution*	*Employment contribution*	*Future GDP contribution*
Agriculture – crops				
Agriculture – livestock				
Construction				
Manufacturing				
ICT (and transport)				
Utilities				
Finance and insurance				
Mining and quarrying				
Tourism				

Existing national policy landscape and effectiveness

Public policy for both disaster risk and climate change has gained considerable strength flowing the 2005 Kashmir Earthquake and the catastrophic flooding of the Indus river basin in 2010. Pakistan is one of the signatories of the UN Hyogo Framework for Action (HFA) 2005-2015: Building the Resilience of Nations and Communities to Disasters. At the core of the HFA lies the integration of risk reduction as an essential component of national development policies and programs. The earthquake in 2005 highlighted Pakistan's vulnerability to disaster risks and motivated a shift from the erstwhile response-focused to the current, more proactive approach. This shift found its first expression in the National Disaster Management Ordinance (NDMO, 2006, replaced in 2010 by the current National Disaster Management -NDM Act), followed up by the National Disaster Risk Management Framework (NDRMF) (2007-2012) that outlined the national DRR agenda.

The **National Disaster Management Authority (NDMA**) is the lead agency at the Federal level to deal with whole spectrum of Disaster Management Activities. It is the executive arm of the National Disaster Management Commission (NDMC), which has been established under the Chairmanship of the Prime Minister, as the policy making body in the field of DRR. In the event of a disaster, all stakeholders, including Government Ministries/Departments/Organisations, Armed Forces, INGOs, NGOs and UN Agencies work through the NDMA as the single focal entity.

There is recognition in Pakistan's **National Disaster Risk Reduction Policy (2013)** that "The involvement of the private sector in DRR is as of yet negligible." However the revised vision statement does include reference to business as an important stakeholder that needs to build awareness and capacity. Unfortunately it is not yet clear in the strategy how the private sector will be mobilised.

Again, the **Climate Change Policy (2012)** also contains reference to the private sector as one of its 11 policy objectives: "To foster the development of appropriate economic incentives to encourage public and private sector investment in both adaptation and mitigation measures." The cost of adapting to climate change in Pakistan is estimated to be USD 6-14 billion per year until 2050.

Both the NDMA and the Ministry of Climate Change confirmed through this study's interviews that it has not yet engaged the private sector directly in a planned or coordinated manner on disaster risk or climate change. As a result there are not yet any nationally driven private sector programmes in this area.

The Government of Pakistan established the **Earthquake Reconstruction and Rehabilitation Authority (ERRA)** shortly after the Kashmir Earthquake in 2005 to lead reconstruction efforts in affected regions. ERRA was established to integrate and coordinate efforts and activities pertaining to post disaster damage assessment, reconstruction and rehabilitation in the affected areas.

The World Bank Group has acted in response to the events of 2005 and 2010 by supporting a large scale public sector support project to assist with national disaster risk financing. This includes a multi-year process conducting analysis of physical and financial risks including loss analysis including the creation of a replicable assessment framework for the country. There is also a disaster risk financing programme focusing on insurance and the feasibility of a catastrophe risk pool to help with national fiscal stability in the event of further extreme events.

Overall, it is clear that the private sector is not a major feature of disaster and climate risk management planning frameworks. Nor are there specific initiatives targeting the involvement of private sector within key economic sectors, or at provincial or local levels. However, the success of the recent elections plus announcements in June 2013 by the government and development partners on the growing importance of Pakistan's private sector in its development plans, suggests that policy landscape is rapidly changing.

Country consultation approach

The Pakistan country case study was developed through consultation with local private sector actors, field and desktop research and selected relevant government bodies. PwC carried out this work with support from LEAD Pakistan, a local project partner and development NGO with excellent access to local stakeholders.

Twelve separate consultations were held with agricultural, construction and insurance/financial services companies. There was also consultation with important public sector players. Wider engagement took place

through a workshop held in Islamabad which attracted an attendance of 42 people. The table below includes the direct one to one consultations; the workshop attendee list is appended.

Table 34: Pakistan primary consultees

Primary consultee list		
Hayat Farms (SME)	Aamer Hayat Bhandara, Director	Agriculture farm growing crops including cotton and wheat which is supplied to local markets. Dairy farm supplies to MNCs such as Nestle.
IGI insurance corporation (national)	Haider Ali, Head of under-writing	Provides general insurance coverage to corporate clients (Nestle, Packages, Engre are some of its major clients)
Habib Construction Services (HCS) (national)	Syed Waqar Naqvi, General Manager	HCS has several large scale infrastructure projects to its credit, including Lahore Ring Road and Sialkot International Airport
Interconstruct (SME)	Asad Malik, CEO	General construction contractor in real estate and infrastructure
Rajput traders (SME)	Pervaiz Ahmad Latifi	Small distributor of seeds
Pakistan Poverty Alleviation Fund (PPAF) (national)	Saqib Siddiqui, General Manager, Private Sector Development Unit Mehreen Khalid, Senior Management Executive, Sector Management Ali Nadeem Qureshi, Sector Management	PPAF aims to promote an effective approach to poverty alleviation. PPAF provides financing through both "grants and loans" organisations may receive both or any one form of assistance.
NESPAK (national)	Imran Taj General Manager, Disaster Management & Reconstruction Division	NESPAK offers a consultancy services ranging from conception to completion and operation of development projects.
Adamjee Insurance (national)	Adbul Sattar, Risk Management Unit in charge	General insurance company with 38% market share in marine, fire and auto.
Good Luck Dairies (SME)	Sheikh Tariq Ellahi	Good Luck Dairies is primarily a milk distributor supplying in the Islamabad/Rawalpindi area. He supplies to several small and large companies including for example Nestle.
Fauji Fertilizer Company (FFC) (national)	Mohsin Kadir Khan	FFC is the largest chemical fertilizer producer in Pakistan with the largest market share in the country (about 60%).
Ministry of Climate Change (public sector)	Mr Irfan Tariq, Director General	The Ministry of Climate Change is the focal point for National Policy, Legislation, Plans, Strategies and programmes with regard to Disaster Management, Climate Change including Environmental Protection and preservation.
National Disaster Management Authority (NDMA) (public sector)	Muhammad Idrees Mahsud Director, NDMA	NDMA is the lead agency at the Federal level to deal with whole spectrum of Disaster Management Activities. It is the executive arm of the National Disaster Management Commission (NDMC), which has been established under the Chairmanship of the Prime Minister, as the apex policy making body in the field of Disaster.

4.2 FOCUS SECTOR: Agriculture

Sector hazards and impacts

Agriculture is Pakistan's largest economic sector and is responsible for 70% of Pakistan's total exports. It contributes to about 24% of Gross Domestic Product (GDP) and accounts for 40% of the total labour force and up to 70% in rural areas[126]. In addition, it is the largest source of foreign exchange earnings. The Indus Delta is a vast tract of fertile land with a total cropped area of 23.76 million hectares[127]. Of the 6.6 million farm households in Pakistan, 86% are classified as small farmers[128]. Important staple crops include wheat (the largest), cotton, rice, sugarcane and maize. However, in recent years, due to increasing prices and demand for pulses, onions, potatoes, chillies and tomatoes these crops have also gained in economic value. The sector's growth has been hampered by poor irrigation and extreme flooding events suppressing growth during 2010 and 2011 in particular. Pakistan also witnessed a crippling drought during 2000-2002 when overall agricultural growth turned negative for these two years.

Livestock has been the fastest growing and increasingly important sub-sector which now comprises almost half of the agricultural GDP. But livestock is threatened by climate change and extreme events too and will increasingly compete with the human population for food.

Farmers and agribusinesses in Pakistan show considerable awareness of the issues that they face. They are also very engaged in their effort to find solutions to protect their holdings from natural hazards but are constrained by low adaptive capacity. The major natural and climate change induced hazards affecting crops and livestock in Pakistan include:

- Reduced availability and unpredictability of water supplies
- Severe and prolonged drought conditions
- Extreme weather events including flood, drought, heat, frost and hail
- Variation in glacial melt water

These hazards impact the agricultural sector in the following ways:

- Reduced yields in regions impacted by extreme weather events including direct crop damage
- Longer growing seasons in some of the cooler northern regions
- Propagation of disease
- Increased competition for scarce food resources
- Spoiled crops or outputs from damaged / flooded or lack of cold storage

Water availability has become a major concern for the agriculture sector which is responsible for 94% of national water demand. Water is not priced in Pakistan and this lack of pricing has sustained inefficient and wasteful water use in the agricultural sector. Pakistan is a very arid country and has two cropping seasons, "Kharif"(autumn harvest) and "Rabi" (spring harvest). The West and North are generally dry; the Sindh and Punjab provinces (South and East respectively) are about 25% more productive but also suffer flooding. [129] In winter FY12, lower precipitation and extended periods of low temperatures (which reduced glacier melting) led to a decline in river flows. Water availability did not improve for summer FY13 due to delays in the monsoon rains.

These circumstances are likely to worsen in the future, as freshwater supplies continue to be overwhelmed by mounting demand pressures, exacerbated by the diversion of important river channels in neighbouring countries. In this context, building water storage capacity is crucial to buffer against dry seasons and mandatory water pricing should be encouraged. The price of irrigation water needs to be raised to reflect excess demand and the resource cost of water availability.

[126] World Bank (2013) Pakistan: Priorities for Agriculture and Rural Development

[127] Pakistan national Statistics http://www.pbs.gov.pk/content/area-and-production-major-crops

[128] Cabi (2012) model for ICT based services for agriculture extension in Pakistan

[129] Looney, R.E. (1994) Impact of Infrastructure on Pakistan's Agriculture

Furthermore, an effect of extreme (high) temperatures has been the emergence of new crop diseases. A disease 'milli-bug' which was previously limited to mango trees, had a disastrous effect on the cotton crop 2-3 years ago. This was during a particularly high temperature spell in the region, changing the pest's behaviour.

Post disaster needs assessments provide the best documentation of the impact of extreme events. The post-2010 flood damage assessments by U.N. agencies led by the Food and Agricultural Organization (FAO) estimate that about 3.3 million hectares of standing crops, including rice, maize, cotton, sugarcane, fruit orchards and vegetables were damaged or lost completely with about 1.3 million hectares affected in the four hardest hit provinces. Pakistan consequently became a net importer rather than an exporter of cotton to support its textile industry.

Substantial losses of other important export crops such as sugarcane, and rice had a large negative impact on the country's trade balance and household incomes, while losses in the production of staple cereals exacerbated food security issues in the country. FAO estimates show that over 1.2 million livestock and 6 million poultry have perished. [130]

Current adaptation activities

Some companies are already taking action to adapt. Rajput Traders, the seed distributer, noted that sowing in arid areas happens earlier than central districts of the Punjab so distributors in the Rawalpindi area are able to sell their product earlier than the distributors in central Punjab. If there is left over stock then that is sold to central Punjab when their sowing season begins. They are therefore less prone to risk than central Punjab distributors.

Fauji Fertiliser Company is the largest chemical fertiliser producer in Pakistan and has storage facilities for their product in case of a sudden fall in demand (or for example in case of a natural disaster such as the 2010 floods). They have a total of 150 warehouses/storage facilities nationwide that are mostly leased properties. These warehouses are all insured and so they are fully covered in case of any damage to the product. FFC has also developed a deep engagement with the farmer community. They have set up a nation-wide farmer education programme in which representatives from their field offices educate the farming community about sustainable farming techniques related to issues such as salinity, soil degradation and water logging. FCC is interested in building resilience for flood affected communities and farmers through its corporate social responsibility programme and is already carrying out rehabilitation activities in certain villages.

Good Luck Dairies, a 5-10 person dairy distributer supplies to the Islamabad/Rawalpindi region. It collects milk from dairy farms in Jhelum, Gujrat and Mandi Bahauddin, supplying several small and large companies including, for example, Nestle. Heavy rain spells affect milk collection from remote areas and in view of the potential for extreme/regular flooding in certain regions, the business has chosen to operate in geographical locations that are not usually affected by such hazards. This shows that greater sector resilience could lead to an extension of market opportunity and new services to vulnerable regions.

Otherwise Good Luck Dairies noted that the price of their products tends to increase as a result of natural hazards, usually due to supply constraints. It generally takes about two months for businesses to recover from floods but recent improvements in the communication and transport infrastructure have had a positive impact on overall operations. A lack of cold storage facilities for dairy supply chains plus a lack of awareness about the importance of cold storage for dairy products at small and medium farm scale is an issue. The recent heatwave (May 2013) led to shortages of camel and cows' milk.

Hayat Farms is a small mixed agribusiness in Punjab province that grows cotton and wheat which is supplied to local markets but also holds dairy herds that supply large corporations such as Nestle. Hayat noted that high temperatures, excess rainfall and flooding have all affected the farm's activities. The Sutlej River which is controlled by India is the river next to the Pakpattan farms. This means that when there is excess water, the flow to Pakistan is opened by India – this has resulted in flooding several times but farmers have slowly learned and have stopped planting crops on the riverbed where there is a chance of flooding.

Sector opportunities

Potential resilience building actions

[130] FAO, *Pakistan Flooding: Executive Brief*, October 5, 2010.

Through workshops and interviews, the following resilience building actions were identified for the agricultural sector:

- Investment in research and development that provides solutions to high-stress agriculture
- Hi-tech meteorological services along with early warning systems to predict floods, drought, cyclones, tsunamis, wind shear, fog, hailstorms, etc.
- Breeding of livestock species and multiplication of seed varieties that are resistant to drought.
- Strategic food reserves to cater for extreme events.
- Know-how, farmer training and capacity building for the eight highly diversified agro-ecological zones.
- Technology transfer in the area of renewable energy at farm level and green technologies build resilience to climate change.
- Investment in forest and tree cover across the country, with due attention paid to special ecologies (e.g. the coastal belt, where mangroves are the most suitable).

Agricultural technology is a major opportunity for innovation, entrepreneurs and inclusive business models. The market opportunity for manufacturing, installing and maintaining irrigation systems, for example, is huge. Jain Irrigation in India manufactures drip irrigation products and now supplies them in India and internationally to 120 markets. Its market capitalisation is USD 1.5 billion with a compounded growth rate of 41% over the past five years. Revenue last year was USD 822 million. With 70% of Pakistan's agricultural land irrigated, the market potential is enormous. Affordability and energy needs for pumping are major barriers to technology adoption however. Solar pumps could provide off grid access to electricity as well as running the irrigation systems, this would provide further resilience, social and development benefits by contributing to education, health (through vaccine storage) and gender related goals.

Hayat Farms outlined their views on how the sector is trying to build resilience. In the field, farmers are developing their own responses. Some farmers in parts of Pakistan are responding to the seasonal shifts and changing weather patterns by adjusting their cultivation schedules and experimenting with new varieties of hybrid seeds and fertilisers to increase yields and improve resilience of crops to pest attacks and water shortages. There are also other practices such as building flood buffers and water harvesting that farmers are adopting to respond to the growing incidence of climate change induced disasters that destroy crops.

These initiatives have a valuable contribution to make to the understanding of how we can protect the environment, or adapt to climate change, but unfortunately they tend to work in isolation, rarely getting the opportunity to come together, share their experience and learn from each other. Farmer-led innovations are not shared or expanded and scientific research remains confined to the laboratories or scientific libraries. They also expressed the view that government policy making is not always able to take into account the practical realities present at local and private sector levels.

Tolerant and hybrid seed species are a major opportunity for new market entrants. Rajput Traders, a small seed distributer, buys seeds from public sourced (Punjab Seed Corporation) as well as private processing units and sells it to farmers in and around Rawalpindi (arid areas). They primarily deal in maize and wheat seeds. Floods and rains do have some affect on sales but these impacts are not significant enough for them to make it a priority. Their clients, including farmers and intermediaries, usually purchase seeds in advance of the sowing season so if there is an extreme event they are more affected than the distributors. The company is not aware of opportunities from trading and distributing new and tolerant seed varieties from both international and local traders suggesting that their lack of awareness might be holding back otherwise economically rational adaptation measures in a market worth USD 1.5 billion in Pakistan. [131]

The company highlighted the need for improved awareness as well as capacity building activities for small to medium level dairy farmers. And suggested that larger companies are in a god position to help with this and improve the efficiency of the overall supply chain of the dairy sector.

The privatisation of agricultural services in Pakistan also provides a substantial opportunity for embedding resilience measures into the marketplace. Mobile applications, including expected future growth of smart phone services are extremely well suited for communication between farmers and extension service providers. There is an undertone of 'moral hazard' to extension services being provided as packaged services with an input product (seed, fertiliser, pesticides, etc); however, there are some resilience benefits to be gained from the interaction. Alternatively the privatisation of public extension services could provide more

[131] World Bank – presentation.

efficient models of support with built in incentives to serve the poor and vulnerable as well as the larger wealthier farms.

Hayat Farms are very willing to work with both small businesses and larger companies to reduce natural hazard impacts but offer some warnings to action in supply chains. Their representative at the consultation spoke about larger companies, such as fertiliser companies, that come and train farmers on how and when to use the fertiliser to enhance yields. However, he said that their primary objective was to increase their own sales and they end up selling a lot more product than required to the unsuspecting farmers. Again, capacity building for farmers, he said, should be provided by large firms sourcing the products (including MNCs), especially on how to reduce risk and the impacts of natural hazards. "Large companies need to give more back to the farmers" was the main argument, but beyond that his opinion was that this would be a practical opportunity to support better outcomes for all.

Barriers to sector resilience

The role of credit is also instrumental since Pakistani farmers often lack finances necessary for carrying out vital farming activities. Though significant challenges remain, access to credit has improved considerably over the past two decades. A well-established network of lending institutions operates to meet the financial requirements of farmers in the rural areas. Currently 26 commercial and microfinance banks with around 3,900 agriculture designated branches are facilitating farmers by extending agriculture credit throughout the country. These include: ABL, Habib Bank Limited (HBL), Muslim Commercial Bank (MCB), United Bank Limited (UBL), two specialised banks, Zarai Tarqiti Bank Limited (ZTBL) and the Punjab Provincial Corporative Bank Limited (PCBL), and 14 private domestic banks. Furthermore, five microfinance banks operate in a growing and increasingly important financial sub-sector. [132]

There are however large parts of the country which are underserved or un-served by MFIs. Most MFIs have not provided coverage to rural areas because of the high cost of serving these areas. The informal credit market accounts for a large proportion of agricultural household debt with only 25% of agricultural operators accessing bank finance. Interestingly this figure rises to 84% for smallholders who are served by a wide variety of providers including family and friends, landlords, money lenders, traders or agents. [133] There is widespread use of Rotating Savings and Credit Associations at all levels in Pakistan. These are called Committees and are especially popular among women from all socioeconomic backgrounds to establish private savings committees which people trust. The members of a Committee know each other well and deposit a fixed amount in a pool which is then distributed by rotation to each member on a monthly basis.[134]

Agricultural infrastructure also needs considerable strengthening. Having gone through its own green revolution in the 1970s and 1980s, Pakistan's agricultural infrastructure is feeling the strain. Although there is reasonable provision in some areas, the quality and physical resilience of both dry and cold storage facilities is often poor. Post-harvest losses are high as a result, compounding poor yields that are already lower than international benchmarks. [135] Access to the larger city markets for fruit, milk and other temperature controlled goods is a problem for the most poor and vulnerable households in particular.

Despite the green revolution of the 1980s, the capacity of the agriculture R&D system has also declined sharply during the last decade and new technologies for rain fed areas and livestock are needed alongside more efficient irrigation infrastructure. These issues must be tackled to address future demand and the supply constraints that can be magnified by climate change.

Irrigation is the single most critical component of water management in the country. However, it is inefficient and degraded, relying primarily on flood irrigation techniques. More efficient drip and spray irrigation systems are not financially viable as a result of ineffective water tariff structures which account for less that 0.5% of crop revenue and are only partially collected. An economic review of Pakistan in 2013 concluded that the total revenues cover less than 25% of the operational costs incurred. Capital and operating costs for irrigation are therefore publically financed contributing to the national debt. As water resource pressures mount, supply to some areas is beginning to fail promoting the case for more efficient infrastructure

[132] Pakistan Ministry of Finance (2012) Economic Review

[133] MoF *Ibid.*

[134] MoF *Ibid.*

[135] http://www.nation.com.pk/pakistan-news-newspaper-daily-english-online/business/02-Jun-2013/rs-15b-must-be-allocated-for-agri-infrastructure-fund

and practices. Introducing better technologies to the market can help considerably and the market potential is significant.

Capacity and skills are a constraint at all levels of the value chain. FFC has no tools in place to identify or assess climate risks. Interestingly, while company operations have been considerably impacted due to natural hazards, FFC's own infrastructure has not been directly affected by climate change as such and they are not aware of what these impacts could potentially be.

A lack of knowledge and risk sharing through the supply chain is an emerging challenge. It was clear from consultations that there are breakdowns where value chain partners had a shared risk or opportunity. First of all there is a general reliance on the government to keep pushing through new waves of infrastructure and policy reforms. This is not financially sustainable as experienced in the late 1980's when the government prioritised but failed to deliver irrigation infrastructure upgrade projects at scale.

The workshops and consultations held have contributed towards the summary analysis at sector level presented below. To combine country level analysis into the meta-analysis of barriers in the main report we have presented the outcomes from country level analysis using a similar structure and format.

The main point to note is that although awareness of the impacts is high, the major barrier to progress on resilience within the agricultural sector is knowledge, capacity and skills relating precisely to resilience building actions. There are likely to be finance and other implementation barriers to overcome but the analysis was clear and consistent between user groups including SMEs and large companies.

This constraint was validated through work by Cabi[136] who state that *"...[farmers] consider themselves as 'information poor', and that news about new agricultural technologies to help them improve productivity is not reaching them - lack of information was cited as the single largest barrier to the uptake of new technologies"*.

Table 35: Summary of sector barriers to uptake of private sector action on resilience

Barrier group	*Barrier example*	*Agricultural Sector* ○ Minor barrier ● Major barrier ● Key barrier	*Description/ Local example*
Risk management capability and maturity	Lack of internal buy-in / leadership	○	Buy-in is not usually an issue as private sector risk awareness is high in Pakistan (e.g. the CEO of Agroventures, a local investor in the agricultural sector, sent a Director to attend the workshop to help find out more about this issue).
	Low risk awareness	○	This is not so much of a concern at local and national company level. Large MNCs tend to reference this barrier more often.
	Challenges of decision making under uncertainty	-	The impact of uncertainty is less pronounced in the local and sector context. The risks are very real.
	Limited sharing of good practice and lessons learned from other business approaches	●	There is a considerable appetite for clear information and examples that are relevant at the sector level.
	Limited tools available e.g. risk assessment, scenario and opportunity evaluation tools	●	Risk awareness is not leading to risk assessment due to a lack of analytical approaches and relevant data.
Technical	Lack of knowledge, capacity and skills in workforce	●	Despite being aware of the risk posed, the agricultural community considered the lack of capacity to respond to be the most pressing barrier.
	Poor communication of useable risk information	●	The availability and communication of better local information on the likelihood, magnitude and timing of events and forecasts would be a considerable benefit. For example, while early warning systems triggered a flood alert, this was not communicated to rural

[136] Cabi *Idid*

			populations.
	Lack of access to technology	○	It was acknowledged that appropriate technology systems existed, however, knowledge about these is not permeating through rural environments.
	Lack of demonstration projects	●	With many farming practices being passed down through generations, demonstration projects are required to convince farmers to changes
	Lack of knowledge sharing / collaboration platforms		The farming community agreed strongly that there is no identifiable reference point for them on this issue. The government obviously has some responsibilities through agricultural extension and the NDMA but they would need far greater resources and skills to meet the needs of the rural population through existing channels.
	Weak sector and value chain partnerships	○	Some direct consultations referenced the opportunity to work more productively with MNC buyers.
	Lack of access to early stage capital (risk finance)	-	Was not referenced as an issue in workshop or consultation
Financial	Technology risk		The adoption of new technologies was considered a major risk, particularly when capital outlays were required and the farmer lacks the financial capacity to take the risk. It also prevents them accessing credit.
	Access to credit	●	Smallholders (less than 4ha) cannot access credit for agricultural inputs. That said, microfinance is quite well developed in some areas of Pakistan. Informal lending is also commonplace which although carries risk means that affordable credit is often available.
	Technology cost gaps	○	There are obvious constraints regarding the affordability of expensive technologies but farmers and agribusiness did not cite this as a barrier. Technologies will have to be largely cost neutral or beneficial with a low capital outlay.
	Lack of access to insurance	●	There is demand for insurance at farm level. Microinsurance schemes have been piloted to reach the poor and vulnerable communities.
	Lack of incentives		There was widespread agreement at a workshop including over 10 individual farmers that there are no incentives that support the uptake of new technologies or actions. Cheap water and subsidised inputs distort the risk profile of certain hazards such as drought.
Local enabling environment	Inadequate policy, regulatory and legal environment	○	Other than allowing for import and development of new technology and continued development of the financial and insurance regulatory environment this was not cited as a major issue for the agriculture sector. Agricultural subsidies are nevertheless clearly powerful and distortionary levers that can give rise to unintended consequences.
	Domestic infrastructure constraints	●	Access to cold and grain storage.
	Market and financial sector risks/capacity	○	The banking and capital markets of Pakistan are reasonably well developed and governed. There is high demand for credit.
	Local political, governance and security risks	○	These risks are understood do not have a material impact at farm level. Some exporters are aware that buyers will be sensitive to increasing local tension.

Public policy action and effectiveness at sector level

Overview of existing private sector engagement and stimulation efforts

Pakistan's agriculture policy recognises that climate change is likely to have a significant impact on the sector; however, action on private sector engagement is in its infancy. In order to understand the effects that global climate change might have on local agriculture, national policy advocates

research in areas including the effects on climate change on crop yields, forests and rangelands and the quantification and control of greenhouse gas emissions from farms. [137]

Organisations such as the **Pakistan Agricultural Research Council (PARC)** are engaged in a variety of technological and scientific solutions including mobile seed threshers and standardising tissue cultures. Likewise, the **Global Change Impact Studies Centre (GCISC)** is doing its own assessments on the impact of global warming on crop yields using scientific crop simulation and modelling methods; however, there is little or no validation on the ground.

The government continues to subsidise key agricultural inputs (e.g. fertiliser, water, and electricity) and intervenes in the market by setting benchmark prices as well as directly procuring strategic crops. This has important implications for the economics of private sector resilience projects and also the sustainability of national public finance policy. Direct government procurement in the wheat and sugar industries has protected and sustained inefficient production systems. Although current food production is considered adequate, future demand from rapid population growth, and climate related risks have alerted authorities to more pressing times ahead. Pakistan has taken the major decision to devolve authority for agricultural affairs to local governments to improve service delivery. It has also established a Ministry of National Food Security and Research to tackle food security issues.

The NDMA claims that recovery from disasters through creating employment is the best way to build resilience. The NDMA do have one success story of engaging the private sector (primarily civil society) after the 2010 floods when sunflower seeds (a new crop in the region) were introduced in the Thatta and Badin regions. After the sunflower seeds were provided, subsequent training was provided on the entire supply chain of the sunflower crop to enable the farmers to successfully sell their product.

The NDMA are undertaking several activities focusing on improving agriculture and livelihoods through introducing new cropping patterns and also focusing on irrigation, livestock, fisheries and forestry sub-sectors. A four-year project titled 'Disaster Preparedness and Response for the Agriculture Sector of Pakistan' covering 51 districts is underway with the FAO focusing on these areas and building preparedness response to disasters.

The **State Bank of Pakistan (SBP)**, the central bank, has developed a comprehensive framework for a commercially viable warehouse receipt system, which will allow farmers to have a reliable storage facility, and the receipts against stored commodities could be used as collateral for bank financing. The implementation of the project rests with Pakistan Mercantile Exchange (PMEX) and a Collateral Management Company is being formed under PMEX for the purpose.

Finally, it is noteworthy that the progressive financial regulations and involvement of the **Securities and Exchange Commission of Pakistan** (SECP), which works as the insurance market regulator in Pakistan, has been instrumental in increasing awareness and benefits of microinsurance, for example, and improving overall investor confidence. Financial services present a major opportunity for Pakistan in tackling resilience issues.

[137] Scoping Study: Pakistan's Options for Climate Change Mitigation & Adaptation, LEAD Pakistan, April 2008

Case study: An insurance PPP for crop protection

The Central Bank of Pakistan (SBP) is working closely with private financial institutions (10 insurance companies and 20 banks) to develop a market-driven rural finance market. An important initiative in this regard was the introduction of a market-based crop loan insurance scheme in 2008.

- Crop loan insurance is mandatory for farmers requesting a loan from a financial institution for any of the five major crops: wheat, rice, sugarcane, cotton, and maize.
- Cover is provided for a range of perils including flood, excessive rain, drought, hail, frost & locust attack.
- Banks provide outreach and collect the insurance premium on behalf of the insurance company.
- The amount of insurance cover is limited to the loan amount.
- Aggregate liability of the insurance companies is limited to 300% of collected premiums.
- 'Calamity declaration' by the Revenue Department, Government of Pakistan is the trigger point for payment of claims, followed by overall and specific farm surveys by the insurance company. In case there is a loss of more than 50% in terms of area yield outcome, the insurance trigger is activated.
- The framework also defines a maximum ceiling on the rate of premium to be charged from a farmer. The maximum annual premium is capped at two percent of the production loan amount to make it affordable for farmers.
- The maximum payout in the event of specified natural disasters is capped at three times the premium amount.

The scheme is market-based; however, the federal government pays the premium for small/subsistence farmers. Overall, the claims have amounted to much less than premiums collected. Claim-to-premium ratio has remained at approximately 50%. As a result, more insurance companies are now offering crop loan insurance products. The poorest rural communities are not being reached however resulting in a general deterioration in their relative quality of life.

Importantly, the flood in 2010 did not stop banks from shying away from rural finance. From 2009 – 2011, approximately USD 20 million was collected in premiums and claims were USD 10 million (including the impact of the 2010 floods). With crop loan insurance gaining momentum; banks have started re-evaluating their agriculture credit business models conversion of business model from "poverty lending" to "financial services".

Source: Adapted from Insurance Journal: March 2013 Edition

Internationally, USAID have very recently launched the **Pakistan Private Investment Initiative** with the Abraaj Group and JS Private Equity Management. The Pakistan Private Investment Initiative will launch two new private equity funds focused solely on Pakistan's dynamic and fast growing small- and medium-sized businesses. It aims to mobilise USD 150 million of investment. USAID will provide seed investment to capitalise the funds and Abraaj Group and JS Private Equity Management have committed to match or exceed these seed funds with investments of their own, as well as private funds raised from other limited investors. By investing in Pakistani private businesses, the United States is supporting private sector growth and job creation – and Pakistan's role as a robust and fast-growing economic partner among its neighbours and within the global economy.

In conjunction with the International Maize and Wheat Improvement Center (CIMMYT) and the PARC, USAID have also announced the **Agricultural Innovation Program** to expand the use of modern technologies in Pakistan's agriculture sector. Through this new four-year, USD 30 million project, USAID will sponsor research to encourage adoption of new technologies in agriculture. To date, 800,000 rural families have increased yields and started earning better incomes through USAID programs.[138]

Hayat Farms made their own practical suggestion as to how the government might help. They propose that the Ministry of Climate Change (MOCC) set up district level committees comprising of four to five people and headed by a local farmer. The purpose of this committee would be to serve as a communication mechanism for the farmers in that area since the 'District Environment Officers' that are presently allocated were ineffective. Hayat felt that with a farmer heading the committee, the most pertinent issues would be highlighted and brought to the highest level of government at the MOCC.

Aamer Hayat Bhandara, a company representative mentioned two particular organisations that have helped his business in understanding the risks posed by climate change and how to cope with them. First was LEAD Pakistan where he was a member of their Leadership Development Programme and gained training on climate change and other environmental challenges faced by businesses. The second was AusAID which selected him for a short course on understanding the agricultural market structure. He said that he, along with five other farmers from Pakistan, was selected for this training and that it was a great opportunity to learn about best

[138] http://www.usaid.gov/news-information/press-releases/us-launches-%E2%80%98agricultural-innovation-program%E2%80%99

practices in the agriculture sector (training was held in Australia). He felt that such opportunities should be more widely available to farmers in Pakistan.

There are also examples of corporate philanthropy and public-private partnerships involving local companies. FFC has been involved in flood relief activities following the 2010 floods under its CSR programme. FFC has taken up the challenge of reconstructing three villages from the districts Rahim Yar Khan and Ghotki. Reconstruction interventions are planned in housing, education, health, water, sanitation and infrastructure. The project will cost 102 million (PKR), 50% of which will be contributed by FFC.

Potential public intervention opportunities for agriculture

The evidence above suggests that there is considerable need and demand for risk reducing products and services. Pakistan's economy has reached a development status whereby the local private sector can offer many of these solutions alone or in partnership with the public sector. Intervention is however needed by local or international support to make this happen. Some interventions address specific constraints whilst some are targeted at multiple private sector development issues. The actions and implementation options identified to address the sector's major constraints are summarised and presented in the table below.

Table 36: Public finance interventions required to support to Pakistan's agricultural sector

Opportunity	*Interventions*	*Implementation options*
Knowledge and capacity: Systematically embed and improve agricultural extension services through capacity building of extension service providers.	• Targeted training of service providers on hazard awareness and responses. • Use of radio broadcasting to scale quick wins and reach remote areas. • Establish a knowledge hub and distribution channels to make planned additions to existing agricultural communication and engagement systems. • Support the development of regulated but privatised extension service provider models (a form of subsidy may still be required).	• Leverage existing extension services infrastructure operating at provincial government levels. • Support and coordinate between existing NGO programmes. • Collaborate with other donor activities (e.g. USAID and GFDRR) to prepare coordinated approach and a separate dedicated knowledge and capacity support facility.
Technology risk: Support technology demonstration sites to improve investor confidence.	• Identify and prioritise top technologies that have market potential in Pakistan. • Identify relevant sites for demonstration projects to be showcased. • Connect buyers and technology providers and provide basic investment support.	• New project/ programme required. • Engage Pakistan Agricultural Research Council (PARC) on the possibility of embedding the programme within their current operations.
Technology innovation and deployment: Stimulate private sector innovation and maturation of technologies.	• Conduct market analysis and potential for key technologies including efficient irrigation products, crop types and agricultural techniques. • Incubate key technologies. Provide R&D and/or business model support for new market entrants. • Facilitate implementation through credit support and market solutions that work with the value chain, regulators.	• New innovation support fund/ programme required. • Embed a resilience window into USAID's newly announced Agriculture Innovation Programme.
Access to insurance and financial services: Microinsurance solutions development for weather risk.	• Support the development or implementation of a regulatory framework for micro weather risk insurance. • Support (directly or through a facility) technical development needs including risk information, data analysis and pricing. • Provide financial support to expand existing microinsurance programmes for crops and livestock. • Embed support into national crop insurance scheme to improve the	• Build upon existing efforts of microfinance and microinsurance institutions. • Create a technical and financial support facility to facilitate development of the sector and maximise access to the poor.

	relationship of this with emerging private sector solutions.	
Facilitate market based solutions: Combine multiple interventions to support sustainable private markets for agricultural resilience. Provide market facilitation support to concurrently address a range of sector constraints including technology, access to finance and knowledge transfer.	• Design and implement an intervention framework to address complex constraints. • Offer technical assistance and investment support to build better business models, underwrite investment risk,	• Create a new and integrated facility that identifies and supports solutions at market scale working with multiple actors.

Cutting across all these interventions is the need for a public-private 'matchmaker' that supports aspects of market development and public services to help enable individual projects. It should also be noted than recommendations will need to be considered in the context of a 'market systems approach' (addressing regulatory, market, government and business value chain issues together), and ensuring that the poor and most vulnerable are not excluded from the solutions.

Public finance opportunities with immediate investment potential

In addition to the potential interventions set out above, this case study identified two specific opportunities to provide immediate support:

(1) Provide funding for the expansion of PPAF's microinsurance activities.
Pakistan Poverty Alleviation Fund (PPAF) is an impressive organisation with good capacity, knowledge and experience. They are chiefly funded by the World Bank, KfW and IFAD.

IFAD and PPAF, through a strategic partnership with the Securities and Exchange Commission of Pakistan, have embarked on the design of an index-based crop insurance and livestock insurance product under the Program for Increasing Sustainable Microfinance (PRISM). Prepared in collaboration with the Meteorological Department and the Livestock Research Institute, the insurance product is based on the needs of small and marginal income farmers. These are the first-ever indexed and hybrid weather microinsurance products that facilitate and compensate small farmers in Pakistan. The product is being piloted and rolled-out as a market based commercially viable model. It is currently focused on drought only (rainfall trigger) and will be tested on rain fed wheat and groundnut.

Weather index and microinsurance schemes can be unattractive to investors, including the insurance industry, because they require reinsurance as the risks are higher and premiums and margins tend to be lower. It can take some time therefore to develop the necessary scale for the market to be self sustaining. With donor support, Swiss Re agreed to be the international reinsurer for the current pilot project in Pakistan. Two locally credible primary insurers were also attracted to the scheme (not disclosed but this could take the form of price support or the donors taking a layer of risk). Public funds are also needed to support premiums for the poorest.

The livestock model is linked to the ritual slaughter of goats for the Islamic event of Eid Al-Adha. Goats are insured using a growth index and paid out using a 'purchase weight plus x-days of weight gain' model. With extreme heat waves such as the recent record breaking events of May 2013 likely to be more common as an impact of climate change in Pakistan this model could have traction.

Early results: There are three stages to the insurance cycle (sow, growth, harvest) and the first harvest was just completing at the time of writing. Demand for the products was a little lower than PPAF hoped for but on the positive side the claims were low which demonstrated to the private sector that it would not need to be a loss making enterprise (clearly the gains and losses are diversified over multiple products, locations and years).

For the livestock product, it has already proved to be popular given the tangible nature of the loss and clear pay out system. However, the scheme could be subject to issues of 'moral hazard' as per many insurance products, whereby the risk of false claims leads to expensive and overbearing loss adjustment by the insurance provider. Despite encouraging early results the funding channels that supported this pilot phase are coming to an end and a highly credible development and trial period risks not being supported in its next phase of development.

PPAF confirmed that further testing and expansion of the scheme and its benefits will need additional funding. They also promoted the establishment of a technical facility or similar to support enabling actions across the microinsurance sector.

(2) Making private agricultural extension services work better and specifically for the poor. Engro Corporation is one of Pakistan's largest conglomerates. Currently its portfolio consists of seven businesses which include chemical fertilisers, PVC resin, a bulk liquid chemical terminal, industrial automation, foods, power generation and commodity trading. The company sent three members of staff from its headquarters in Karachi to the workshop in Islamabad. Engro were very keen to engage with this project and its outcomes as it takes great interest in the success and productivity of agriculture in Pakistan. This is driven by its exposure to natural hazards through its agribusiness and smallholder customer base but also through its energy and commodity business lines.

Engro were keen to talk about how donors can support improved agricultural resilience through existing relationships with their customers. Skilled company representatives advise individual smallholders on their farming techniques, crops, soils and inputs. Acknowledging that there is a sound business reason to advise on fertiliser use, Engro were keen to explore what else could be done to leverage their existing outreach programmes to improve the resilience of farmers. It is in their interest to do this because continued and improved agricultural operations are good for business but they noted that the whole cost of providing this support should not necessarily come down to them.

Two basic **models of cooperation** were discussed during the workshop: (a) direct funding to support more comprehensive extension services e.g. making more of their mobile soil and water testing laboratories, moving from region to region help farmer's fine tune their usage of fertilisers based on the results of their soil analysis (plus the use of meta data which can be drawn from this); and (b) support reform and wider commercialisation of integrated extension services that indirectly provide companies like Engro opportunity to grow its revenue.

This latter option could take many forms involving both government and the private sector. A range of companies such as Syngenta, Nestle, Hala, Pioneer Pakistan (seeds), Fauji Fertilizers and Lakson Tobacco for example are all using their outreach services to both sell product and increase productivity and resilience. If they do not, customers will not continue to buy from them. Could a private sector initiative transform these services to help reach more small-holding farmers, reduce the burden on government and help develop their businesses at the same time? USAID were also meeting with Engro during their visit to Islamabad raising the prospect of donor collaboration.

4.3 FOCUS SECTOR: Construction

Sector hazards and impacts

The construction sector has many connections within the wider economy, particularly to industrials and manufacturing. Construction and engineering services play an important role in development and in Pakistan it is the second largest sector after agriculture. While it only accounts for just over 2% of GDP compared with 4%-12% in developed economies, [139] the construction sector offers job opportunities to millions of unskilled, semi-skilled and skilled people. New housing or infrastructure projects can promote and enable growth through the multiplier effect (e.g. 1 unit of investment = 5 units of growth). The many linkages between construction projects and other industries such as cement, steel and building products means that demand for construction services in particular can act as a major growth stimulus. The official economic review of Pakistan noted the following related insights into construction sector performance:

"[amongst all industrial sectors] …only the construction sector displayed strong growth during the year, mainly on the back of post-flood reconstruction activities, increase in public works, project loan inflows, and a rebound in private sector demand. As a result, construction-based industries (including cement, glass, wood, etc.) also performed well during the year." – State Bank of Pakistan, Jan 2013.

The sector is complex with a wide range of inputs and material supply chains. Sector outputs range from the construction of local homes to huge public infrastructure schemes. As Pakistan continues its economic development, the sector has huge potential for growth but the quality of construction remains a considerable challenge to the physical resilience of the economy, and international export of construction services.

[139] Pakistan Ministry of Finance (2012) Economic Review

The major hazards affecting the construction sector/ built environment in Pakistan include:

- Earthquake
- Flash and widespread flooding
- Coastal storm surge
- Tsunami
- Extreme heat
- Tropical cyclone/wind storms

The Kashmir earthquake of 2005 tragically exposed the vulnerability of Pakistan's built environment to natural hazards. The official death toll was 75,000 (others estimated it to be higher) with 3,500,000 people displaced. The devastation in some areas was complete; approximately 60% of official administrative, education and health buildings collapsed and over 400,000 residential buildings were destroyed. [140] Construction techniques for the vast majority of buildings prior to 2005 did not include engineered structures such as steel frames, bracing or structural ties, meaning that most walls were built from unreinforced stones or bricks which are not earthquake resistant.

There is little adoption or enforcement of design codes, earthquake zoning was incorrect, quality is poor and price is paramount. These factors drive considerable vulnerability for almost the entire population. In fact, in the case of an earthquake, a poor family with a single story residence may be less vulnerable than a wealthier family in a multi storey construction.

The same is not true for some other hazards such as flooding when in 2010 one fifth of the country was submerged, 20 million people were affected and an estimated 8 million Pakistanis were displaced from their homes. The United Nations Office for the Coordination of Humanitarian Affairs reported that over 1.8 million houses were damaged and estimates include that more than 5,000 miles of primary and secondary roads, 400 bridges, 400 miles of railways, 11,000 schools, and 200 health facilities were affected, with damage being particularly severe in northern regions like the Swat Valley.

The impacts observed by the construction sector, particularly from the Kashmir earthquake were both stark and consistent. All sector consultees recognised that until then, proper recognition of natural hazards was not being incorporated into design or construction practices. However, there is lack of proper hazard and risk mapping data. During the planning phase of a construction project, it is necessary for developers to carry out hazard and risk assessment surveys of the site to assess its safety for construction and also match construction model to local conditions. But due to the shortage of public data and a lack of technical skills and financial resources from clients and consultants/contractors, this requirement is not adequately fulfilled in public or commercial construction projects.

Interconstruct, a local construction firm operating in Punjab delivers infrastructure projects, such as bridges, where it is particularly important to incorporate appropriate flood design measures. The company has experienced damage to construction equipment and materials, with one bridge constructed by them being razed in a flood (in Kohat). Although Interconstruct is aware of the threat posed by flood risk generally, it is not clear whether those risks are systematically addressed. The company takes on construction contracts based upon the views of the company owner; there is no separate board or team to oversee risk management in a strategic manner. The owner relies on his own knowledge and understanding of natural disasters and climate risks to his business and says that engaging consultants to carry out environmental feasibility studies is too costly.

HCS, another contractor, has several large scale infrastructure projects to its credit, including the Lahore Ring Road and Sialkot International Airport. They deal with environment and climate hazards in the design phase of the project, as most of their projects are funded by foreign donor agencies or the government who have specific requirements regarding design risk tolerances. Most of their projects involve large-scale infrastructure which could potentially be damaged by floods or earthquake. They are able to hire consultants to prepare designs which incorporate these potential impacts. HCS did experience damage in 2005 when some parts of Sialkot Airport's runway were damaged during construction. HCS expressed the view that the level of awareness about floods has been fine, although their frequency is increasing which will require more technical know-how and expertise in future. They also confirmed that the earthquake of 2005 was a watershed event in raising

[140] Haseeb *et al.* (2011) Construction of Earthquake Resistant Buildings and Infrastructure Implementing Seismic Design and Building Code in Northern Pakistan 2005 Earthquake Affected Area.

awareness about earthquake resilient structures in the construction sector and most of their projects now have provision for such an event.

Sector opportunities

Resilience building needs

The industry has proposed the following actions at the sector level:

- **A simple and replicable design for resilient housing:** The establishment of a common, cost-effective resilience construction model, technique or design feature, such as 'base isolation' (a seatbelt for buildings), or the use of prefabricated (factory manufactured) modular buildings.
- **A central data repository:** There should be a central repository that holds risk information in a useable format. Developers and technical advisers should be able to access these at all locations when planning construction projects.
- **Improve engagement with the private sector:** Private construction companies are generally not engaged on the issue because there is little demand from their clients for such explorations. There are also no standardised systems for completing hazard and risk assessments for construction and there are varying levels of credibility for any data produced.
- **Mainstreaming innovative technologies:** Some technologies already exist but have not yet been adopted. One representative shared their experience of work in coastal areas, where they have adopted the 'Bangla technology' of floating structures in order to avoid sea level rise and other disasters.
- **Enhanced sector collaboration:** At peer to peer level, a strong association of contractors can work together on capacity building and to share the costs of resilience actions as well as sharing information and knowledge. Improved working relationships between the Contractors Association of Pakistan and the Pakistan Engineering Council should also be developed.
- **Stronger regulation and enforcement capacity:** Strong policy frameworks, combined with efficient and transparent standards, procedures and rules (building control authorities), are needed to improve governance of the sector and reduce the current issue of illegal and unregulated construction. Government also needs to more effectively regulate raw material markets (e.g. cement or aggregate quality) and completed projects. The quick pace of construction development (given the size and growth of population) poses a major enforcement challenge which should not be underestimated. Industry proposed the following measures:
    - If pre-construction hazard and risk mapping were enforced by government as a legal requirement for all construction projects, the demand and market for such services would quickly develop. Companies would make this a mandatory practice and would attempt to bring in the required skills and resources if this was made a legal obligation.
    - In addition to legal enforcement, incentives could also work to promote more climate compatible practices in the construction sector. Certain tax breaks and exemptions could be offered to companies that meet the risk/hazard assessment requirement or make changes to construction site/design on the basis of such assessments.
    - Incentives could be linked with the compliance index to be monitored by the local agencies/governments. At the small scale, financial assistance and at large scale tax exemptions/relaxations could be provided.

- **Industry incentives:** Industry suggested subsidising machinery imports and fuel costs so that they could reduce the cost burden, which is increasing due to having to adopt more disaster resilient designs.
- **Data and information:** Companies need access to data and the latest tools and software technology available to conduct disaster and climate risk assessments.

National Engineering Services Pakistan (Pvt) Limited (NESPAK) is a large and successful international design and engineering consultancy organisation that operates in the same market as Interconstruct but operates on the design side primarily and generally has access to greater resources. They hold a strong market position for flagship reconstruction and resilient infrastructure contracts, having developed the guidelines for and carried out the bulk of the construction work post-earthquake in the Azad Jammu & Kashmir (AJK) and Khyper Pakhtunkhwa (KP) provinces. They claim to have some of the best engineering specialists in the country and that all projects that they are involved in take into account the possible impacts of natural hazards. As a flagship

resilience project they were involved in the reconstruction of Balakot City including the identification of a new location for the city but also the planning and design, including flood spillways and improved design codes.

NESPAK has prepared national guidelines for disaster resilient housing and oversaw of the construction of 600,000 units to replace those damaged in the earthquake. The effort is ongoing, peaking in 2010 when 1,100 staff at NESPAK were involved in the project, creating a major business opportunity for the organisation. They won this contract as they were one of the few design firms that had the necessary skills and capacity, including a dedicated disaster risk reduction unit. Unfortunately they are atypical of Pakistan's design and engineering firms.

Sector barriers

Reconstruction efforts did create new business opportunities for some companies but not all. New and innovative solutions for disaster resilient structures such as 'light gauge structures' have already been introduced to the market though uptake is slow. Structural safety has now become an important concern and most large infrastructure projects have elaborate provisions to ensure that they are resilient to floods and earthquakes. This is a positive development and should help to build capacity and demonstrate resilient design. However, there are two major exclusions from these improved design measures.

The first is that private sector clients in particular, and the smaller projects where skills and/or awareness is lacking, will continue to drive lowest-cost design and construction. NESPAK explained to us that clients simply will not pay for the additional work or materials, which presents a major barrier. The regulations do impose requirements on firms to adopt certain practices however these are poorly enforced below the top tier of engineering projects.

Secondly, the poorest and most vulnerable communities that are served by the informal sector are the least likely to be aware of, or adopt, resilient housing designs without considerable education and assistance. The demand for disaster resilient constructions is constrained as most clients are not willing to pay additional sums of money to incorporate risk assessment studies. This was verified by NESPAK who considered incentives or cost reducing innovation as being central to market transformation efforts.

Interconstruct also recalled the construction boom that followed the earthquake of 2005. They described some of the perceptions in the industry, such as that government corruption and inefficiency prevented the sector from sustaining the boom which could have set the trend and design models for earthquake resilient housing. According to the contact, up to 80% of contractors have yet to receive their payments from ERRA and most went out of business. As a result, Interconstruct recognise that resilient construction requires a concerted effort of government and non-government sectors but it is wary of the former's ability in devising a strong policy framework. Furthermore, an ineffective Contractors Association of Pakistan is seen to further prevent collaboration, sector competitiveness and overall sector growth. Artificially high construction costs are perceived to result from supposed collusion within the cement industry. The construction sector is also not considered an 'industry' by the banking sector and no commercial loans are available for contractors.

Table 37: Summary of sector barriers to uptake of private sector action on resilience

Barrier group	*Barrier example*	*Construction Sector* ○ Minor barrier ● Major barrier ● Key Barrier	*Description/ Local example*
Risk management capability and maturity	Lack of internal buy-in / leadership	●	Observed in both smaller companies and, more importantly, clients.
	Low risk awareness	○	Awareness is generally high at all levels however clients are not always acting on the information they have.
	Challenges of decision making under uncertainty	●	This barrier exerts its influence when a design does not know what scale of hazard to prepare for. Climate change is requiring designers to think again in coastal and flood prone areas for example.
	Limited sharing of good practice and lessons learned	○	True, but this is more a skills issue as guidelines and standards are available.

	from other business approaches		
	Limited tools available e.g. risk assessment, scenario and opportunity evaluation tools	●	There is very little adoption of tools in the market beyond the biggest consultancies (e.g. NESPAK).
Technical	Lack of knowledge, capacity and skills in workforce	●	Specialist skills are only available in some parts of the market.
	Poor communication of useable risk information	○	Designers and contractors still do not feel that they have access to appropriate information.
	Lack of access to technology	○	Technologies are available but have not penetrated the markets due to price and other factors.
	Lack of demonstration projects	○	There are demonstration projects in housing and infrastructure but the costs are a major issue.
	Lack of knowledge sharing / collaboration platforms	○	Not referenced specifically but criticism of the Contractors Association suggests that this could be improved.
	Weak sector and value chain partnerships	●	The main issue here is the flow down of demand for resilience measures from client to designer to contractor.
	Lack of access to early stage capital (risk finance)	-	Not referenced.
Financial	Technology risk	○	Only likely to be an issue in the form of trust that an engineered solution will be superior in order to justify the additional cost.
	Access to credit	○	Referenced by smaller contractors.
	Technology cost gaps	●	Major issue cited by all construction firms.
	Lack of access to insurance	-	Not referenced.
	Lack of incentives	●	Major issue cited by all construction firms.
Local enabling environment	Inadequate policy, regulatory and legal environment	●	The enforcement of new structural design regulations is systemically poor.
	Domestic infrastructure constraints	○	There are some limited constraints of high grade materials e.g. aggregates that are expensive to transport to the right places and are therefore substituted with lower quality alternatives.
	Market and financial sector risks/capacity	○	A general issue for the sector rather than one linked to resilience.
	Local political, governance and security risks	○	These risks are understood do not have a material impact at project level. The reputation of Pakistani firms operating internationally is affected by this however.

Potential public intervention opportunities for construction

There is a considerable need and demand for risk reducing design, technology adoption and supporting products and services. However the needs are just as great in the enabling environment. Despite high levels of risk awareness, Pakistan's construction sector does not have the skills, knowledge and financial appetite to adopt new practices.

Table 38: Public finance interventions required to support to Pakistan's construction sector

Opportunity	*Interventions*	*Implementation options*
Support technological innovation: Stimulate private sector innovation of low cost resilience products.	• Establish a design competition to discover resilient designs for very low cost materials, housing and other building types for specific regions of Pakistan (e.g. mass produced prefabricated buildings). Multiple unit housing in high density areas can suffer from a higher incidence of social and wellbeing issues; new designs should also consider innovative ways of using/designing communal space to	• Set up a new innovation challenge fund to tackle this and other resilience issues in Pakistan. • Run the competition through the NDMA.

	mitigate this. • Support technology demonstration sites to improve investor confidence in new techniques. • Support outreach to developed markets (e.g. Japan) to support technology transfer.	
Stimulate market demand: Offer financial or other incentives to support increased client commitment to specifying resilience structures and projects.	• Develop a lifecycle business case for resilient building design. • Address market failures through forms of guarantee, market subsidy or price guarantee for resilient products or designs. • Offer a 'free' resilience design review to commissioning clients to outline the risks and opportunities of an enduring project design. • Facilitate the development of a form of independent certification to approve certain designs as 'safe'.	• Likely to be implemented through an independent programme, in conjunction with an industry association or through NDMA or EERA.
Risk information: Improve quality of and access to data on major hazard types.	• Fund the design and hosting of a risk information portal containing all information pertaining to natural hazards and climate change impacts in Pakistan. • Create provincial communication channels with appropriate formats of simplified data (e.g. printed) to inform local building trades.	• Integrate support to existing World Bank project to conduct a national risk assessment. • NDMA or provincial satellites likely to be the appropriate host.
Sector skills and capacity: Build sector capacity in risk assessment and resilient design.	• Targeted training of service providers on hazard awareness and design responses. • Improve public sector skill base within building control authorities. • Raise awareness of the financial and legal consequences of inaction and poor design by private sector clients.	• Increase resources of construction sector associations in setting up specific programme on resilient design. • Build the existing training capacity of the EERA or NDMA to increase outreach programmes.
Enhance regulatory capacity: Support the needs of government to more effectively engage with and regulate the private sector.	• Support the revision of regional multi hazard/ climate change resilient design codes for Pakistan. A major overhaul would coordinate the synthesis all national and regional codes. • Financially support private sector led accredited inspection and validation of building and infrastructure design and completion. • Review forms of market incentives available and test economic feasibility of implementation.	• Build on existing standards and codes that exist at national and regional levels. • Financially support regulatory expansion through the private sector.
Support improved sector collaboration: The sector has appetite to work together more effectively to driver a private sector led solutions.	• Establish forms of partnership programme of collaboration platforms with sector associations. • Use these platforms to bring value chain linkages together from other industries. • Offer finance support to industry led collaborations.	• Work directly through existing industry associations. • Encourage new associations through a new challenge fund structure.

4.4 FOCUS SECTOR: Insurance

Public finance opportunity: Weather and catastrophe risk insurance

There was a strong willingness amongst the insurance cohort to collaborate with the public sector. The participants felt that donor agencies would probably need to step in to provide support for newly designed innovative insurance products such as small ticket (low premium) products until such a time when the market for these products is mature enough to sustain itself. Industry felt that donors could engage other insurance companies from abroad to come in with their experience from other parts of the world and start a

learning and capacity building process. Some of the barriers to the insurance sector that were identified included:

1. Awareness: The insurance industry does not enjoy a very high penetration rate (0.7% compared to 1.2% in Bangladesh, 2.5% in Malaysia and 4.5% in India). One of the workshop participants pointed out that only 1% of the damages caused by the floods of 2010 were claimed from the insurance sector. This represents a weakness but also an opportunity. The participants proposed the following solutions:

i. The learning and marketing needs to come from within the industry but an independent entity could come and help by sharing its experience.
ii. A part of the Federal Insurance Fee which is an annual supervision fee paid by the insurance companies to the government should be spent on creating awareness.
iii. The industry should concentrate on low cost advertising such as local radios as a cheap and effective means of creating awareness.

2. Regulatory framework: The insurance sector feels that the regulatory frameworks, including the regulators themselves, are not providing a strong and level playing field to the industry. As a solution, participants agreed that an appropriate regulatory framework provided by a strong independent regulator was needed for the industry to flourish. They also suggested that the insurance sector was over-capitalised at present.

3. Affordability: Insurance is not currently an affordable product for all in Pakistan, hence the low penetration rate. The industry cohort suggested the need to support innovative small ticket products. The government should be encouraged to provide a subsidy for a certain period of time until the products become self-sustaining.

A case for action in the Pakistan catastrophe risk and/or microinsurance market?

Access to global (re)insurance and capital markets is fundamental to developing sustainable weather risk insurance instruments. In low-to-middle income countries, domestic insurance companies often lack the financial resources needed to withstand the large economic losses triggered by adverse weather events, limiting the supply of weather risk insurance. External financing through reinsurers and other financial institutions such as investment banks and hedge funds is therefore critical for a solvent insurance industry where risks can be shared and diversified through these international markets. Many also often lack experience in the design and underwriting of weather risk insurance products, particularly those of the innovative variety. In addition to the critical role of underwriting the risk, international (re)insurers significantly contribute to providing technical expertise and knowledge transfer on product structuring, pricing and data analysis.

In Pakistan, the natural hazards that will drive insurance uptake are earthquake, flood and drought, all of which are relevant across most geographical regions. These products could be offered across a variety of scales (e.g. national, sub-national and local) and to a range of policy holders (e.g. commercial, retail and micro products). Increasing scale offers the potential to achieve economies of scale and diversify risks. Partnerships could be based on for example, delivering traditional weather related catastrophe risk insurance coverage, or implementing more innovative products and schemes including weather index-insurance and weather derivative products.

However, entering a new market requires significant investment by these companies. Mutually supportive international PPP can unlock local market opportunities. Donors can help to coordinate and catalyse international (re)insurance market entry through assisting dialogue between international and local partners, supplying initial funding to contribute to start-up costs, offering equity capital or mezzanine debt, providing technical cooperation and sharing knowledge of local markets.

It is clear from the consultations with industry that DFID (potentially with other donors) may need to help reduce the costs associated with being the first mover on these issues. In our consultations, a leading global reinsurer stressed the need for having pre-requisite market information before being able to enter new markets. Specifically, demand assessments would need to be conducted in order for them to move focus away from more developed markets that have constant demand for their services.

By aggregating risks into a single pool or facility, local insurers can approach the international reinsurance market with a larger, more diversified portfolio which should serve to reduce transaction costs and lower reinsurance prices. A facility of this nature would be able to contribute to regional risk management efforts as well as make rapid payouts in the case of extreme events. Such institutional models can be designed to have transparent governance structures, allow private sector engagement, and can serve as conduits for international climate finance spend (adaptation and/or loss and damage).

Both weather and catastrophe risk insurance would require some form of local and international partnership to access new skills, resources, finance and innovation. This approach could take the form of a direct partnership between DFID, other participating donors, local NGOs (e.g. PPAF), an international firm (e.g. insurer, reinsurer, broker) and local (re)insurance provider. The latter would enable the international actor to effectively access the local market premium growth potential while the local actor can build confidence in the local market through a financial incentive (i.e. initially a seeding commission and over time a larger share of the risk) and support in developing a new line of business competence (e.g. promoting improved technical resources for risk data and modelling, underwriting practices, product design, loss adjustments). The experience and expertise gained through these partnerships also helps to bring trust to the market that is seemingly lacking within the industry.

Could there be an opportunity to lead the transformation of the Pakistani market by combining existing efforts with international expertise and insurance capability to scale up microinsurance efforts or support the establishment of a national catastrophe risk pool?

A first step would be to determine appropriate candidates and alliances for a public-private partnership. DFID could utilise some or all of the following partnerships arrangements:

A. *International primary insurers*: this could be either directly or through facilitating partnerships between international insurers and domestic primary insurers to provide the necessary financial capacity, skills and technical expertise to underwrite weather risks whilst keeping capital costs down. A clear entry route to supporting such a partnership would be to focus on the domestic insurers. The partnership would need to be at significant scale in order to cover transactional costs on both sides, and could take the form of the local insurer initially taking a seeding commission whilst the international firm underwrites 100% of the risk. Over time as the local insurer develops technical and market confidence, the local insurer would begin to underwrite an increasing proportion of the risk, accruing more of the premium growth.

B. *International brokers (e.g. Willis Re, JLT Re, Aon Benfield, Guy Carpenter)*: Brokers play a role of 'market makers' and may therefore be the most important early stage partnership for DFID. One or more brokers could complement the above partnership arrangements as not only do international brokers have the on-the-ground market knowledge and contacts but they also have relationships with the international (re)insurance community. A DFID/broker partnership would help to provide the best match and an effective relationship that is fit-for-purpose. Our discussions with international brokers show that there is appetite for such an arrangement with minimal financial outlay from DFID.

C. *International reinsurers (e.g. Swiss Re, Munich Re, Berkshire Hathaway, Hannover Re, SCOR Re, Lloyd's):* Reinsurers will enter the market once the demand for reinsurance has been established from the domestic market, which should be satisfied by the previous recommendation to strengthen domestic markets. Reinsurers can also potentially help interested domestic providers to structure products that are effective, fit-for-purpose and accessible to the market, which indirectly helps to grow demand for reinsurance. In the case of agricultural insurance, reinsurers such as Munich Re and Swiss Re have been looking at technologies that permit weather monitoring to facilitate risk assessments and the creation of weather/crop derivatives and thus could bring valuable know-how to bear.

D. *International catastrophe risk modelling firms (RMS, AIR, EQUECAT)*: Partnership with one or more catastrophe risk modelling firms could complement the above partnership arrangements as these firms bring the technical expertise required to develop the risk models that underpin the ability to underwrite weather risks and enable innovative product design. It is likely that the (re)insurer would bring in these skills as needed, but in instances where risk data for a given peril/region is a key market barrier to entry (e.g. crop risks), a direct partnership with a catastrophe risk modelling firm based on technical cooperation could un-lock this start-up barrier without giving preference to a single reinsurance provider. This is an approach the MDBs have followed in emerging economies (e.g. India, Philippines,

Chile). The model can be made available to the local government, and used for wider risk management decision-making, in addition to informing insurance coverage.

E. *Local provider:* With some or all of the partnership approaches, there would ideally be a local partner involved to incorporate local market knowledge and build market capacity. Access to a diversified portfolio of risks will support the establishment of a functioning market. The form of partnership should therefore be assessed and designed to access variety of scales depending on the local provider's reach (e.g. regional, national, sub-national). Increasing scale offers the potential to achieve economies of scale and diversify risks.

A **next step for DFID would be to formulate a process to engage with the local industry** contacts made through this work, and then potential international (re)insurance partners. **A business case and feasibility study** would also be required to determine the scope, structure and objectives of the initiative; plus an outline **design for a national insurance support facility** to support the necessary activities. A support facility could operate over a multi-year time bound period and provide continued engagement, monitoring and evaluation, knowledge dissemination and stakeholder outreach. This activity would build on current efforts by the World Bank on national disaster risk financing, and also support and link these efforts to existing initiatives that are in need to further stage support such as PPAF's micro crop and livestock insurance programmes.

Case Study: Pakistan Poverty Alleviation Fund (PPAF) – Microinsurance

As a form of National Development Bank, PPAF acts as an Apex fund that houses a private sector development department. The role of PPAF is to act as a wholesaler and intermediary of funds, while its partner organisations (NGOs and microfinance institutions) perform retailing functions of loaning funds and implementation of projects on the ground. On a cumulative basis it has disbursed USD 348 million for credit, USD 75 million for community infrastructure schemes and USD 34 million for capacity building. It has developed itself as a professional and highly credible institution with a strong and efficient corporate culture.

- 60% of its microfinance portfolio is for the agricultural sector including crops and dairy products.
- PPAF has 50% of the total share of microfinance services in Pakistan.
- In the microinsurance field, PPAF has two ongoing projects: a) Index crop insurance (based on rainfall – weather index), b) Hybrid Index Livestock insurance (payoffs linked to weight of animal + death).
- Both these projects have been piloted in the Khushab and Chakwal districts of Pakistan.
- The involvement of the SECP (Securities and Exchange Commission of Pakistan – which works as the insurance market regulator in Pakistan) has been instrumental in increasing awareness and benefits of microinsurance.
- PPAF claimed to play an instrumental role in bringing about the massive increase in popularising insurance services in Pakistan – from a total of 60,000 customers in 2000 to 2.5 million customers in 2013.

4.5 Islamabad / Rawalpindi workshop participants list

Table 39: Pakistan workshop participants list

	Name	Designation	Organisation
1	Fahd Khawaja	Business Head	ENGRO Fertilisers
2	Julia Jandl	Country Technical Advisor	ACTED
3	Bilal Sherpao	T.L Public Private Partnership	International Relief and Development (IRD)
4	Crosby Fish	Partnerships Advisor	SSG Advisors
5	Nadeem Sajjad	Advisor Sales	ENGRO Fertilisers
6	Adeel Anwer	Group Brands Manager	ENGRO Fertilisers
7	Mehreen Khalid	Senior Management Executive	Pakistan Poverty Alleviation Fund (PPAF)
8	Syed Amjad Huassain	Head CDM cell	Ministry of Climate Change
9	Nazish Iqbal	NAMA Officer	Ministry of Climate Change
10	Madeeha Ahsan	Junior Executive	Fauji Fertiliser
11	M. Jamaluddin	Insurance Consultant	East West Insurance
12	Muhammad Abid	Senior Manager	Pakistan Poverty Alleviation Fund (PPAF)
13	Dr Munir Zia	R&D Coordinator	Fauji Fertiliser
14	M. Faheem Afzal	Conservation officer	EFU Insurance
15	Nasreen Rashid	Insurance Consultant	N/A
16	Riyyan Satti	Associate	Fauji Fertiliser
17	Ahsan Javed	NAMA Coordinator	Ministry of Climate Change
18	Mazhar Hayat	Section Officer (CC)	Ministry of Climate Change
19	Azhar Qureshi	ED	ECI
20	Nasar Quershi	CEO	Alfalah Insurance
21	Dr Muhammad Rizwan	Senior Engineer	National Engineering Services Pakistan (NESPAK)
22	M. Amir Sohail	Head of Geohazards	National Engineering Services Pakistan (NESPAK)
23	M. Asghar	Regional Business Coordinator	Small and Medium Enterprises Development Authority (SMEDA)
24	Zubia Batool	Programme Officer	Department for International Development (DFID)
25	Usman Faisal	Senior Management Executive	Pakistan Poverty Alleviation Fund (PPAF)
26	Sharmeen Sarfraz	Director	Agroventures
27	Rubab Khan	CDM Expert	Ministry of Climate Change
28	Zahra Khalid	Social Analyst	Pakistan MicroFinance Network

29	Moazzam Iqbal	Tech Analyst	Pakistan MicroFinance Network
30	Tahir Sultan	RH	EFU Insurance
31	M. Idrees Mahsud	Member (DRR)	National Disaster Management Authority (NDMA)
32	Brig Sajid Naeem	Member (OPS)	National Disaster Management Authority (NDMA)
33	Dr Shahid Zia	CEO	Lok Sanjh Foundation
34	Irfan Ali	DD	Pakistan Agricultural Research Council (PARC)
35	Rooh-ul-Amin	Officer	ActionAid
36	Ali Tauqeer Sheikh	Chief Executive Officer	LEAD Pakistan
37	Hina Lotia	Director Programmes	LEAD Pakistan
38	Dina Khan	Sub-Regional Coordinator Asia	Climate and Development Knowledge Network (CDKN)
39	Muhammad Rizwan	Manager M&E	LEAD Pakistan
40	Arif Rahman	Coordinator Climate Change	LEAD Pakistan
41	Sana Shahid	Associate Coordinator	LEAD Pakistan
42	Unknown x2	Unknown	NESPAK construction

Appendices

Appendix A: Definitions

The following definitions relating to climate change adaptation and disaster risk reduction intend to provide clarity and consistency throughout this report. The definitions set out in Table 1 below have been taken or slightly amended from definitions in reports developed by hundreds of climate change specialists from around the world. The definitions below are primarily compiled from:

- IPCC (2012) Managing the risks of extreme events and disasters to advance climate change adaptation
- UNEP (2008) Public Finance Mechanisms to Mobilize Investment in Climate Change Mitigation
- http://www.unisdr.org/we/inform/terminology

Table 1: Definitions of key climate change and disaster related definitions:

Term	*Definition*
Capacity	The combination of all the strengths, attributes, and resources available within a community, society, or organization that can be used to achieve agreed goals. Capacity may include infrastructure and physical means, institutions, societal coping abilities, as well as human knowledge, skills and collective attributes such as social relationships, leadership and management.
Climate change	A change in the state of the climate that can be identified (e.g. by using statistical tests) by changes in the mean and/or variability of its properties and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings, or to persistent anthropogenic changes in the composition of the atmosphere or land use.
Climate change adaptation (CCA)	The process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities.
Disaster	The potential losses, in lives, health, status, livelihoods, assets, and services, which could occur to a particular community or society over some specific future time period.
Disaster risk	The likelihood over a specified time period of severe alterations in the normal functioning of a community or a society due to hazardous physical events interacting with vulnerable social conditions, leading to widespread adverse human, material, economic, or environmental effects that require immediate emergency response to satisfy critical human needs and that may require external support for recovery.
Disaster Risk Management (DRM)	Processes for designing, implementing, and evaluating strategies, policies, and measures to improve the understanding of disaster risk, foster disaster risk reduction and transfer, and promote continuous improvement in disaster preparedness, response, and recovery practices, with the explicit purpose of increasing human security, well-being, quality of life, resilience, and sustainable development.
Disaster Risk Reduction (DRR)	The concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events.

Exposure	The presence of people, livelihoods, environmental services and resources, infrastructure, or economic, social, or cultural assets in place that could be adversely affected by the impacts of climate change or disasters.
Hazard	A dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage.
Primary intervention	Direct responses to climate change or natural hazard drivers focused at reducing risk levels.
Public finance instrument (PFI)	A financial tool used to deliver private sector support to recipients. These instruments include equity or debt finance, risk guarantees, price support and tradable units.
Public finance mechanism (PFM)	An entity, vehicle, structure, fund or facility through which public sector finance aims to mobilise and scale up the level of private sector investment or engagement in a market, in response to a market failure or public need. There are various types of public finance mechanisms including challenge funds, pledge funds, fund of funds, budget support, public-private partnerships, impact investment fund, and venture capital public-private partnerships.
Resilience	The ability of a system and its component parts to anticipate, absorb, accommodate, or recover from the effects of a hazardous event or the impacts of climate change in a timely and efficient manner.
Risk assessment	A methodology to determine the nature and extent of risk by analysing potential hazards and evaluating existing conditions of vulnerability that together could potentially harm exposed people, property, services, livelihoods and the environment on which they depend.
Risk transfer	The process of formally or informally shifting the financial consequences of particular risks from one party to another whereby a household, community, enterprise or state authority will obtain resources from the other party after a disaster occurs, in exchange for ongoing or compensatory social or financial benefits provided to that other party.
Secondary intervention	Indirect responses to climate change or natural hazard drivers that leverage wider development or growth objectives to improve or augment an existing project, organisation, geography or system.
Transformation	The altering of fundamental attributes of a system (including value systems; regulatory, legislative, or bureaucratic regimes; financial institutions; and technological or biological systems).
Vulnerability	The propensity or predisposition to be adversely affected, i.e. the characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard or impact of climate change. There are many aspects of vulnerability, arising from various physical, social, economic, and environmental factors. Examples may include poor design and construction of buildings, inadequate protection of assets, lack of public information and awareness, limited official recognition of risks and preparedness measures, and disregard for wise environmental management.

Table 2: Definitions of key business terms:

Term	*Definition*
Microenterprise (ME)	The smallest type of enterprise in which the employee headcount and turnover often fall below certain limits. Such limits may vary significantly across countries (e.g. developed countries versus developing countries). In a microenterprise the owner is likely to also be the manager. In developing countries, microenterprises often fall within the informal sector.
Multinational Company (MNC)	A private or shareholder owned entity that is registered in, produces and sells products and services in, and has assets in at least one country (but often several countries) in addition to its home country.
National company (NC)	A company that is registered in, holds assets in, and produces and sells products from its country of registration.
Small and Medium-sized Enterprise (SME)	An enterprise in which the number of employees and either turnover or balance sheet total fall below certain limits. Such limits may vary significantly across countries (e.g. developed countries versus developing countries).
Supply chain	The network created amongst different companies producing, handling and/or distributing a specific product. Specifically, the supply chain encompasses the steps it takes to get a good or service from the supplier to the customer.
Value chain	A high-level model of how businesses receive raw materials as input, add value to the raw materials through various processes, and sell finished products to customers.

Appendix B: Theory of change

Impact	**Poor people in developing countries are more resilient to climate change and extreme events, and through this are able to realise additional poverty reduction benefits.**			
Out-comes	The private sector's engagement and investment in disaster risk management and climate change resilience activities, supports the implementation of risk reduction at scale to the benefit of vulnerable people in poor countries.			
Outputs	**Enabling Environment:** 1) Improved policy and regulatory environment for private sector investment and engagement in DRR and CCA. 2) Greater availability of and access to information, data, and capacity for private sector.	**Funding:** Improved financial architecture for public and private investment at local, national, and international levels.	**Collaboration and Partnerships:** Increased willingness and ability to form intra-sector and cross-sector partnerships for private sector investment and engagement in DRR and CCA.	**Pipeline Projects:** Availability of potential pilot projects and programmes that can help stimulate investment and engagement in DRR and CCA.
Activities	• Support the design and mandate of the GCF as it relates to the private sector's role in DRR and CCA. • Support the raised profile of Hyogo Framework so it is effective for CCA in addition to DRR. • Leverage activities / resources of PCG. • Knowledge transfer to the private sector on DRR and CCA. • M&E for DRR and CCA projects disseminated to private sector in engaging language and format. • Targeted training and coaching for local businesses and their staff. • Build capacity at the public sector level, and develop targets (e.g. timeframes, focus areas) to better incorporate CCA and DRR into national and sector plans. • Develop new PFMs that are suitable for the local context. • Identify and enhance existing knowledge hubs and resources (e.g. best practices, key stakeholders, technical information) related to CCA and DRR that can be offered to the private sector through appropriate public sector mechanisms.	• Leverage in greater private finance to existing DRR and CCA related programmes (e.g. CDKN). • Resilience building and climate proofing of existing and new PSD projects and programmes. • Improve the effectiveness of MDB channels for delivery of private finance. • Develop and administer innovative financial mechanisms to scale up DRR and CCA for different types of companies (e.g. SMEs, national companies, corporates). • Identify and build awareness around successful financing arrangements. • Identify and leverage appropriate funding partners (e.g. national banks, rural banks, microfinance institutions).	• Support the development of further partnership, mentoring, and collaboration formats (e.g. B2B, PPP). • Build capacity and invest in new partners especially in priority sectors. • Identify and implement channels through which there can be increased cross-sector dialogue on CCA and DRR. • Disseminate information on successful cross-sector partnerships for development and for CCA and DRR. • Develop incentives for greater intra-sector and cross-sector collaboration.	• Increase the proportion of private sector involvement in DRR and CA projects and programmes through access to pipeline projects. • Identify and prioritise a pipeline of projects that could be targeted through PFMs. • Raise awareness among the private sector around pipeline projects, resources needed to implement the projects, and incentives for businesses to become involved.
Inputs	Funding	Skills & Knowledge	Capacity	

	Description	Underlying Assumptions
Problem	Poor people in developing countries will become increasingly vulnerable to the effects of climate change.	
Impact	Poor people in developing countries are more resilient to climate change and extreme events, and through this are able to realise additional poverty reduction benefits.	• Vulnerable people adapt to new ways of working and new programmes initiated by businesses that help build their capacity and resilience to climate change and disaster risks • The public and development sectors continues to support and facilitate connections between businesses and vulnerable people where needed. • The public sector continues to develop the enabling environment so that the information, policies, and infrastructure necessary to keep the private sector engaged in CCA and DRR remains supportive. • The private sector's thinking and approach to CCA and DRR continues to mature so that such measures are incorporated to reduce risk to their businesses *and* seize new opportunities.
Outcomes	The private sector's engagement and investment in disaster risk management and climate change resilience activities, supports the implementation of risk reduction at scale to the benefit of vulnerable people in poor countries.	• Barriers to private sector engagement and investment in DRR and CCA exist and must be overcome in order for increased business participation. • There is increased willingness within the private sector (and management buy-in) to understand the risks, impacts, and actions required to increase resilience. • Businesses begin to streamline climate and disaster risk planning into their normal risk management planning and processes. • Private sector players actively seek opportunities provided through improved enabling environment, access to funding, partnerships, and potential projects. • New private sector or cross-sector partnerships are effectively formed. • Private sector finance, knowledge, and delivery capacity is mobilised. • Public sector mechanisms to encourage the private sector engagement and investment in CCA and DRR continue to actively aim to break-down barriers for the private sector. • Public sector mechanisms are continuously monitored and evaluated to ensure that they are specifically meeting the needs of the private sector in the local context. • Capacity and knowledge building in key sectors is underway. • Governance mechanisms have been developed in country and locally to deliver help facilitate business engagement in CCA and DRM.

Appendix C: List of documents used in literature review

- AccountAbility (2009) **The business of adaptation - briefing paper**
- Centre for Strategic & International Studies (2012) **Corporate Engagement in natural disaster response - piecing together the value chain**
- Climate Works Foundation (2009) **Project Catalyst - adaptation to climate change - potential costs and choices for a global agreement**
- CTI Private Financing Advisory Network (2012) **Background paper on adaptation - exec summary**
- DFID (2011) **Defining disaster resilience, DFID approach paper**
- EC (2006) **Linking climate change adaptation and DRM for sustainable poverty reduction**
- GTZ (2002) **Disaster risk management - working concept**
- IDS (2010) **Climate Smart Disaster Risk Management brief**
- IFC (2010) **Climate risk and financial institutions - challenges and opportunities**
- International Business Leaders Forum (2012) **The business of adapting to climate change a call to action**
- IPCC (2012) **Managing the risks of extreme events and disasters to advance climate change adaptation** IPCC (2009) **Mainstreaming Disaster Risk Reduction into Development: Challenges and Experience in the Philippines**
- KPMG (2012) **Climate change adaptation in the private sector**
- NRT (2012) **Climate Prosperity - A Canadian initiative**
- OECD (2011) **Private sector engagement in adaptation to climate change**
- Oxfam (2009) **The new adaptation marketplace - climate change and opportunities for green economic growth**
- Oxfam PREP (2012) **Value Chain Climate Resilience - a guide to managing climate impacts in companies and communities**
- Pew Centre (2008) **Adapting to climate change - a business approach**
- Stockholm Environment Institute (2011) **Institutionalising climate adaptation finance under the UNFCCC and beyond - could an adaptation market emerge**
- Stockholm Environment Institute (2009) **Private sector finance and climate change adaptation**
- SwissRe (2011) **Closing the financial gap - New partnerships between the public and private sector to finance disaster risk**
- UNEP (2011) **Business and climate change adaptation, towards resilient communities and companies**
- UNEP/SBI (2010) **Advancing adaptation through climate information services - results of a global survey on the information requirements of the financial sector**
- UNISDR (2008) **Private sector activities in disaster risk reduction - good practice and lessons learned**
- Warhurst (2006) **Disaster prevention - a role for business**
- WEF (2011) **A vision for managing natural disaster risk - proposals for public/private stakeholder solutions**
- WEF (2008) **Building resilience to natural disasters, a framework for private sector engagement**
- World Bank (2010) **Building Resilient Communities: Risk management and response to natural disasters through social funds and community-driven development operations**
- World Bank (2008) **CAT Risk financing in developing countries - principles for public intervention**
- World Bank (2010) **Financial Protection of the State against Natural Disasters**

- World Bank (2011) **Disaster risk financing and insurance business lines**
- World Business Council on Sustainable Development (2008) **Adaptation - an issue brief for business**
- WRI (2012) **Public financing instruments to leverage private capital for climate relevant investment - private capital for climate relevant investment - focus on multilateral agencies**

Appendix D: Consultation notes

Definitions of preparedness

No preparedness – we do not have any understanding of the climate risks we face and exposure to natural hazards is never factored into key decisions, even if we are aware of them.
Low preparedness – we have a basic understanding of the climate risks we face and rudimentary response plans are in place. Exposure to natural hazards is rarely factored into key decisions, even if we are aware of them.
Moderate preparedness – an understanding of climate risks exists and exposure to natural hazards is often factored into key decisions. Reponses are in place, though preparedness may be inconsistent across the organization, or more focused on business continuity than active management.
High preparedness – we have a sophisticated understanding of climate risks across the organization and active plans to manage these and build resilience to natural hazards.

1. Pakistan

1.1 Adamjee Insurance

Consultation notes		
Company information		
Adamjee Insurance *National insurance company*	Abdul Sattar, Risk Management Unit in charge	With a 38 per cent market share, Adamjee leads its competitors in the general insurance (marine, fire, auto and miscellaneous) sector
Impacts of natural hazards on business; response of the firm		
• Heavy flooding in 2010 – many claims had to be disbursed • The insurance sector has to factor in natural disaster impacts in decisions, although much of this is done on policy to policy basis without overall strategic risk management. The company was well prepared due to diverse portfolio and re-insurance already in place • The company has not set itself any further targets related to reducing climate change risks; even though they are currently moderately prepared and would like to be in a position of high preparedness • The board and executive management are responsible for climate risk management (top-down); they use loss history assessment and studies shared by re-insurance companies to assess climate risks.		
Barriers and opportunities		
The main challenges to understanding and managing climate-related risks come from lack of supporting domestic infrastructure (including public utilities, financial and trade infrastructure); and information gaps and lack of access to best practice examples. Not aware of any opportunities.		
The enabling environment: further support required from donors/government		
Local and national government policy is the most important aspect of the enabling environment. Potential incentives include regulatory/fiscal, technical assistance to undertake risk assessment, concessional loans to develop/trial new services, well-defined regulatory framework, and capacity building/training support. Capacity building activities currently take place at the company level but such training could be streamlined through public sector education institutes. Would be willing to engage with NGOs and public sector bodies to support such activities, as well as potentially peer-to-peer and cross-industry collaboration. Mention that NDMA studies on natural disaster risk management are unreliable.		

1.2 Fauji Fertilizer Company Limited (FFC)

Consultation notes
Company information

Fauji Fertilizer Company Limited (FFC) *National fertilizer company*	Mohsin Kadir Khan, Deputy Manager Marketing Coordination	FFC is the largest chemical fertilizer producer in Pakistan with the largest market share in the country (about 60%). The company was listed on the Karachi Stock Exchange in 1991 and has remained in the list of top 25 best performing companies of Pakistan consecutively since 1994.
Impacts of natural hazards on business; response of the firm		
• FFC has been minimally affected by climate change, and has overall low preparedness for other climate risks • The board and executive management are involved in understanding, identification and assessment of climate risks. • The 2010 floods severely impacted the agricultural sector which caused a decline in fertilizer demand. • Revenue fell in the short run but business recovered quickly • Climate change has not been given much thought on the organisational level; operations not considerably impacted by natural hazards • FFC has backup leased, insured storage facilities in case of a sudden fall in demand for product • The company aims to reduce risk and secure operations against impact of climate risks and natural hazards over the next 5 years, although not quantifiably • FFC has set up a 50 mW wind power plant for commercial energy production		
Barriers and opportunities		
FFC has no tools in place to identify or assess climate risks; information gaps are the main barriers. No quantification of risk reduction. It is not aware of any opportunities.		
The enabling environment: further support required from donors/government		
FFC sees trust and reputation as the most important element of the enabling environment; and requires no further public sector support in climate risk management. FFC is already contributing to flood relief activities (51 million PKR), and sees the need for building resilience in flood affected communities. It has already developed a deep engagement with the local farming community.		

1.3 Good Luck Dairies

Consultation notes		
Company information		
Good Luck Dairies *Local milk distributor*	Sheikh Tariq Ellahi, Address: Jan Sher Tower Hotel, Committee Chowk, Rawalpindi Phone: 03008509509	Good Luck Dairies is primarily a milk distributor supplying in the Islamabad/ Rawalpindi area. He supplies to several small and large companies including for example Nestle.
Impacts of natural hazards on business; response of the firm		
• Heavy rainfall in monsoon season affects collection from remote areas • Aware of the hazards and chosen to avoid them by operating in other geographical areas		
Barriers and opportunities		
Barriers include lack of skills and capacity to implement solutions, lack of local insurance or microinsurance, lack of public utilities, and lack of (access to) information to understand exposure to risks. Opportunities: price and sales of product may increase due to overall fall in supply. Improvements in communication and transport infrastructure have had positive impact on operations.		
The enabling environment: further support required from donors/government, reducing risks		
Financial incentives, local and national government policy would help the business better understand risk. Awareness and capacity-building activities are needed for small to medium level dairy farmers; larger companies could help with such trainings.		

1.4 Habib Construction Services

Consultation notes		
Company information		
Habib Construction Services *National engineering and construction company*	Syed Waqar Naqvi, General Manager Procurement	HCS has several large-scale infrastructure projects to its credit, including Lahore Ring Road and Sialkot International Airport
Impacts of natural hazards on business; response of the firm		
• An earthquake in 2005 partially damaged airport construction, but massively raised awareness on the importance of earthquake resilience. • The firm is well aware of natural hazards as most of their projects involve large scale infrastructure vulnerable to flood and earthquake damage. • Flood frequency is increasing so more technical expertise required in future. More technical studies on disaster risks would have helped manage past situations • The company has no objectives relating to reducing climate risks; even though they currently have low preparedness and would like moderate preparedness to climate risks • The firm hires consultants to make designs which incorporate environmental impacts, as specified by terms of reference by clients including foreign donor agencies, Pakistani government. Environment and climate hazards dealt with on a project basis, no assessment of risk at company level.		
Barriers and opportunities		
Barriers come from technology risks (cost gaps and uncertainty from new technology), and market risks (susceptibility to price spikes, labour market), and information gaps. Opportunities include the fact that structural safety has become a more important concern and most infrastructure projects now have elaborate resilience provisions.		
The enabling environment: further support required from donors/government		
Regulatory or fiscal incentives and technical assistance to undertake risk assessment are areas of public sector support that would help the company manage climate risks. This is due to a lack of latest technology to conduct DRM studies and EIAs, and a lack of supportive regulatory mechanism. The firm would be interested in engaging in dialogue with government and non-government sectors and cross-industry collaboration, in search of regulation, improving climate risk management, and subsidised machinery. Suggestion that public-private partnership is only beneficial in economic booms.		

1.5 Hayat Farms

Consultation notes		
Company information		
Hayat Farms *Farm*	Aamer Hayat Bhandara, Director Phone: 0300-5551606	Hayat Farms is an agriculture farm growing crops including cotton and wheat which are supplied to local markets. The dairy farm supplies to MNCs such as Nestle.
Impacts of natural hazards on business; response of the firm		
• High temperatures, rainfall and flooding affect the farms • Farmers have stopped planting crops in exposed areas when there is a chance of flooding; they are much better prepared for floods than droughts • New crop diseases have had devastating effects e.g. the 'milli-bug' disease which devastated cotton 2-3 years ago • Farmers are unaware of climate change • LEAD Pakistan and AusAID have helped Mr Hayat understand agricultural market structure and climate change risks		
Barriers and opportunities		
Barriers to understanding climate risks include lack of capacity and skills to understand risks and implement solutions, lack of local/microinsurance, lack of public utilities, lack of information, lack of access to capital, high costs to understand risks and implement solutions. Mr Hayat stressed the importance of insurance in a sector where output is almost entirely dependent on nature. Not aware of any opportunities from natural hazards.		
The enabling environment: further support required from donors/government		
A 2002 government initiative introduced crop insurance but this was never implemented. Access to insurance,		

better trust/reputation and improved local and national policy would improve understanding of risks. Mr Hayat would be very willing to work with both other small businesses and larger companies to reduce natural hazard impacts. Capacity-building of farmers is of the utmost importance, e.g. fertilizer companies training farmers on enhancing yield. Larger companies have a responsibility to the farmers who supply to them and from whom they are making heavy profits – "they need to give back". The Ministry of Climate Change should set up district level committees to serve as grievance redress mechanisms.

1.6 IGI Insurance Corporation

Consultation notes		
Company information		
IGI insurance corporation *National insurance company*	Haider Ali, Head of under-writing, 021-35368873	Provides general insurance coverage to corporate clients (Nestle, Packages, Engre are some of its major clients)
Impacts of natural hazards on business; response of the firm		
• Their operations and clientele are in urban areas which are not exposed to any large-scale disasters • They are well aware of future natural hazards e.g. re-insurance of insurance, loss limit for mega businesses, exchange rate fluctuations passed on to clients, risk management unit responsible for understanding, identifying and assessing climate risks • No plans to set objectives based on reducing natural hazard risks; they consider themselves to have high preparedness (sophisticated understanding) of climate risks across the organisation • New products and markets being considered (e.g. personal home insurance) but no plans to consider crop and livestock cover		
Barriers and opportunities		
No main challenges or barriers to understanding climate-related risks.		
The enabling environment: further support required from donors/government		
Regulation and taxes are major elements of the enabling environment which affect ability to participate in risk management. No further public sector support required; no experience of government or international support, but would be willing to engage with NGOs for climate risk management. Developing policy frameworks should be done at governmental levels, not interested in engagement by individual insurance providers.		

1.7 Interconstruct

Consultation notes		
Company information		
Interconstruct *Regional construction contractors*	Asad Malik, CEO	Contractors (real estate, physical infrastructure like river bridges)
Impacts of natural hazards on business; response of the firm		
• Flooding damaged construction equipment and a bridge, causing minor impact on operations. • The firm responded with preventative measures such as now tying up equipment and tools on exposed building sites • The owner is a civil engineer and feels well aware of natural hazards and their business risk. • The company has no objectives in reducing climate risks, and feels moderately prepared for the risks • There is no separate team to strategically oversee risk management – the owner relies on his own knowledge and understanding of natural disasters, considering wider impacts in the community		
Barriers and opportunities		
Consultants to devise environmental risk strategy are too expensive for a business of this scale. Wary of governments' ability in devising a strong policy framework for disaster resilience. Contractors association of Pakistan is weak and ineffective. The demand for disaster resilient constructions is quite low as it involves a cost premium. Main challenges: governance risks, regulatory and legal barriers, lack of local capacity and skills lack of risk reduction mechanisms, technology risks, market risks, information gaps, lack of access to capital (no commercial loans available for contractors). Opportunities come from the construction boom following earthquakes and other natural disasters (however, corruption and inefficiency particularly in ERRA prevented the sector from sustaining the boom which could have set the trend for earthquake-resilient housing)		

The enabling environment: further support required from donors/government
Requires stronger and more transparent policy framework supported by all stakeholders (contractors, regulators, clients); improved working relationship between Contractors Association of Pakistan and Pakistan Engineering Council. Public sector support required: regulatory/fiscal incentives, technical assistance to undertake risk assessment, concessional loans to trial new initiatives, well defined regulatory framework, capacity building/training support. Willing to engage with NGOs but not with public sector bodies. Contractors would be able to collaborate in capacity building and climate resilient construction projects.

1.8 Ministry of Climate Change

Consultation notes		
Company information		
Ministry of Climate Change *Government department*	Mr Irfan Tariq, Director General (Env & CC), Ministry of Climate Change, Ph # +92-51-9245528 Cell# +92-300-4202554 Email: mirfantariq@gmail.com	The Ministry of Climate Change is the focal point for National Policy, Legislation, Plans, Strategies and programmes with regard to Disaster Management, Climate Change including Environmental Protection and preservation. The Division also deals with other countries, international Agencies and Forums for coordination, Monitoring and Implementation of Environmental Agreements.
Impacts of natural hazards on business; response of the firm		
• Pakistan's first ever climate change policy was approved in 2012 • The Ministry's adaptation focus has so far been on water treatment and energy issues e.g. a project is underway to convert 100,000 of the 300,000 tube wells in Pakistan to run on solar energy		
Barriers and opportunities		
No mention of any barriers or opportunities to climate risk management		
The enabling environment: further support required from donors/government		
No discussion of the enabling environment		

1.9 National Disaster Management Authority (NDMA)

Consultation notes		
Company information		
National Disaster Management Authority (NDMA) *Government authority*	Muhammad Idrees Mahsud Director, NDMA Tel: +92 51 9210316 Email: idreesmahsud1@gmail.com	NDMA is the lead Federal agency dealing with disaster management activities. In the event of a disaster, all stakeholders, including Government Ministries/Departments/Organizations, Armed Forces, INGOs, NGOs, and UN Agencies work through and from part of the NDMA to conduct one window operation.
Impacts of natural hazards on business; response of the firm		
Not applicable		
Barriers and opportunities		
No barriers or opportunities mentioned		
The enabling environment: further support required from donors/government		
The NDMA-CDKN risk insurance project is engaging the private sector. Several other activities are focusing on improving agriculture and livelihoods. A four year project entitled 'Disaster Preparedness and Response for the Agricultural Sector of Pakistan' is underway with the FAO. Under the 2013 disaster risk management plan, 118 priorities with USD 1 billion required for all activities.		

1.10 National Engineering Services Pakistan (NESPAK)

Consultation notes		
Company information		
National Engineering Services Pakistan (NESPAK) *Semi-governmental construction consultancy company*	Imran Taj General Manager, Disaster Management & Reconstruction Division Tel: +92 51 9245785 Email: imrantaj@nespakerp.com Salman Shahid Principal Engineer, Disaster Management & Reconstruction Division Tel: +92 51 2874018 Email: salman.s@nespakerp.com	NESPAK is a construction consultancy, offering services ranging from conception to completion and operation of development projects. Fields of specialisation include power and mechanical; water and agriculture; architecture and planning; highways, bridges, airports and seaports; environmental and public health engineering; engineering for industry; heating, ventilation and air-conditioning; information technology and geographical information systems (GIS). Main clients: Ministry of Water and Power, some private sector clients.
Impacts of natural hazards on business; response of the firm		
• They carried out the bulk of post-earthquake construction in 2005, and were involved in the design and construction of new Balakot city • They have new and innovative solutions for disaster resilient structures; including guidelines for disaster-proof houses.		
Barriers and opportunities		
No capacity to act in addition to limited awareness; local construction firms do not care enough to introduce these solutions to customers; the technology is expensive to install and people in smaller cities do not have the financial resources to spend on disaster proofing.		
The enabling environment: further support required from donors/government		
Currently working with World Bank and Asian Development Bank funding to complete the construction of 600,000 disaster-proof homes. No further support mentioned.		

1.11 Pakistan Poverty Alleviation Fund (PPAF)

Consultation notes		
Company information		
Pakistan Poverty Alleviation Fund (PPAF) *Nationwide Apex fund for poverty reduction*	Saqib Siddiqui, General Manager, Sector Development Unit Tel: +92 51 2613931 Email: saqib@ppaf.org.pk Mehreen Khalid, Senior Management Executive, Sector Management Tel: +92 51 2613931 Email: mehreen.khalid@ppaf.org.pk Ali Nadeem Qureshi, Sector Management Tel: +92 51 2613931 Email: aliq@ppaf.org.pk	PPAF aims to promote an effective approach to poverty alleviation aligned with the MDGs. Provides financing through grants and/or loans to organisations. Their current strategy identifies priority areas of improving human Development Index, food insecurity, social mobilisation and microfinance-appropriate areas; and work has common themes of social inclusion, gender and the environment.
Impacts of natural hazards on business; response of the firm		
• Has played an instrumental role in increasing insurance services in Pakistan from 60,000 to 2.5 million customers in 13 years		
Barriers and opportunities		
Reluctance of insurance companies to get involved in microinsurance due to high risk requiring re-insurance.		

The enabling environment: further support required from donors/government
PPAF has a good relationship with Securities and Exchange Commission of Pakistan, which increases awareness and benefits of microinsurance. A framework for collaboration between public and private sectors should be developed to encourage coordinated rehabilitation efforts.

1.12 Rajput Traders

Consultation notes		
Company information		
Rajput Traders *Small distributor of seeds*	Pervaiz Ahmad Latifi, Phone: 93 (300) 5358177 Address: W/571, Ratta Road, Near Novalty Cinema, Rawalpindi	Rajput Traders buys maize and wheat seeds from public (Punjab Seed Corporation) as well as private processing units and sells it to farmers in and around Rawalpindi (arid areas).
Impacts of natural hazards on business; response of the firm		
• Floods and heavy rains have some effect on sales but not significant. Clients purchase seeds in advance of the sowing season so natural hazards affect them much more than the distributors • Sowing in arid regions happens earlier than in other areas so if there is lower demand Raiput Traders have an advantage over other distributors		
Barriers and opportunities		
Lack of capacity and skills to understand risks and implement solutions, lack of information required to understand risks. Not aware of any opportunities from climate change.		
The enabling environment: further support required from donors/government		
The business does not require any further help in understanding risk. No history of collaboration and have not considered it due to low impact of natural hazards.		

2. Bangladesh

2.1 ACI Agribusiness

Consultation notes		
Company information		
ACI Agribusiness *National agriculture*	M. Saifullah, Head of Strategy, ACI Agribusiness Unit, Phone: 01730021035, email: saifullah@aci-bd.com	ACI Agribusiness is the largest integrator in Bangladesh in Agriculture, Livestock and Fisheries and deals with Crop Protection, Seed, Fertilizer, Agrimachineries, and Animal Health products. It also has strong partnership with national and international R & D companies, universities and research institutions.
Impacts of natural hazards on business; response of the firm		
• Storms, average temperature increases and heat waves affect the cost of production since ACI has to replace damaged seeds for the farmers; the supply chain is also disrupted. Lack of fresh water affects core business. • Mostly aware of climate hazards e.g. production is located in flood-free areas; trying to develop drought and salinity-resistant seeds; looking into changing cropping patterns • The company aims to reduce its risk exposure by 10-25% in the next 5 years. Currently low preparedness with a desire for moderate preparedness. • The strategy team is responsible for managing climate risks, analysing local geographic information before starting an operation.		
Barriers and opportunities		

The main challenges to managing climate risks come from the regulatory and legal environment. Also the financial environment: ACI has high credit risk as they provide product to the retailers on a credit basis, the rate of default is high. Increased sales of seed and fertilizer and possibility of using new char.[141]
The enabling environment: further support required from donors/government
ACI would like government help to change the national cropping pattern (which crop species are cultivated around storm season), as well as governmental support in training and development. They would like increased crop insurance as currently the company and poor farmers are suffering; and easy access to low cost fund for the farmers. ACI expects more PPPs under the supervision of the Ministry of Agriculture; they would like to work with government to create linkages between laboratory and field (through local governance staff). They would be interested in dialogue on policy frameworks and information sharing.

2.2 AMCL PRAN

Consultation notes		
Company information		
Agricultural Marketing Company Limited PRAN *National level agro processor*	Chief Operating Officer	PRAN is the largest agro food processor and exporter of Bangladesh. They work with farmers to create demand for local products, and give training and financial support to poor farmers.
Impacts of natural hazards on business; response of the firm		
• Erosion, flooding, storms, high temperatures, salinity and drought all affect AMCL PRAN through limiting supply and quality of raw materials and increasing costs. They minimised damage by introducing different crop varieties and crop rotation systems, and in some areas have built dams and fences to protect agricultural land • The company aims to reduce its risk exposure by more than 25% in the next 5 years, currently with low preparedness but aiming for moderate. • Regional sales and distribution teams are involved in understanding and assessing climate risks. They choose geographical location based on natural disaster/climate change exposure.		
Barriers and opportunities		
The main challenges to climate risk management are governance risks, lack of local capacity, market risks, lack of supporting domestic infrastructure, and information gaps. Other barriers include: climate risk not included in core policy, not enough funding, and lack of partnerships. Opportunities come from higher production for some crops, e.g. chilli which grows well after flood.		
The enabling environment: further support required from donors/government		
They are very open to support form external entities (government, donors, NGOs) around information sharing and collaboration, as well as public risk guarantees or insurance and technical assistance on new projects. The most important elements of the enabling environment are trust, regulations, local and national government policy, and information sharing. They have some experience working with Oxfam. The main aim is to improve company preparedness by helping the poor farmers become better prepared, especially in char areas.		

2.3 Asha Sweaters

Consultation notes		
Company information		
Asha Sweaters (Pvt.) Limited *National ready-made garments (RMG)*	Ashib Hussain, Head of merchandising, phone: 01930-806745	Asha Sweaters is export-oriented. It employs over 600 members of staff and is based in Gazipur industrial zone.
Impacts of natural hazards on business; response of the firm		
• Flooding, storms and lengthy rainy seasons affect core business, supply chain and people; although they do not feel particularly exposed to disaster and/or climate change. They have alternative power supplies and pay more to employees if they wanted to leave. • The company has not set any objectives related to reducing climate risks. They are at low preparedness		

[141] Char are tiny islands in the major rivers which appear after extreme events like river erosion through flooding. Watermelon grows well in char areas

and do not feel they need to change this: increasing preparedness might be too expensive at this point in time. • Operational/regional teams are responsible for risk management. Their main tool is TV weather forecast.
Barriers and opportunities
The main barriers to climate risk management come from governance risks, the financial environment, lack of capacity and skills, lack of supporting domestic infrastructure, and lack of access to capital. Within the organisation they lack technical employees to understand risk; beyond the organisation the main thing lacking is collaboration. As a profit-making company they have no interest in spending money to understand DRR and CCA risk. Opportunities – during the dry season they get workers at low cost since they have less alternative employment.
The enabling environment: further support required from donors/government
Government and NGOs should provide all the funding (direct investment) for the learning process around understanding climate risk. Asha Sweaters feel financial incentives, local/national government policy, and regulations are the most important elements of the enabling environment. They would be interested in engaging in policy dialogues but only if they are not 'bogged down' with work.

2.4 Bombay Sweets

Consultation notes		
Company information		
Bombay Sweets Ltd. *National agro conglomerate*	D D Ghosal, Head of marketing, email: debighosal@yahoo.com, Phone: 01713013022	Bombay Sweets, one of the largest agro conglomerates and packages food producers in Bangladesh, started its journey back in 1948 and became mechanized in 1986.
Impacts of natural hazards on business; response of the firm		
• Direct sourcing of raw materials has made the company more vulnerable to climate risks, especially due to variability in crop timings and quality of crop due to other weather-related factors. The firm responds by offering assistance to farmers and buying crops before the harvest to give farmers assurance on sales. They also geographically select locations based on risk exposure. • The firm feels mostly prepared for the risks and they were able to minimise damage to the farmers; they have no objectives to reduce risks over the next 5 years. • They use no specific tools to assess climate risks, but they have on occasion brought consultants from abroad for advice on specific crop species.		
Barriers and opportunities		
The main challenges seem to be around trust and public/farmer support for external collaboration. One opportunity provided by flooding is when silt is carried by the flood and increases fertility of the land.		
The enabling environment: further support required from donors/government		
The most important element of the enabling environment would be free technical support and foreign consultants working in the field. The firm is sceptical about public sector support, which in their view is not sustainable. They have worked with Katalyst and BADC, although concern was raised about public trust in these schemes. Knowledge sharing is important but is expensive and time-consuming, and secrets are guarded closely.		

2.5 DBL Group

Consultation notes		
Company information		
DBL Group *National textiles company*	Md. Arifur Rahman, Executive, Environmental Management System, phone no. 01730701634, email: arifems@dbl-group.com	DBL Group is a diversified and integrated knit garments manufacturing & composite industry with strong backward linkage. The group started its business in 1991 and currently has facilities for spinning, fabric knitting, dyeing and finishing, garments, washing, packaging and

		printing.
Impacts of natural hazards on business; response of the firm		
• High temperature affects factory workers; heavy rains/storms affect raw material shipments and deliveries. DBL provides water to employees during summer, and has detailed emergency training and response plans in place. • The company has not set itself any objectives to reduce climate risks; they currently feel at moderate preparedness. • The board and executive management, operational teams, and specific environment and safety team are responsible for managing climate risks.		
Barriers and opportunities		
The main barriers come from the regulatory and legal environment, lack of capacity and skills, lack of risk reduction mechanisms, technology risks, information gaps, and the natural environment. Government agencies do not regulate properly; most of the workers are illiterate; local insurance companies will not cover employee accidents; and the workers have insufficient training. They see no opportunities presented from climate change.		
The enabling environment: further support required from donors/government		
The most important aspects of the enabling environment are business costs/benefits, trust, reputation, government policy and access to insurance. They would require further technical assistance, concessional loans to trial new initiatives, well defined policy frameworks, and training support from the public sector. They are interested in policy dialogue relating to preparing emergency response/mitigation plans for natural hazards. DBL currently collaborates with NGOs and third party contractors and suppliers, and would be interested in engaging with governments, investors, community groups and customers/clients.		

2.6 Green Delta Insurance

Consultation notes		
Company information		
Green Delta Insurance Co. Ltd *National insurance company*	Shubasish Barua, Vice president, Cell no: 01713-129355, email ID- sbarua@green-delta.com	Green Delta Insurance Company Limited (GDIC) is one of the leading private non-life insurance companies in Bangladesh. GDIC was incorporated in December 14, 1985.
Impacts of natural hazards on business; response of the firm		
• Flooding and fire incidence has increased and therefore it is becoming more difficult for the insurance premiums to cover company costs. The company adjusts premium costs based on an analysis of previous years' records; they are in the process of developing a new insurance scheme for drought. • The company aims at reducing climate risk but thinks that in the Bangladeshi context a 5-year plan is not possible since natural (and man-made) disasters are so unpredictable, and its water system is dependent on neighbouring countries. GDIC currently has no preparedness for climate risks, and is aiming for moderate preparedness (although compared to other Bangladeshi companies GDIC feels it has moderate preparedness). • Board/executive management and operational teams are responsible for risk management. • They currently use data from IDRA insurance index[142].		
Barriers and opportunities		
The main challenges come from lack of technological capacity in Bangladesh, lack of investment, lack of utilisation of data (not lack of data). Other barriers include governance risks, regulatory and legal environment, and financial barriers. Increasing insurance premiums present opportunities for the company, as long as they can retain their client base.		
The enabling environment: further support required from donors/government		
The company would welcome investment from foreign organisations' CSR funds. They want changes in government policy to promote crop variety, as well as financial incentives and better regulation and legislation. They require public sector support to give technical assistance, risk guarantees or insurance, and capacity building/training support. They are looking for a partner to help reduce operating costs, and to work with development NGOs (e.g. DFID) at ground-level to provide capacity-building. GDIC is very interested in engaging in policy dialogue around climate risks.		

[142] Insurance Development & Regulatory Authority Bangladesh

2.7 Interstoff

Consultation notes		
Company information		
Interstoff *National ready-made garments company*	Naimul Chowdhury, Executive Director Email: naimul@icl.bdrmg.com	Interstoff is a large scale export oriented RMG company. It currently employs 4500+ people and is based in Gazipur, a district 30 kilometres away from Dhaka
Impacts of natural hazards on business; response of the firm		
• Flooding affects employee access to work and shipment of materials and goods; it also has some indirect impacts such as inflation in food prices. Cyclones affect production and supply of products and damages employee housing, production is 10-12% lower during disaster period. They are mostly aware of natural hazards, providing subsidised food for employees and constructing replacement homes in collaboration with major buyers (e.g. M&S, Tesco). Flooding is so common that buyers no longer consider it disaster; also flooding occurs out of peak season. • The company has plans to reduce risk over the next 5 years (not quantified) • The HR team should be involved in climate risk management as the process needs to be employee-driven; also the board should be involved. • There is no formal method for risk assessment; they rely instead on experience and public data.		
Barriers and opportunities		
The main challenges to climate risk management are lack of access to finance, and the need for greater PPP support as single companies are not able to invest large amounts. No clear opportunities from climate change.		
The enabling environment: further support required from donors/government		
They require infrastructure-related support from government and donors e.g. building new hospitals and roads; as well as government food subsidies, and greater access to finance. They would like greater technical assistance from the public sector, government support for DRM which starts before the disaster not during/after. They would like greater PPP support. They have already set up a local committee collaborating with all HR teams in the area, with lots of emphasis on DRM.		

2.8 Lal Teer Seed Limited

Consultation notes		
Company information		
Lal Teer *National agri-business*	Mahbub Anam, Managing Director, Cell no: 01713022371, Email Id: mahbub.anam@multimodebd.com	Lal Teer Seed Limited is the first Research-based and the largest seed company in Bangladesh, operating since 1995. Being only ISO 9001:2008 certified seed company in the country; it is engaged in developing, producing, processing and marketing high yielding seeds to develop sustainable foundation of agriculture and food security of the country.
Impacts of natural hazards on business; response of the firm		
• Research is being conducted into more crop varieties to cope with new climate conditions e.g. salinity-resilience, drought resilience. • The company feels moderately prepared and would like to reach high preparedness to climate risks. • The board and executive management, and risk management teams are responsible for climate risk management.		
Barriers and opportunities		
The main barriers are caused by the regulatory, legal and financial environment and lack of access to capital – getting funds for research is very difficult since commercial banks charge 19% interest against research loans. The operating costs are high because the capital is locked up in crops during cultivation time (up to 5 months). Natural hazards create opportunities to produce new seed varieties.		
The enabling environment: further support required from donors/government		

Funding from donor agencies will be vital, as well as technical assistance from the public sector. They would also like to see better risk guarantees/insurance, and price support mechanisms. They have experience of working with Katalyst, IFC and USAID-PRICE as well as collaboration with foreign research institutions. They are willing to engage further with investors to carry on research uninterrupted.

2.9 Mutual Trust Bank Ltd.

Consultation notes		
Company information		
Mutual Trust Bank Ltd *National banking firm*	Mohammed Sami-Al Hafiz, Group Chief Communications Officer, Phone: 02-882 6966 (Ext 2490) Mohammad Iqbal, Senior Vice President & Head of SME Banking, Phone: 02-881 7271 (Ext 114)	MTB, one of the major banks of Bangladesh, has been in the business since 1999. The SME division of the bank comprises of 8% of the total business and it is growing at a high rate (Last year it comprised of 6% only). Our interview mainly focused on SME banking's risk exposure since this segment is the most vulnerable one in the face of natural disaster/ climate change.
Impacts of natural hazards on business; response of the firm		
• Drought, crop disease, water pollution, storms, soil erosion and flooding affect core business and make costs higher. They are mostly aware of the climate risks and carry out climate risk analysis before entering new markets; it also considers risk exposure of clients. • The company has no objectives to reduce climate risk within the next 5 years; they are currently at low preparedness and would prefer to be moderately prepared. • The management committee (members from every department) oversees climate risk management. They do not use specific tools but they check historical data and consult local people and experts on the disaster risk of an area.		
Barriers and opportunities		
The barriers come from inadequate monetary environment, lack of commercial feasibility support, lack of local insurance and microinsurance markets, lack of access to risk guarantees and high vulnerability to extreme weather events. They are not entitled to receive donations. No opportunities seen from climate change.		
The enabling environment: further support required from donors/government		
They need awareness campaigns to make people/small businesses aware of climate risks, they would like support from government and development organisations for this. They would also like to see better crop insurance (public risk guarantees or insurance), and capacity building/training support at management level. Every DRM policy has to be approved by the Central Bangladesh Bank so it is vital they get involved. They would like to see further collaboration with governments and international NGOs. They show particular interest in green finance policies.		

2.10 Pabna Meat

Consultation notes		
Company information		
Pabna Meat *Agriculture (livestock) SME*	Liaquat Ali, Proprietor Email: pabnameat@gmail.com	Pabna meat is an international standard meat producing company with a view to supply Quality Halal & Hygienic meat & meat Product in the market of Dhaka. Pabna meat is only the second company to use full modern equipment to produce meat
Impacts of natural hazards on business; response of the firm		
• Flood and heavy rain severely impact cattle collection and delivery; meat quality is reduced by irregular and insufficient feeding during floods. They are mostly aware of risks and minimise losses by agreeing liabilities with the cattle suppliers, and increase reserve meat stocks before flood season.		

Barriers and opportunities
Barriers to climate risk understanding come from political instability (impacts supply chain), lack of public utilities, and lack of access to capital (at the moment Pabna Meat can only use 30% of its net processing capacity). Opportunities: during flooding season profits increase as cattle price goes up. Employee salaries go down as they have fewer options for alternative employment during flood season.
The enabling environment: further support required from donors/government
Key elements of the enabling environment include incentives, local/national government policy, and regulation/taxes. If there were more meat processing companies there would be stronger government natural hazard policies for the industry. They currently work with the BIF to develop business models and other NGOs to procure healthy meat; but would not be willing to collaborate with external large corporations for fear of losing control over the company (although knowledge sharing is acceptable).

2.11 Standard Chartered Bank

Consultation notes		
Company information		
Standard Chartered Bank *Banking MNC*	Dilara Khan, Cluster manager, operation (CRES), Corporate Real Estate Services, mobile: 01737307711, dilara.khan@sc.com	Standard Chartered Bank is one of the leading multinational banks in Bangladesh operating in both consumer banking and corporate banking.
Impacts of natural hazards on business; response of the firm		
• Flood and heavy rainfall impact operations, in particular data backup systems. At the time of recent disasters they had very low preparation for response. They are aware of climate change issues that directly impact client business, but think that the impact of natural disasters is more than we could predict as it affects the core country economy. • They have plans to reduce risk exposure by 10-25% during the next 5 years. • Centralised risk management teams are involved in risk management, and a third party vendor carries out physical assessment of outlet infrastructure.		
Barriers and opportunities		
The main barriers come from the regulatory, legal and financial environment, local skills and lack of capacity. Opportunities: climate risk awareness (both internal and external to the company) has been increased by recent disasters and now buildings are more resilient, and there are trainings in place on mitigation and adaptation to natural disaster risk.		
The enabling environment: further support required from donors/government		
From the public sector they would require regulatory/fiscal incentives and technical assistance on business models and risk assessment. The government should create a common platform for organisations to be part of DRR programmes, and it is their responsibility to encourage institutes to consider DRR issues.		

2.12 Unilever Bangladesh

Consultation notes		
Company information		
Unilever Bangladesh Limited *Multinational consumer goods company*	Hasan Mazhar, Senior Brand Manager, Foods & Water, Cell no - 01730727777, email Id- hasan.mazhar@unilever.com	Unilever Bangladesh Ltd. is the top multinational company and top MNC in Bangladesh. Through its water purifier brand 'Pureit', it has reached thousands of households with its brand message "As pure as boiled water"
Impacts of natural hazards on business; response of the firm		
• Flooding disrupts the distribution channel especially in remote areas; heavy rains and cyclones increase operational costs and reduce inventory level, also affects distribution. Disasters also change consumer product preferences • During floods, stock is delivered by river; timings are altered during floods to minimise losses; securing stock not to wash away; villages rebuilt. • The company disaster risk control mechanism comes from Unilever global HQ; the company feels it has moderate preparedness for climate risks.		

- There are centralised risk management teams which deal with understanding, identifying and assessing climate risks.

Barriers and opportunities

Main challenges come from governance risks, local capacity and skills, and domestic infrastructure – especially the poor quality of transport facilities in the south of the country, development of which is vital. Opportunities come from new products introduced and new employment opportunities.

The enabling environment: further support required from donors/government

Government-provided warehouses in disaster-prone areas in order to stock emergency products; the warehouses could also be used as a shelter home for vulnerable people. They would welcome technical assistance for new projects/risk assessment, price support mechanisms and capacity building/training support as support from the public sector. They already have experience partnering with Save the Children, World Food Programme, and Lifebuoy Friendship Hospital. Would be willing to engage in cross-industry collaboration, and would like to work with the media to promote world hand wash day project.

2.13 Nestle Bangladesh

Consultation notes

Company information

Nestle Bangladesh *Multinational food and nutritional company*	Naquib Khan, Corporate Affairs Director Tel: +880-2-9882759, ext: 219 Email: naquib.khan@bd.nestle.com	Nestlé Bangladesh Limited, a wholly owned subsidiary of Nestlé S.A., started its commercial production in 1994 and currently employs 400 people directly in the company and another 1000 people indirectly in the industry. Nestlé Bangladesh covers nearly every field of nutrition: infant formula, milk products, chocolate and confectionery, instant coffee, etc

Impacts of natural hazards on business; response of the firm

- Floods and cyclones impact wheat and rice production, hampers distribution network, and makes storing final products a problem. Poorer villagers are the worst sufferers of natural disasters but they cannot afford Nestle products, so demand doesn't fluctuate that much during disasters.
- Specific plans to respond to all disasters e.g. boats for distribution during flooding, regular emergency drills with all level of employees – "We are not in a crisis, we manage crisis". They feel 100% aware about natural hazards (high preparedness).
- The company has plans to reduce disaster risks over the next 5 years (no quantification available)
- The corporate crisis committee, headed by the CEO, plans climate change risk management strategies, and does an annual review to develop targets for the company

Barriers and opportunities

The main challenges are due to lack of (locally relevant) scientific research, inability to measure, report and verify performance; and high vulnerability to extreme weather events. They see no opportunities presented by climate change.

The enabling environment: further support required from donors/government

Currently collaborate with BRAC university disaster management department for assessing the probability of disasters; University of Dhaka to train locals about nutrition. Nestle is a socially responsive organisation and works closely with the community. Nestle would appreciate further technical support on climate risk. No further support required to them but more insurance is vital for their distributors. The Nestle brand does not need any booster regarding trust/reputation. More experience sharing would help support resilience, and Nestle would be interested in participating in policy dialogue (although any collaboration must be approved by global HQ)

3. Kenya

3.1 Hayaan Camels

Consultation notes		
Company information		
Hayaan camels *Livestock trading agency*	Hussein Haji Abdulahi	Hayaan Camels keeps camels for dairy and trades cattle and other livestock. 20 herdsmen are employed for the camel business and 15 employees in cattle trading.
Impacts of natural hazards on business; response of the firm		
• Increasing frequency of drought leads to high mortality of cattle (up to 40%) and indirectly impacts the camel business through loss of income. Milk production and collection is more challenging during drought and although camels are more resilient they are then exposed to theft and banditry. They struggle to meet increasing demand for meat.		
Barriers and opportunities		
The main challenges to managing climate risks come from political instability, insecure property/land rights, lack of capacity and skills, lack of public utilities (especially transport infrastructure), lack of good quality information, lack of access to capital and high costs of understanding risks and implementing solutions. Opportunities arise through the camel branch of the business, increasing resilience. They can also sell by-products such as hides and skins.		
The enabling environment: further support required from donors/government		
They would like to see soft loans for capital investments, better regulation and tax exemptions, access to local insurance, accurate information provision, and Savings And Credit Co-operatives for livestock keepers. NGOs have shown very poor support and only during emergencies, however Hayaan Camels would be interested in collaborating with other livestock businesses and NGOs in support of environmental policy advocacy.		

3.2 Ishaqbini Hirola Community Conservancy

Consultation notes		
Company information		
Ishaqbini Hirola Community Conservancy *Not for Profit national NGO*	Benson Ojwang, Manager. Cell: +254 738 933 185/+254 721 376 206. Email: info@ishaqbinihirola.co.ke, benson.ojwang@nrt-kenya.org, www.ishaqbinihirola.co.ke	Ishaqbini Conservancy is a community-led conservation Trust started in 2007 and situated on the eastern bank of the Tana River, concentrating on wildlife conservation, peace and security and supporting socio-economic development.
Impacts of natural hazards on business; response of the firm		
• Drought and flooding meant that no regular operations could take place since the surrounding community relied on them for support. The organisation has tried to create resilient livelihoods by putting in place community support programmes for conservation, planned grazing and eco-tourism. They advocate early preparation through community awareness and immediate response by working with local governments. • The company aims to reduce risk exposure by over 25% over the next 5 years through means such as holistic land management. They have moderate preparedness but would like to be highly prepared. • Operational and regional teams are responsible for risk management, and they use methods such as vulnerability monitoring, disease surveillance, historical data analysis on wildlife and community socio-economics, etc.		
Barriers and opportunities		
Lack of access to emergency funding slows response to natural disasters. Other barriers from the legal and regulatory environment, lack of local capacity, lack of risk reduction mechanisms, technology and market risks, lack of domestic infrastructure, lack of access to capital, poor B2B linkages and value chains, and a vulnerable natural environment. Opportunities for partnership with adjacent farming conservancies and international		

donors to support their goals.
The enabling environment: further support required from donors/government
They intend to incorporate county government, KWS, donors and other partners in to support their risk reduction goals. They would like to see financial incentives, improved local and national policy, technical assistance with risk assessment, direct investment, price support mechanisms and capacity building support. They would also like to see carbon exchange programmes for community support. They would be willing to go to great lengths to engage in policy dialogue necessary for DRR and climate change, and already collaborate with governments, investors, third parties, community groups and NGOs.

3.3 Kenya Camel Association

Consultation notes		
Company information		
Kenya Camel Association	Contact	Type of firm
Impacts of natural hazards on business; response of the firm		
• Flooding and drought increase operational costs, cause loss of incomes and livelihoods, and causes new camel diseases. The association is aware of the risks and makes plans earlier with the help of donors, works with stakeholders for conflict resolutions, encourages disease prevention and veterinary training.		
Barriers and opportunities		
They lack staff with technical expertise at the local levels, and information on weather and climate is not passed down to camel keepers. It is difficult to integrate modern and indigenous knowledge. Other barriers come from political instability and marginalisation, insecure property rights, lack of local insurance and public utilities. Opportunities for more camel keeping as they are more resilient to harsh conditions; selling of camel by-products; international trade; increased eco-tourism.		
The enabling environment: further support required from donors/government		
They would like to see incentives such as better markets for their products, improved local and national policy, better regulation e.g. permits, better legislation and urgent access to local insurance. They have already worked with the FAO, UNDP, and USAID; and would be willing to work with other businesses for facilitation of activities, product diversification, capacity building, and information sharing.		

3.4 Kenya Commercial Bank

Consultation notes		
Company information		
Kenya Commercial Bank *MNC for microfinance*	Clarisse Aduma	Variety of products relating to dairy; cereals; sugarcane; tea;(in the process of developing a product for livestock financing; coffee; and horticulture targeted for this year)
Impacts of natural hazards on business; response of the firm		
• Droughts cause death of livestock and other problems, which leads to increase in financial withdrawals relative to deposit and therefore reduced cash flow for the bank. They responded with insurance products, loan restructuring, and support from e.g. the African Guarantee Fund. • They plan to reduce risk exposure by more than 25% over the next 5 years • They look at ecological/climate condition when deciding on products		
Barriers and opportunities		
Information unreliability.		
The enabling environment: further support required from donors/government		
They are collaborating with county and regional governors.		

3.5 Kenya Livestock Marketing Council

Consultation notes		
Company information		
Kenya Livestock Marketing Council *National livestock consultancy*	Mr Qalicha G. Wario, CEO	A national organisation in 13 counties promoting livestock interests through e.g. facilitating

		market linkages, information provision, advisory services, capacity building and policy influence
Impacts of natural hazards on business; response of the firm		
• Drought impacts livestock and affects income and livelihoods; floods can also cause land degradation and sweep away livestock; the two also cause diseases. The firm responded by trying to reduce impact on the farmers e.g. through fundraising, advice, community-managed DRR training, capacity-building.		
Barriers and opportunities		
The main issue is lack of access to capital including small loans and microfinance. Barriers to climate risk management come from political instability, corruption, insecure property rights, lack of capacity, lack of local infrastructure and public utilities, poor information and understanding. The risks bring opportunities to make people more business-oriented, to diversify into camel keeping, and to different products. They would like to increase women's engagement in this sector and to increase efficiency across the value chain.		
The enabling environment: further support required from donors/government		
They would like grants to establish strategic reserves and to combat diseases; improved national and local government policy; and access to local insurance. The most important factor is the sustainability of the solutions. Currently working with Oxfam, CORDAID and the Ministry of Livestock although highlights issues with corruption. They would like to collaborate with any organisation that is in line with their objectives – in facilitation of market access, information provision, business skills capacity, policy influencing, sustainable markets, private sector investment support, etc.		

3.6 Northern Rangelands Trust

Consultation notes		
Company information		
Northern Rangelands Trust *National livestock and tourism*	Mike Harrison, MD-NRT	Core mandate is to build resilience through economic diversification, build peace, local institutions, grasslands management, clearing of invaded species, basic livelihood needs like water storage, etc
Impacts of natural hazards on business; response of the firm		
• Drought causes loss of livestock (8% killed in 2009), livelihoods, and increased conflict. The company encourages an off-take purchase programme to encourage farmers to sell when the prices are good and re-stock when the rains come. • The company aims to reduced risk exposure by over 25% in the next 5 years, providing county governments are able to provide infrastructure, peace, utilities etc. The company would like to increase their preparedness from moderate to high. • The board and executive management provides the conceptual level of risk management and operational teams work with communities to provide the bottom up approach. They do not use technical tools but rely on community understanding of risk.		
Barriers and opportunities		
Barriers come from political instability, conflict over water and grazing pastures, insecure property rights, high interest rates, poor quality infrastructure, lack of insurance, technology cost gaps, lack of large investment due to global financial crisis, lack of awareness of NRT, highly degraded natural environment. The main opportunity is economic diversification, using a wider portfolio of products to reduce resilience. NRT provides resilience advice, more and more partnership opportunities.		
The enabling environment: further support required from donors/government		
Solving of the barriers mentioned above. They are currently working with USAID, Danida and other bilateral donors and NGOs, as well as partners from other local companies, cross-industry collaboration, community groups, third parties and customers/clients. The whole process of building resilience requires external support e.g. .through an adaptation fund. They would be interested in engaging in top-down dialogue and developing policy frameworks.		

3.7 Ol Pejeta

Consultation notes		
Company information		
Ol Pejeta	Contact: n/a	Type of firm: n/a
Impacts of natural hazards on business; response of the firm		
• Drought causes loss of cattle due to food shortages. They have some awareness of the natural hazards and know this will happen again; the main preparation strategy is building up reserves of grass fodder. • The company aims to reduce risk exposure by more than 25% over the next 5 years, from currently moderate risk preparedness to high. • The board and executive management is responsible for risk assessment. They use historical experience, and short term data to make decisions.		
Barriers and opportunities		
The main barriers are the regulatory and legal environment (there is a big worry about land rights in the new constitution), information gaps, and the unpredictability of the natural environment. Have not considered any opportunities.		
The enabling environment: further support required from donors/government		
In the enabling environment, the business case for risk management needs to be viable, they require trust between communities and themselves, they need current policy to support livestock businesses, and financial support including careful consideration of taxes and insurance schemes. They highlight the need for the Ministry of Environment and other stakeholders to disseminate information properly. They would also like technical assistance in risk assessment, well-defined policy frameworks, and capacity building support from the public sector. They would be willing to engage with other companies in the sector, NGOs and clients.		

3.8 Safaricom

Consultation notes		
Company information		
Safaricom *National telecommunications company*	Michael Koech; Principal Environment and Sustainability Officer; Tel: +254 722 003 441; Mobile: +254 722 930 681; email: mkoech@safaricom.co.ke	National mobile phone company offering data, voice call and mobile money services
Impacts of natural hazards on business; response of the firm		
• Floods reduce access to sites and make it harder to get skilled staff; drought means reduced power production; higher costs of operations and reduced quality of network. They are aware of the challenges and carefully consider location and exposure of assets at the planning stage, and also have emergency procedures in place e.g. alternate energy supplies. • The company aims to reduce its risk exposure over the next 5 years although has no quantified targets. It would like to move from moderate to high preparedness. • All levels of the company are involved in understanding risk: the board, strategy team, regional teams, risk management teams and business continuity teams. They use available information from relevant government departments, and stakeholder consultations.		
Barriers and opportunities		
Accessibility and security in Northern Kenya are key issues. Other barriers come from technology risks, lack of local skills, poor domestic infrastructure, information gaps and a vulnerable natural environment. Opportunities arise from renewable energy, innovation in resilient transmission systems such as fibre optics.		
The enabling environment: further support required from donors/government		
No details provided for this section.		

4. Mozambique

4.1 Agrifocus

Consultation notes		
Company information		
Agrifocus *National pesticide, fertiliser, spray equipment, seed, and agricultural clothing company*	Ricardo Sequeira, Executive Director	Agrifocus is a large national agribusiness company set up in 1998 selling and distributing pesticides, fertilisers, spray equipment, seeds, and agricultural clothing, with branches across the country (Maputo, Chokwe, Nampula and Beira). The company employs approximately 180 people.
Impacts of natural hazards on business; response of the firm		
• One of the company's storage warehouses in Chokwe was damaged by the heavy flooding this year and much of their stock was lost. They were covered by insurance which paid out on the claim but the insurance company has refused to renew their cover. They do not want to move their warehouse to a new location as they need to store products in this area close to where there is a sizeable market. • Local farmers in the Chokwe region were not insured. International insurance companies will not insure at this small scale with only large businesses being covered. • Other large businesses have been significantly impacted - an international company producing rice and maize in the Chokwe valley with operations worth USD 4 million is in the process of closing down due to significant losses from the floods. This sends a negative signal to other companies and discourages investment in the area. • It was suggested that the impacts of the floods around Chokwe were intensified by poor dam management further upstream. Multiple dams were opened at one time which resulted in higher flows than necessary downstream in Chokwe. Early warning systems were late in informing the local population and people did not want to leave their land until the last minute. • Agrifocus has a team of agronomists who teach and engage local farmer communities in rural regions on methods to increase yields and issues such as high salinity, soil degradation and water logging. Every year they select farmers and conduct demonstrations on how and when to apply products to increase yield and invite other farmers to see the benefits (i.e. increased yield). Their main objective is to increase sales of their products and build their market but this action also has resilience co-benefits for local farmers. The company recognises the importance of building demand for the longer term and the farmers having the capacity and understanding of how to increase their crop yields.		
Barriers and opportunities		
Smallholder farmers unable to access finance to purchase pesticides, fertilisers, etc. Lack of awareness and understanding in rural smallholder communities of agricultural techniques that could increase crop yields and actions that could be taken to minimise crop losses. There was recognition that opportunities exist from climate risk, with the potential spread of pests and crop disease opening new markets for Agrifocus' products.		
The enabling environment: further support required from donors/government		
Improved early warning systems Education to smallholder farmers on agricultural techniques which can improve crop yields. Support to develop full value chains nationally e.g. including support to develop national agro-processing companies Rural transport infrastructure requires significant investment.		

4.2 AgDevCo

Consultation notes
Company information

AgDevCo *Not-for-profit agricultural development company operating in sub-Saharan Africa. Acting as principal, it invests "social venture capital" to create commercially viable agribusiness investment opportunities, bringing them to the point where they can attract private investment from domestic and overseas investors.*	Chris Isaac, Director – Business Development	AgDevCo has played a key role in the development of the Beira Agricultural Growth Corridor (BAGC) in Mozambique and currently acts as the Fund Manager for the Beira Corridor Catalytic Fund.

Impacts of natural hazards on business; response of the firm

- Farms and agribusinesses in the Beira Agricultural Growth Corridor initiative around Chimoio have had their crop yields affected by prolonged periods of drought in the middle of the wet season. This was followed by torrential downpours early in 2013 which have led to flooding and further damage to crops.
- In Inhambane, farmers had to manage semi-drought conditions with approximately 700mm rainfall falling in the year, after which followed 2 days where 750mm rain fell leading to high crop damage.
- Increasing unpredictability as to the start and length of the wet season is becoming an increasing concern for these businesses considering their dependence on rain-fed agriculture.
- AgDevCo has conducted an initial weather insurance pilot in collaboration with the Agricultural Polytechnic in Manica (ISPM). With financial support from Kiva and working with commercial farmers operating outgrower models, weather index insurance was included alongside loans (at 15% interest) disbursed to smallholders farming 5-10 hectares each. The weather index insurance product only pays out after 24 days of no rain. In January the farmers experienced 18 days of no rain and so did not receive a payout but managed to still achieve half of the yield that they would normally produce. Tweaking the insurance product to pay out after 18 days of no rain would add around 20% to the cost. The product would be highly expensive for the farmers to purchase and would only provide support if the crop was completely wiped out.
- Smallholders would be unlikely to purchase this insurance product in the future unless it could be sold at lower cost. The cost is currently around 20-25% of the amount insured. It was suggested that this cost would need to be reduced significantly for uptake of the product. Satellite data is available however and it is easy to identify the farmers who would benefit most from this insurance.

Barriers and opportunities

Irrigation was highlighted as a major requirement. There are major barriers around the financing of irrigation systems. Less feasible at the smallholder level but at the larger commercial farm level AgDevCo noted the importance of developing irrigation across the clustered projects in the Beira Agricultural Growth Corridor. There is a current lack of patient capital available for irrigation to run alongside commercial capital. Obtaining land rights in Mozambique remains difficult.

The enabling environment: further support required from donors/government

Infrastructure-related support from government and donors i.e. patient capital for irrigation systems at scale. Subsidise pilot weather index insurance schemes to reduce the cost and increase uptake of insurance products by smallholders.
Rural electrification and rural transport infrastructure needs significant investment.
Importance of technical assistance reinforced and the need to work directly with agribusinesses on business development support.

4.3 Agro-Alfa

Consultation notes

Company information

Agro-Alfa *Steel processing and industrial maintenance company*	Bilal Juma Amade, Engineering Director	Agro-Alfa was privatised in 1996 and is headquartered in Maputo with branches in Matola (supplying MozAL), Tete (currently in the early stages – but is planned to be

		the largest), Nampula, Quelimane and Beira (servicing the port). Their main client is MozAL (second largest supplier to MozAL). Other clients include the Ministry of Education, Ministry of Agriculture, and various construction companies.

Impacts of natural hazards on business; response of the firm

- An example from recent 2013 flooding events where they had been building schools in Inhambane (for the Ministry of Education) - they could not access the sites (and some of their staff were stranded in the field).
- They had increased their workforce and operations through supplying construction companies with the materials to rebuild bridges.
- Agro-Alfa established a subsidiary (Agro-Alfa Energia) in 2009. This is a renewable energy company that specialises in solar and wind, and currently employs 2-3 staff. It seems that this venture was not established to secure energy for their own needs, but to exploit a business opportunity opened up by government policy, which was to increase the state of electrification in Mozambique (it has changed from around 5% in 2005, to around 7% in 2006, to around 20% now). Their supply is sold in entirety to the government for use in rural areas. Financial support was available from government (FUNAE) and chosen suppliers received advance payment. No technical assistance/support was available.

Barriers and opportunities

No clear opportunities from climate change. Agro-Alfa Energia worked in conjunction with Electricidade de Mocambique (EDM), Mozambique's publicly-owned electricity company. There is consideration that they should look into CDM opportunities/selling carbon credits, but intimated that it was not yet on their radar.

The enabling environment: further support required from donors/government

Supportive national government policy for smaller scale renewable energy opportunities – currently they feel it is only worthwhile to supply EDM and EDM's partners – they are not interested in smaller-scale opportunities such as individual solar water heaters.

4.4 AusMoz Farm Holdings

Consultation notes

Company information

AusMoz Farm Holdings *Commercial scale farming (bananas and lychees)*	Andrew Macpherson Director Email: mcg.a@bigpond.com	Commercial farming operation in Manica province set up in 1998.

Impacts of natural hazards on business; response of the firm

- Erratic rainfall has led to crop failures with late and mid-season droughts affecting yields of bananas and lychees.
- The lack/poor quality of rural infrastructure (power and transport) increases the vulnerability of the business and adds to costs.

Barriers and opportunities

- Lack of available finance for irrigation systems and difficult to attract this finance
- Limited skills and capacity (including agricultural technique knowledge) within local workforce
- Limited connectivity to the electricity network leads to a reliance on diesel generators for power which increases costs and prevents investments in cold storage facilities, irrigation systems and ripening rooms which could add to productivity.
- Poor transport infrastructure increases costs and ability to access larger markets and potential export markets in some cases. Access to the larger city markets for fruit and other temperature controlled goods is a problem.
- Without being able to expand their own operations, commercial farms struggle to engage with more local smallholders to build greater community resilience through increased employment and education

on improved agricultural techniques.
- Illegal mining becoming a major issue and resulting in reduced water quality in local rivers.

The enabling environment: further support required from donors/government

Targeted finance to improve rural electrification.

4.5 Cleanstar Mozambique

Consultation notes

Company information

Cleanstar Mozambique *An integrated food, energy and forest protection business.*	Bill Rustrick, Director of Agriculture Email: b.rustrick@cleanstarmozambique.com	The company Cleanstar Mozambique was formed in 2010 by Novozymes and CleanStar Ventures. A sustainable cooking fuel manufacturing facility based in Dondo in Mozambique's Sofala Province produces ethanol-based cooking fuel from surplus cassava supplied to the company by local farmers following CleanStar's sustainable farming systems. Cooking fuel and cookstoves are sold to urban consumers in Maputo.

Impacts of natural hazards on business; response of the firm

- In Sofala province (in the central coastal region of the country) smallholders are increasingly finding that they are unable to grow maize in higher temperatures. Smallholder farmers engaged by Cleanstar Mozambique are already experiencing reduced yields from maize and impacts on cassava crops from mosaic virus.
- Extreme (high) temperatures have limited maize growth and caused the spread of mosaic virus as the white fly prevalent region is increasing.
- Smallholders have limited awareness and understanding of improved climate resilient agricultural techniques. Smallholders continue using traditional techniques from their elder family members and often are unwilling to change their practices unless they directly see the benefits of increased yields from demonstration plots.
- Cleanstar Mozambique provides inputs but also advice on more sustainable or climate-smart agricultural techniques to local smallholders through demonstration plots with a 'lead farmer' (e.g. showing the benefits of planting crops that return important nutrients such as potassium back to the soil to build organic matter).
- A large proportion of farmers are illiterate and have little way of learning new farming techniques unless through demonstration or via radio alerts or programmes.

Barriers and opportunities

There are currently a limited number of seed suppliers due to a current lack of incentives for them, resulting from the current seed policy and legislative environment in Mozambique. Increased availability of more resilient seed varieties would generate greater opportunities for smallholder farmers to increase yields and produce excess crops to generate income.
Cleanstar Mozambique (and others, including food and beverage companies) has also identified the need for farmers to focus on growing more resilient crop varieties (e.g. cassava and move away from total dependence on less resilient types such as maize). These companies are identifying new potential opportunities for turning these more resilient commodities into high value products through processing.
Knowledge sharing and collaboration opportunities with other companies who can use by-products of the ethanol bioprocessing.

The enabling environment: further support required from donors/government

Attracting new seed suppliers into Mozambique through reform of national seed policy and legislation. Building capacity and skills for local agronomists through improved agricultural college courses Building basic finance and business knowledge and skills in local workforce Technical assistance to identify market opportunities for ethanol and cookstoves in local cities (i.e. Beira) rather than distant markets e.g. Maputo.

4.6 Maputo Port Development Company (MPDC)

Consultation notes		
Company information		
Maputo Port Development Company (MPDC) *National private company with the concession of Maputo's port from 2003 through to 2033.*	Mario Rassul, Environmental Consultant	MPDC holds the rights to finance, rehabilitate, construct, operate, manage, maintain, develop and optimize the entire concession area. The company also holds the powers of a Port Authority, being responsible for maritime operations, piloting towing (tugboats), stevedoring, terminal and warehouse operations, as well as the port's planning development.
Impacts of natural hazards on business; response of the firm		
• The Maputo Port Development Company (MPDC) has been impacted by tropical storms, both through the need to temporarily shut down the port, with vessels unable to enter or leave due to dangerous sea conditions, and through issues associated with insufficient drainage capacity during periods of storm water runoff. • The MPDC aims to increase the movement of cargo and expand the port's operations and there is recognition that the issues already facing the port e.g. drainage during heavy rainfall, need to be addressed. • The MPDC is currently in the initial early stages of developing a master plan for Maputo port with the assistance of international consultants conducting a full risk assessment for the port. There is recognition that in order for the port to increase the quantity of cargo it can handle there is a need to improve the transportation links, drainage capabilities and access to water and to take into account potential risks from sea level rise. • There is awareness of the risks and understanding of the need to act but limited in-house capacity to assess these risks.		
Barriers and opportunities		
Limited internal resource capacity to assess climate risks. Limited knowledge and information sharing currently. It was identified that Beira port is likely to also face climate impacts but that there has been no sector discussion or collaboration to discuss these potential impacts or share knowledge to date. No clear opportunities from climate change.		
The enabling environment: further support required from donors/government		
Increased sharing of best practice and lessons learned in addressing climate risk and building resilience.		

4.7 Technoserve

Consultation notes		
Company information		
Technoserve *International NGO that promotes business solutions to poverty in the developing world*	Jake Walter, Mozambique Country Director	Technoserve has been providing technical assistance to agribusinesses in Mozambique since 1998.

Impacts of natural hazards on business; response of the firm		
• Technoserve is providing technical assistance to commercial banana farm in Nampula, SMEs supported as part of the USAID DCA scheme and plantation forestry companies e.g. Green Resources. 'Lead' smallholder farmers supported through the DCA to purchase a tractor and thresher and share climate resilient agricultural techniques, knowledge and skills to other local smallholders through demonstration plots. Technoserve provide technical assistance to support these lead farmers. • Opportunities in developing commercial export businesses (particularly in tropical fruits e.g. bananas) and plantation forestry that could provide employment and growth opportunities in northern rural regions of the country and increasing resilience of remote rural communities. • Limited scale is currently hampering commercial export businesses – economies of scale are missed. Clustering of commercial farms needed to create sufficient commercial driver for investment in rural transport network and export infrastructure, especially in the northern regions of the country. • Opportunities for plantation forestry in the north of the country and associated processing (paper, wood, pulp). • Jain Irrigation looking to set up operations in Beira (irrigation systems and mango pulping operations).		
Barriers and opportunities		
National and local information not freely available from government e.g. detailed spatial land mapping and water table mapping. Information that is available from government can be lacking in detail. Resources and capacity in national government is limited – this leads to potentially long delays in approvals from government for projects		
The enabling environment: further support required from donors/government		
Support for PPPs for dam infrastructure and collaboration and negotiation of multiple sector uses for dam infrastructure and water use within a region (including commercial agriculture, forestry, mining) Support to develop regional clusters of commercial farming operations (with potential outgrower models) and associated transport and export infrastructure		

4.8 Green Resources

Consultation notes		
Company information		
Green Resources *Norwegian forest plantation, carbon offset, forest products and renewable energy company*	Ana Meyer, Senior Carbon Associate Joana Mendes Godinho Project Development Manager	Green Resources has recently expanded into Mozambique from initial operations in Tanzania and Uganda. Forestry plantation started in Niassa province (north Mozambique)
Impacts of natural hazards on business; response of the firm		
• Green Resources are looking to expand into sustainable agroforestry and charcoal projects beyond their initial focus on forestry plantations. • De-incentivise 'slash burn degrade' technique and encourage climate resilient techniques (including charcoal production in a more efficient way). • Initial pilot project engaging local communities and smallholders on improved techniques to increase crop yields (and partnering with Technoserve) was encouraging but there are concerns about how they can make this commercially viable at a larger scale.		
Barriers and opportunities		
Lack of access to available finance for agroforestry and charcoal projects and further work needed to understand how these projects could be part of a profitable business model. Resources and capacity in national government is limited – this leads to potentially long delays in approvals from government for projects (example given of CDM validation for Niassa forestry project). Underdeveloped rural infrastructure (particularly in the north of the country). Local smallholders have limited awareness and understanding of improved climate resilient agricultural techniques.		

The full forestry sector value chain in Mozambique is weak in places. The processing industry in the country is limited meaning that there is little value add to primary timber products.
The enabling environment: further support required from donors/government
Knowledge sharing platform for companies operating in the agriculture and forestry sector in the region to share information and potential collaboration/partnership opportunities Knowledge and capacity building efforts required within government on REDD+, afforestation and agroforestry.

4.9 National bank

Consultation notes		
Company information		
National commercial bank	Valdir Jetha / José Sousa Pinto	National commercial bank in Mozambique with facilities across the country (approximately 30% of facilities currently in rural areas but greatest footprint in main urban centres)
Impacts of natural hazards on business; response of the firm		
• There are currently limited opportunities for SMEs to access credit through commercial banks in Mozambique. • Through the USAID Development Credit Agency, the bank is offering credit lines to SMEs (particularly in agriculture and food processing sectors). • Predominant focus to date on cotton and cashew sectors. • Credit lines are offered to support businesses affected by recent flooding. Credit may not be offered to businesses deemed to be in high risk areas e.g. those at risk from future flood events or those with insufficient pre-existing capacity and business structures in place. The business needs to exhibit an ability to build and generate future revenue including a clear understanding of market opportunities. • Technoserve (NGO with operations in Mozambique) provides technical assistance to businesses which the bank offers credit lines to e.g. on business planning and development, market analysis.		
Barriers and opportunities		
Identified that offering credit lines to SMEs in rural areas (through the support of the USAID DCA) is an emerging opportunity where they can build market share and expand into new rural markets and gain advantage over competitors.		
The enabling environment: further support required from donors/government		
The bank is still looking to donors to act as guarantor for credit lines they offer to SMEs Large scale investment in irrigation is required. Technical assistance to SMEs is needed to run alongside guarantee funds – particularly in business development and planning.		

4.10 Solarkom

Consultation notes		
Company information		
Solarkom *Solar powered technology (lights, phone chargers, radios) start-up company*	Steven Dils	Solar powered technologies imported from Germany, assembled and distributed in Mozambique. Company started in 2012.
Impacts of natural hazards on business; response of the firm		
• Dissemination of solar powered technologies to remote rural communities can build their resilience (e.g. through access to communication and mobile networks)		
Barriers and opportunities		
• Lack of available finance at the small scale required; large financing arrangements are available e.g.		

through the AECF REACT window but for a small start-up company these grants and loans are too large to take on. Financial support appears to be limited for initial concepts and innovations (support is focused at the piloting and upscaling phase of new technologies and business models)
- Renewable technologies imported into the country face high import taxes (relative to conventional generators and technologies).
- Lack of awareness in rural communities that these renewable technologies are available (limited marketing and campaigns by national government to date).
- Lack of business enabling environment for the creation of an SME sector.
- Largely untapped market for off grid renewable energy and RE technologies.

The enabling environment: further support required from donors/government

Guarantee fund for SMEs whereby local banks extend credit lines and bridging credit to start-up businesses (in sectors beyond agriculture and food processing).
Technical assistance to find and develop rural distribution networks.
Awareness raising and educational campaigns by government to build awareness in rural communities and districts of available products and technologies.
Reform of customs regime and import taxation on renewable energy technologies.

4.11 Vale

Consultation notes

Company information

Vale *Brazilian multinational diversified metals and mining corporation*	Carolina Coutinho Sustainability Manager	Vale has mining operations (coal) in the Tete province in Mozambique (since 2011).

Impacts of natural hazards on business; response of the firm

- The company did not meet its 2013 target for coal exports, due in part to heavy flooding which prevented transportation of coal along its railway line to the port at Nacala. Heavy rains and flooding in the Zambezi Valley closed the Sena railway line in February for two weeks causing significant disruption to operations.
- Well-developed enterprise risk management systems and a sustainability/climate change department with assigned resources.
- The company is already taking action to reduce its risks from natural disaster and climate change. It is investing in water efficient technologies across its operations, including in Mozambique and has taken action in building resilience along its value chain.
- Collaborating with a competitor, Rio Tinto and the Mozambique government the partnership has invested in improved export infrastructure (a railway from Tete to Nacala and a new port in Nacala bay).
- Flood risk was considered when the railway was planned to ensure that the most suitable and least exposed location was chosen.
- A desalination plant is also planned at the port to reduce the company's potential future vulnerability to water shortages.
- The company has also provided finance and technical assistance to local communities for constructing small dams in order to improve their water access to increase their crop yields and protect their livelihoods during periods of extended droughts.
- There is extensive dialogue with other mining companies operating in the region and with MICOA regarding water infrastructure and transport investments that would build their resilience to disaster and climate risks.
- After the 2013 floods, Vale also donated USD 500 million to the INGC on a materials basis in the form of water purification tablets, mosquito nets, construction materials for disbursal to affected communities.

Barriers and opportunities

No mention of any barriers to disaster and climate risk management. Opportunities through sector collaboration with peers e.g. improving export infrastructure
The enabling environment: further support required from donors/government
Continued discussion and collaboration with peers and government representatives e.g. MICOA needed on priority issues e.g. water availability and use.

5. Multinational Companies

6.1 Agribusiness

Consultation notes		
Company information		
Multinational tea and horticultural trading	Environment manager	The company has extensive tea and horticultural interests in Kenya, South Africa, Sri Lanka and China, complemented by global trading, packaging and extraction activities. Its primary markets are in the UK, USA, Asia and increasingly continental Europe.
Impacts of natural hazards on business; response of the firm		
• Extreme cold in Europe and unpredictable weather in Kenya: at times irrigation was a struggle, at time there is too much water. To manage the situation they invest in water storage, improving irrigation efficiency, changing sourcing locations, changing insurance schemes, and long-term stakeholder planning. • The company is relatively aware of climate hazards, given immediate impacts on business • They do not have a specific risk management team but do have a risk management process for the business, but it is a part of normal on-going work which is done by the Board. • In terms of climate change and natural disasters, they look to mitigate.		
Barriers and opportunities		
The biggest barrier comes from lack of awareness on how to identify tools to assess climate risks. Extreme and unpredictable events are not necessarily worth insuring against if they happen so rarely, but can be devastating. Lack more reliable information for predicting frequency of these extreme events. Another barrier is that horticultural farmers in SSA are not recognised and do not receive the same support as agricultural/subsistence farmers. Opportunities come from different forms of collaboration e.g. engagement with smallholder farmers.		
The enabling environment: further support required from donors/government		
They would like technical assistance to better understand risk assessment tools, as well as supporting funding. They would be very willing to work with government and NGOs as this would improve stability of operations and increase recognition for their famers. Working with the government would help initiatives such as microfinance for farmers and finding practical solutions.		

6.2 Agribusiness

Consultation notes		
Company information		
Multinational agricultural supplier	Environment Manager	Leading global integrated supply chain manager and processor of agricultural products and food ingredients, supplying various products across 16 platforms in 65 countries.
Impacts of natural hazards on business; response of the firm		
• Climate effects such as drought and flood impact crops such as wheat, cotton, cashew and coffee, reducing quality and yield; different levels of awareness of climate risk depending on geographic area,		

although not necessarily a sectoral approach. Response level and preparedness depends on the geography and the product • In Mozambique heat waves and water availability are the biggest issues and cause direct impacts at farm level. They make strategic decisions based on an understanding of the area • Awareness and responsiveness to climate risks depends largely on the 'maturity' of the area (e.g. California and Australia have business regulations in place) • The company aims to reduce risk and secure operations against climate impacts over the next 5 years. They have a consistent approach to addressing risk across the organisation.
Barriers and opportunities
It is challenging to have regulation in place that actually works and is maintained. Key challenge is to make the connection between the subject and direct relevance to business and direct relevance to our stakeholders which impacts on business. Everything has to be able to seen through the eyes of someone that is in the business and be owned by them and not needed to be a sustainability or CSR project. There are challenges due to the high variety in geographic locations and country-specific issues. Data availability is often a problem. Opportunities to look at new varieties of seeds/plants.
The enabling environment: further support required from donors/government
They would look to the public sector for access to better technology, support in working more collaboratively along the value chain, access to finance for local projects, and technical assistance. They have a range of partners that they work with; also work with other international organisations. The nature of collaboration depends largely on geography, product and type of supplier – it needs to be a range but also needs to bring practical results on the ground. They are looking to scale up successful responses e.g. training, technology and information sharing, working with government agencies.

6.3 Packaging company

Consultation notes		
Company information		
Multinational packaging company	Global Category Director	Multinational consumer packaging company headquartered in the United Kingdom. Manufacturer of beverage cans and rigid plastic packaging. Has plants across Asia, Europe, North America and South America.
Impacts of natural hazards on business; response of the firm		
• Has supply chain vulnerability in a range of global regions, however climate risk is very rarely considered in sourcing decisions. Examples include earthquakes preventing production at a South American plant; however the company did not choose to carry out any other natural hazard reviews. • The company could do more to identify risk, however it is something that needs to be case by case		
Barriers and opportunities		
Barriers come from the fact that risk management in the organisation has no real consistency. Perception that climate and disaster risk is not a conversation that MNCs want to have – business exists for profit only, not for moral or other reasons. Climate risk management seen as philanthropy.		
The enabling environment: further support required from donors/government		
Likes the idea of donors potentially addressing a market failure in commercialising a product, but believes that most impact will be from liberalising the economy in free market terms to benefit the poor. Not really interested in platforms and knowledge hubs etc.; does however want access to information and could be persuaded to work with the supply chain. Intra-organisational collaboration is the most important.		

6.4 Oil and Gas Company

Consultation notes
Company information

Multinational oil and gas company	Environment and climate change advisor	American MNC that is focused on oil and gas exploration and production. It is one of the world's leading integrated energy companies, which operates on six continents and has a global workforce
Impacts of natural hazards on business; response of the firm		
• They consider sea level rise and extreme events, although do not accept a link between extreme events and climate change/warming. • They are working with operating companies to understand and identify climate risks		
Barriers and opportunities		
Companies can be completely resilient but sometimes public infrastructure does not provide any regional protection. There is also a lack of sophistication in regional climate models. Also reduced efficiency of power generation system in warmer temperatures. No opportunities identified.		
The enabling environment: further support required from donors/government		
They are not sure about engaging in policy dialogue but would be interested in keeping track of government developments.		

Appendix E: Resilience initiatives

Specific consultations

Table 3: Consultation list

	Name	Initiative
1	Alex Harvey	AECF and AECF REACT
2	Magdalena Banasiak	AECF and AECF REACT
3	Anjali Saini	AECF REACT
4	Paulo Mole	AECF REACT (Mozambique)
5	Andrew Maclean	PIDG (and EAIF)
6	Radhika Dil	PIDG (and GAP)
7	Edward Farquharson	PIDG
8	Jack Newnham	BIF and IAP
9	Carolin Schramm	BIF and IAP
10	Craig Davies	EBRD SEI

1. IFAD's Adaptation for Smallholder Agriculture Programme (ASAP)	
IFAD's Adaptation for Smallholder Agriculture Programme (ASAP) is a new programme to help small-holder farmers respond to climate change by scaling up and showcasing multiple-benefit adaptation approaches to landscape management and rural development.	
Public finance mechanisms (PFMs) and instrument types employed	
Category of investment vehicle:	Multi-donor fund
Category of instruments:	Grant
Types of instrument employed:	Grant co-financing, technical assistance and knowledge management
Institutional arrangements	
Name of entity promoting the initiative:	International Fund for Agricultural Development (IFAD) International Fund for Agricultural Development (IFAD) with
Entity type:	UN development agency
Donors	Governments of Belgium, UK, Canada, Netherlands and Sweden.
Institutional structure:	Grants are allocated through existing IFAD country programmes and host country governments
Scope	
Development area:	Food and nutrition (food security – especially targeted at smallholder agriculture)

Target sectors:	Agribusiness (more specifically – smallholder farmers) Financial service providers
Geography:	Global
Category of private sector actors engaged:	Small-holder farmers
Scale (USD):	USD 2.5 billion pledged
Timeframe:	2012-2020
Category of barriers addressed (not necessarily private sector specific barriers)	
1. Commercial risks	Yes – e.g. through development of microinsurance products to reduce risks for smallholder farmers, or climate-proofing production systems
2. Technology and product risk	Yes – e.g. through demonstration of technologies, and innovative smallholder financing products and services
3. Policy environment	Yes – IFAD engage directly with host country government in development and design of programme activities
4. Capacity and skills	Yes – through development of capacity of supporting institutions in 'climate-smart' design of agricultural development programmes, and through developing the skill base of local farmers
5. Corporate maturity	n/a
6. Collaboration and partnership	Yes – through development of 'climate-smart' value chain approaches, to link smallholder farmers to markets and service providers
7. Information and knowledge	Yes – the programme will share best practice examples and lessons learned globally
Partnership models realised	
Type of partnership:	Public to public partnerships
DRM / CCA intervention types	
Type of interventions supported:	Both primary and secondary CCA activities. These could include: use of water efficient irrigation infrastructures for crop production; use of 'climate-smart' techniques in agricultural production; collection of weather information and data to develop innovative smallholder support services (e.g. weather warning, microinsurance).
Effectiveness	
Market transformation:	1. Is it replicable/ scalable? ASAP establishes an example as to how climate change adaptation considerations can be programmes into existing ODA spend. This is something which could be replicated across other ODA funding. However the programme does not set specific targets for leveraging private sector finance. This could limit its overall scalability. 2. Are their opportunities through the programme to engage the private sector? Indirectly. For example through businesses establishing public-private partnership arrangements with host country government recipients of ASAP funding, to support sustainable agricultural value chain creation. 3. How does the programme deliver wider development benefits? The programme has the potential to deliver significant livelihood, climate change, food-security, water security, and biodiversity co-benefits.
Private capital leverage:	Volume of private capital leveraged: n/a Public: private capital leverage ratio: n/a
Transactional efficiency:	Transactions costs as a % of total disbursals (USD): too early to evaluate Volume pledged versus volume disbursed (USD): 2.5 billion versus 4.9

<table>
<tr><td></td><td>million

Minimum disbursal volume: indicative USD 5 million (based on suggested pipeline to date)

Maximum disbursal volume: indicative USD 15 million (based on suggested pipeline to date)

Average number of disbursals processed per year: indicative total of 12 for 2013 with a total spend of USD 121 million.</td></tr>
<tr><td>Resilience impact:</td><td>Only 1 project has received financing through ASAP to date, so analysis of resilience impacts achieved is not possible at this stage.

However the 2020 targets for the programme are as follows:

<table>
<tr><th>#</th><th>10 Key Indicators</th><th>2020 target</th></tr>
<tr><td>1.</td><td># of poor smallholder household members
whose climate resilience has been increased because of ASAP disaggregated
by sex</td><td>8 million people including
4 million women and girls</td></tr>
<tr><td>2.</td><td>% of new investments in ENRM in IFAD 9th
Replenishment compared to IFAD 8th Replenishment</td><td>Doubling share of ENRM
investments in IFAD 9
compared to IFAD 8</td></tr>
<tr><td>3.</td><td>Leverage ratio of ASAP grants versus non ASAP financing</td><td>1:4</td></tr>
<tr><td>4.</td><td>% increase in number of non-invasive on farm plant species per smallholder farm
supported</td><td>30 % increase</td></tr>
<tr><td>5.</td><td># of tonnes of GHG emissions (CO2e) avoided and/or sequestered</td><td>80 million tonnes</td></tr>
<tr><td>6.</td><td># increase in hectares of land managed
under climate resilient practices</td><td>1,000,000 hectares</td></tr>
<tr><td>7.</td><td>% change in water use efficiency by men
and women</td><td>30 % average increase</td></tr>
<tr><td>8.</td><td># of community groups involved in ENRM
and/or DRR formed or strengthened</td><td>1,200 community groups
including especially disadvantaged men and
women</td></tr>
<tr><td>9.</td><td>$ value of new or existing rural infrastructure made climate-resilient</td><td>USD 80 million</td></tr>
<tr><td>10.</td><td># of international and country dialogues
where IFAD or IFAD-supported partners
make an active contribution</td><td>40 dialogues including in
specific areas such as gender and marginalized groups</td></tr>
</table>
</td></tr>
<tr><td colspan="2">How could the programme better engage the private sector?</td></tr>
<tr><td colspan="2">The same principles of integrating climate change considerations into programme design could be applied through a private sector window. This could provide direct access funding to businesses looking to ‘climate-proof’ smallholder supply chains, or develop ‘climate-smart’ agriculture goods and services.</td></tr>
</table>

Sources of information
• http://www.ifad.org/climate/asap/ (accessed 22.04.13) • http://www.ifad.org/operations/projects/design/106/mozambique.pdf (accessed 22.04.13) • http://allafrica.com/stories/201210041080.html (accessed 22.04.13)

2. AECF's REACT window - Mozambique	
The AECF REACT Mozambique Window is a special fund of the AECF that is open to business ideas based on renewable energy and adaptation to climate technologies.	
Public finance mechanisms (PFMs) and instrument types employed	
Category of investment vehicle:	Multi-donor challenge fund
Category of instruments:	Grants and debt
Types of instrument employed:	Matching grants and concessional loans
Institutional arrangements	
Name of entity promoting the initiative:	The Africa Enterprise Challenge Fund (AECF) is a special partnership initiative of the Alliance for Green Revolution in Africa.
Entity type:	NGO
Donors	REACT Mozambique is funded by the Netherlands Ministry of Foreign Affairs **(NMFA)**. The previous REACT Round 1 and Round 2 windows were funded by **UKaid** from the Department for International Development, Danish International Development Agency **(DANIDA)** and the Swedish International Development Cooperation Agency **(SIDA)**. The other major funders of the AECF are the Australian Government Aid Program, the International Fund for Agricultural Development **(IFAD)**.
Institutional structure:	The Board of AGRA provides the governance structure for the AECF and is responsible to the AECF's donors. However, in practice, the AECF operates as an independent fund reporting to its own Investment Committee which in turn reports to a Governing Council made up of its donor funders and ultimately AGRA's Board. The Fund Manager of the AECF and the REACT Window is KPMG Development Advisory Services. Y&R Brands handle the AECF's marketing and communications.
Scope	
Development area:	Energy access, rural pro-poor development, food security, adaptation to climate change
Target sectors:	Energy, agriculture, and rural financial services
Geography:	The current REACT window is targeted at Mozambique.
Category of private sector actors engaged:	Non-exclusive, although would need to be able to contribute at least 50% match funding, of which 50% must be in cash. Applicants can be businesses registered anywhere globally, but must be implementing activities in Mozambique.
Scale (USD):	10 million
Timeframe:	Application window for Mozambique REACT window open Feb – May 2013 only
Barriers addressed	
1. Commercial risks	Yes – directly through access to capital, and indirectly through potential development of microinsurance products
2. Technology and product risk	Yes – through supporting untested business models and innovative technologies as a 'proof of concept'
3. Policy environment	n/a
4. Capacity and skills	n/a

5. Corporate maturity	n/a
6. Collaboration and partnership	n/a
7. Information and knowledge	Yes – AECF shares best practice experience from funded projects
Partnership models realised	
Type of partnership:	Public private partnerships
DRM / CCA intervention types	
Type of interventions supported:	Primary, secondary and tertiary. For example REACT could be used by businesses working with small-holders to implement 'climate-smart' agriculture on smallholdings, and throughout agribusiness supply chains. Or to develop innovative goods and services such as rental equipment for use in zero-tillage field preparation.
Effectiveness	
Market transformation:	1. Is it replicable/ scalable? Yes – the REACT window could be rolled out in different regions, and with additional funding. 2. Are their opportunities through the programme to engage the private sector? The REACT window is exclusively targeted at the private sector. 3. How does the programme deliver wider development benefits? The programme has the potential to deliver significant livelihood, climate change, food-security, water security, and biodiversity co-benefits.
Private capital leverage:	Volume of private capital leveraged: on the basis of 1:1 matched funding, USD 10 million of private capital directly leveraged Public: private capital leverage ratio: anticipated 1:1
Transactional efficiency:	Transaction cost as a % of total disbursals (USD): Volume pledged versus volume disbursed (USD): Minimum disbursal volume: USD 250,000 Maximum disbursal volume: USD 1.5 million Average number of disbursals processed per year: indicative total of 10-15 projects to be selected for funding through the window
Resilience impact:	[Need to carry out performance review of impacts from previous 2 REACT funding windows]
How could the programme better engage the private sector?	
REACT is one of the few CCA initiatives specifically targeted at the private sector. Potential improvements [to be substantiated through stakeholder consultation] could include: • Additional technical assistance during concept development and implementation • Specific windows of support targeted at SME enterprises	
Sources of information	
• http://www.ruralelec.org/fileadmin/DATA/Documents/Webinars/2013-03-20_REACT_Presentation_Moz_Launch.pdf (accessed 24.04.13) • http://www.aecfafrica.org/react/r/index.php (accessed 22.04.13)	

3. Adaptation Fund	
The Adaptation Fund was established to finance concrete adaptation projects and programmes in developing countries that are parties to the Kyoto Protocol and are particularly vulnerable to the adverse effects of climate change.	
Public finance mechanisms (PFMs) and instrument types employed	
Category of investment vehicle:	Multi-donor fund
Category of PFMs / instruments:	Grant
Types of instrument employed:	Grants
Institutional arrangements	
Name of entity promoting the initiative:	Adaptation Fund Board
Entity type:	Multinational board of government representatives - composed of 16 members and 16 alternates
Donors	Under the Clean Development Mechanism (CDM), emission-reduction projects in developing countries can earn certified emission reduction (CER) credits. These credits can be traded and sold by industrialized countries to meet a part of their emission reduction targets under the Kyoto Protocol. Financing for the Adaptation Fund comes mainly from sales of certified emission reductions. The share of proceeds amounts to 2 percent of the value of CERs issued each year for CDM projects. The fund also receives contributions from governments, the private sector, and individuals
Institutional structure:	The Global Environment Facility (GEF) provides secretariat services to the AFB and the World Bank serves as trustee of the Adaptation Fund, both on an interim basis, agreed until 2015. All applicants must submit project proposals through a National Implementing Entity, a Regional Implementing Entity, or a Multilateral Implementing Entity. Proposals also require endorsement by the Designated Authorities of the country in which the project or programme would take place.
Scope	
Development area:	Adaptation to climate change
Target sectors:	Not explicit - *A concrete adaptation project/programme is defined as a set of activities aimed at addressing the adverse impacts of and risks posed by climate change.*
Geography:	Developing countries - Global
Category of private sector actors engaged:	n/a
Scale (USD):	151 million pledged to date
Timeframe:	Proposed in 2001. Made operational 2009. Indefinite life of fund moving forward.
Barriers addressed	
1. Commercial risks	Yes – the AF can overcome lack of access to capital
2. Technology and product risk	Yes – funding can be used to overcome technology cost cap barriers, and provide 'proof of concept' demonstration.
3. Policy environment	Yes – all funding allocated through the AF, must be done so through accredited NIE or RIE. This ensures activities are aligned with domestic policy
4. Capacity and skills	Yes – however capacity building can only be funded if complementary to implementation of 'concrete adaptation projects or programmes'.
5. Corporate maturity	n/a

6. Collaboration and partnership	Yes – AF funding can be used to support partnership development between the various implementing entities within the programme. However the AF does not specifically target public-private partnership creation.
7. Information and knowledge	Yes – the AF provides a forum for sharing best practice examples and experience globally
Partnership models realised	
Type of partnership:	Public-Public partnership
DRM / CCA intervention types	
Type of interventions supported:	Primary and secondary. For example AF funding has been used to support development of primary intervention types such as flood protection, and also for secondary type interventions aimed at improving the climate resilience of agricultural production systems and value chains.
Effectiveness	
Market transformation:	1. Is it replicable/ scalable? Potentially – the CDM financing link provides the potential for long-term funding. However the sustainability of this depends on carbon market developments. Alternative funding mechanisms are being considered by the board. 2. Are their opportunities through the programme to engage the private sector? Opportunities are limited due to two factors: • 10 million USD funding cap, limits incentives for private sector involvement • NIEs typically have less experience in engaging the private sector in PPP structures, than MDBs or other IDIs 3. How does the programme deliver wider development benefits? The AF has the potential to deliver significant livelihood, climate change, food-security, water security, and biodiversity co-benefits.
Private capital leverage:	Volume of private capital leveraged: n/a Public: private capital leverage ratio: n/a
Transactional efficiency:	Transaction cost as a % of total disbursals (USD): transaction costs of approximately 12% of total disbursals Volume pledged versus volume disbursed (USD): 151 million pledged versus 54 million disbursed Minimum disbursal volume: USD 2.9 million (based on approved projects to date) Maximum disbursal volume: USD 9.9 million (based on approved projects to date) Average number of disbursals processed per year: 11.5 (based on average approvals 2011-2012 only)
Resilience impact:	
How could the programme better engage the private sector?	
For the Adaptation Fund to effectively engage the private sector, the institutional capacity of NIEs and RIEs in	

designing and implementing PPPs will have to be developed. As capacity building activities fall outside of the scope of direct funding through the AF, this would need to be delivered through an alternative source.
Sources of information
• http://unfccc.int/cooperation_and_support/financial_mechanism/adaptation_fund/items/3659.php (accessed 25.04.13) • https://www.adaptation-fund.org/ (accessed 25.04.13) • http://www.climatefundsupdate.org/listing/adaptation-fund (accessed 25.04.13) • https://www.adaptation-fund.org/sites/default/files/Review%20of%20Interim%20Arrangements-Final_0.pdf • http://unfccc.int/resource/docs/2012/sbi/eng/inf08r01.pdf • Consultation with Su-Lin Garbett-Sheils, DFID.

4. Pilot Programme for Climate Resilience (PPCR)	
A targeted program of the Strategic Climate Fund (SCF), which funds technical assistance and investments to support countries' efforts to integrate climate risk and resilience into core development planning and implementation.	
Public finance mechanisms (PFMs) and instrument types employed	
Category of investment vehicle:	Multi-donor fund
Category of PFMs / instruments:	Grant, debt, financial de-risking instruments
Types of instrument employed:	Technical assistance, grants, concessional loan, development of insurance products
Institutional arrangements	
Name of entity promoting the initiative:	World Bank
Entity type:	MDBs
Donors	Australia, Canada, Denmark, Germany, Japan, Norway, Spain, UK and United States
Institutional structure:	The World Bank serves as the Trustee and Administrating Unit of the PPCR. The World Bank Group, the African Development Bank, the Asian Development Bank, the European Development Bank, and the Inter-American Development Bank are the implementing agencies for PPCR investments.
Scope	
Development area:	Adaptation to climate change
Target sectors:	Not explicit. However likely to include agriculture, microinsurance, smallholder financial services, water, natural resource management (inc forestry), and energy.
Geography:	20 developing countries and regions including – Tonga, Samoa, PNG, the Pacific, St Lucia, St Vincent and the Grenadines, Haiti, Jamaica, Dominica, Grenada, the Caribbean region, Zambia, Mozambique, Yemen, Tajikistan, Nepal, Niger, Cambodia, Bolivia, and Bangladesh.
Category of private sector actors engaged:	Private sector actively engaged through 70 million concessional funding set aside. Types of private sector actors could include – local banks, local businesses, and international businesses. Direct access for SMEs unlikely due to due diligence requirements.
Scale (USD):	1.1 billion Pledged to PPCR as of June 2012. 70 million set aside for private sector direct engagement.
Timeframe:	Intended fast start finance period of 2008-2012. However the PPCR adopts the CIF sunset clause which enables closure of funds once a new financial architecture becomes effective

	under the UNFCCC regime. Until such time, donors and recipients operate under the existing framework.
Barriers addressed	
1. Commercial risks	Yes – the PPCR funding can help overcome lack of access to capital, and lack of access to insurance through development of improved climate risk data sets to underpin products.
2. Technology and product risk	Yes – funding can be used to overcome technology cost cap barriers, and provide 'proof of concept' demonstration.
3. Policy environment	Yes – all funding channelled through the PPCR must be to support initiatives aligned with national adaptation plans and objectives.
4. Capacity and skills	Yes – funding can be used to provide technical assistance in development of concepts
5. Corporate maturity	Yes – funding can be used to provide technical assistance to support the development of scoping assessments and feasibility assessments to support decision making under uncertainty.
6. Collaboration and partnership	Yes – the scoping assessments developed as part of national PPCR planning activities, supported development of B2B and public-private partnership activities.
7. Information and knowledge	Yes – a key objective of the PPCR is to develop improved data sets for use in assessment of climate risks, and development of climate related insurance products.
Partnership models realised	
Type of partnership:	Public-Public partnerships, B2B partnerships.
DRM / CCA intervention types	
Type of interventions supported:	Primary and secondary. For example supported activities could include - Improving agricultural practices and food security, building climate-resilient water supply and sanitation infrastructure, monitoring and analyzing weather data, and conducting feasibility studies for climate-resilient housing in coastal areas.
Effectiveness	
Market transformation:	1. Is it replicable/ scalable? Yes – the PPCR could be expanded in geographic scope to include additional developing countries. 2. Are their opportunities through the programme to engage the private sector? Yes – the PPCR explicitly looks to engage the private sector in dialogue and development of CCA interventions. This is demonstrated by the USD 70 million private sector set aside concessional financing window. 3. How does the programme deliver wider development benefits? PPCR programs are country-led and build on National Adaptation Programs of Action (NAPAs) and other national development programs and plans. The PPCR complements existing development efforts and supports actions based on comprehensive planning consistent with countries' poverty reduction and development goals.
Private capital leverage:	Volume of private capital leveraged: [TBC] Public: private capital leverage ratio: [TBC]
Transactional efficiency:	Transaction cost as a % of total disbursals (USD):

	Volume pledged versus volume disbursed (USD): 1.155 billion pledged versus 8 million disbursal Minimum disbursal volume: USD 0.3 million (based on approved country programmes to date) Maximum disbursal volume: USD 110 million (based on approved country programmes to date) Average number of disbursals processed per year:
Resilience impact:	The PPCR expects to deliver the following outcomes: • An increased capacity to integrate climate resilience into country development strategies; • A more inclusive approach to climate resilient growth and development; • An increased awareness of the potential impact of climate change; • Scaled-up investment for broader interventions and programming related to climate resilience; and • Improved coordination among stakeholders regarding country-specific climate resilient programs
How could the programme better engage the private sector?	
The PPCR programme has been designed to engage the private sector in CCA intervention implementation. This is evidenced through the recently announced 70 million USD concessional financing window targeted at private sector engagement. In addition, the PPCR is indirectly looking to support SME agriculture enterprises, through supporting the development of agricultural microinsurance products and smallholder credit lines.	
Sources of information	
• http://www.climatefundsupdate.org/listing/pilot-program-for-climate-resilience (accessed 26.04.13) • https://www.climateinvestmentfunds.org/cif/ppcr (accessed 26.04.13) • https://www.climateinvestmentfunds.org/cif/set-aside/ppcr (accessed 26.04.13)	

5. Least Developing Countries Fund (LDC)	
LDCF was established to support a work programme to assist Least Developed Country Parties (LDCs) carry out, inter alia, the preparation and implementation of national adaptation programmes of action (NAPAs).	
Public finance mechanisms (PFMs) and instrument types employed	
Category of investment vehicle:	Multi-donor fund
Category of PFMs / instruments:	Grant
Types of instrument employed:	Technical assistance, and grants
Institutional arrangements	
Name of entity promoting the initiative:	Global Environment Facility
Entity type:	International development institution
Donors	Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Hungary, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Romania, Spain, Sweden, Switzerland, UK, and United States.
Institutional structure:	The GEF is the administrator of the LDC Fund, and the World Bank acts as trustee. Decisions on fund allocation are made by a board of 32 GEF member constituent representatives (14 developed, 18 developing).
Scope	
Development area:	Adaptation to climate change
Target sectors:	Not explicit. Depends on national priorities but includes: food security and agriculture, water, coastal management, energy, health, ecosystems, and early warning systems and disaster risk management.
Geography:	Least Developed Countries
Category of private sector actors engaged:	Private sector actors not directly engaged through the fund
Scale (USD):	605 million pledged
Timeframe:	Operational since 2002
Barriers addressed	
1. Commercial risks	Yes – overcomes lack of access to capital for implementation of adaptation planning and interventions
2. Technology and product risk	n/a
3. Policy environment	Yes – the LDC fund supports the development and implementation of national adaptation plans / programmes of action, aligned with national priorities and policies. In many cases this activity is the first step in formulation of national climate change policies.
4. Capacity and skills	Yes – the LDC fund provides capacity building support to national institutions during development of NAPAs.
5. Corporate maturity	Yes – the information compiled in the NAPAs related to climate change impacts and risks, supports informed decision making by policy makers who would otherwise face challenges given the uncertainty.
6. Collaboration and partnership	Yes – supports inter-ministry planning. However it does not specifically look to develop public-private partnership models necessarily.
7. Information and knowledge	Yes – NAPA formulation process helps overcome challenges of interpretation of technical data by policy makers
Partnership models realised	
Type of partnership:	Public-Public partnerships
DRM / CCA intervention types	
Type of interventions supported:	Primary and secondary. These include - early warning system development, coastal infrastructure development,

	forest rehabilitation activities, adoption of climate-smart agriculture systems.
Effectiveness	
Market transformation:	1. Is it replicable/ scalable? The LDC fund is already operating at global scale. Opportunities to scale support for implementation of CCA / DRM plans could be explored. 2. Are their opportunities through the programme to engage the private sector? Not directly. The remit for exploring opportunities for working with the private sector lies with the respective host country governments for which NAPAs are being developed. 3. How does the programme deliver wider development benefits? The NAPAs developed and implemented through the LDC fund are aligned to national development objectives. Co-benefits include food security, ecosystem restoration, livelihood creation, biodiversity, and other ecosystem service restoration benefits.
Private capital leverage:	Volume of private capital leveraged: n/a Public: private capital leverage ratio: n/a
Transactional efficiency:	Transaction cost as a % of total disbursals (USD): Volume pledged versus volume disbursed (USD): 605 million pledged versus 133 disbursed Minimum disbursal volume: 0.2 million (approved projects to date) Maximum disbursal volume: 11.49 (approved projects to date) Average number of disbursals processed per year: 11.8 (2003-2012 project approvals)
Resilience impact:	•
How could the programme better engage the private sector?	
[To be developed through consultation]	
Sources of information	
• http://www.climatefundsupdate.org/listing/least-developed-countries-fund (accessed 30.04.13) • http://unfccc.int/cooperation_support/least_developed_countries_portal/ldc_fund/items/4723.php (accessed 30.04.13) • http://www.thegef.org/gef/node/3311 (accessed 30.04.13)	

6. Climate Development Knowledge Network (CDKN)	
A program that supports decision-makers in the public, private, and NGO sectors in designing and delivering climate compatible development through research, advisory services, and knowledge management.	
Public finance mechanisms (PFMs) and instrument types employed	
Category of investment vehicle:	Multi-donor fund
Category of PFMs / instruments:	Grant
Types of instrument employed:	Technical assistance, research, and matching grants
Institutional arrangements	
Name of entity promoting the initiative:	• PwC • Lead International • Oversees Development Institute • Fundación Futuro Latinoamericano • INTRAC • SouthSouthNorth
Entity type:	Private sector and NGO alliance.
Donors	The Climate and Development Knowledge Network is funded over an initial five-year period from March 2010 by the UK Department for International Development (DfID). Additional funding commitment has since been made by the Dutch Ministry of Foreign Affairs.
Institutional structure:	PwC leads and manages global alliance of six private and not-for-profit organisations which together form the CDKN.
Scope	
Development area:	• Climate compatible development strategies and plans • Improving developing countries' access to climate finance • Strengthening resilience through climate-related disaster risk management • Supporting climate negotiators from the least developed and most vulnerable countries
Target sectors:	Water, energy, agriculture, finance and disaster risk management
Geography:	The program operates across 3 regions, Asia, Africa and Latin America, and is directly engaged in 46 countries across these three regions. The programme has 14 deep engagement countries which is the focus of our programme, these are: Bangladesh, Nepal, India, Pakistan, Indonesia, Uganda, Mozambique, Rwanda, Ethiopia, Kenya, Peru, Colombia, El Salvador and the Caribbean (comprising 17 countries in CARICOM).
Category of private sector actors engaged:	The CDKN is preparing an initiative to engage the private sector directly. This will be called the Climate Business Development Network (CBDN). The CBDN will engage with a range of businesses from MNCs, National Companies to SMEs, and look to foster Business to Business partnerships for delivery of climate compatible goods and services.
Scale (USD):	72.3 million GBP
Timeframe:	2010-2015
Barriers addressed	
1. Commercial risks	Yes – overcomes lack of access to capital for implementation of adaptation planning and interventions
2. Technology and product risk	n/a
3. Policy environment	Yes – CDKN supports the research, development and implementation of national adaptation plans and policies aligned with national priorities.
4. Capacity and skills	Yes – CDKN provides capacity building support to national institutions during development of NAPAs. The CBDK will

	help build private sector capacity in implementation of climate compatible goods and services.
5. Corporate maturity	Yes – in the future the CBDN will support businesses in developing countries analyse the risks and opportunities of delivery of climate compatible business models.
6. Collaboration and partnership	Yes – the CBDN will help formulate business to business partnerships in development of climate compatible business concepts and offerings.
7. Information and knowledge	Yes – the CDKN portal provides an online platform for sharing best practice examples and relevant information and data related to climate compatible development.
Partnership models realised	
Type of partnership:	Public-Public, South-South, South-North, and through future CBDN - business to business and public-private partnerships
DRM / CCA intervention types	
Type of interventions supported:	Primary and secondary. Relevant to climate change adaptation and disaster risk management across a range of sectors including: agriculture, water, energy, and natural resource management.
Effectiveness	
Market transformation:	1. Is it replicable/ scalable? Yes. CDKN support could be scaled and extended to new priority countries and regions. 2. Are their opportunities through the programme to engage the private sector? The CBDN currently being designed also offers a model for stimulation of business to business partnerships that could lead to implementation of climate compatible business models. 3. How does the programme deliver wider development benefits? The research and CCA/DRM plans developed and implemented through CDKN are aligned to national development objectives. Co-benefits include food security, ecosystem restoration, livelihood creation, biodiversity, and other ecosystem service restoration benefits.
Private capital leverage:	Volume of private capital leveraged: n/a under CDKN to date. However business contributions will be a requirement of funding through the CBDN. Details to be determined. Public: private capital leverage ratio: n/a under CDKN to date. However business contributions will be a requirement of funding through the CBDN. Details to be determined.
Transactional efficiency:	Transaction cost as a % of total disbursals (USD): 10% Volume pledged versus volume disbursed (USD): 72.5 million GBP versus 43.9 million GBP. Minimum disbursal volume: 500 GBP (approved projects to date) Maximum disbursal volume: 500,000 GBP (approved projects to date)

	Average number of disbursals processed per year: 1,500 (invoices processed through finance team)
Resilience impact:	•
How could the programme better engage the private sector?	
The CDKN is developing a sub-programme focused on direct engagement with the private sector – the Climate Business Development Network. The CBDN (still in formulation phase) will focus on fostering business to business partnerships to help overcome knowledge, skills and capacity barriers, related to development of climate compatible products and services.	
Sources of information	
• http://cdkn.org/?loclang=en_gb (Accessed 01.05.13) • Consultations with CDKN management team	

7. *IADB's PROADAPT Facility*	
IADB supported programme to provide technical assistance to projects, collect knowledge and lessons learned from these projects, and support the development of new models, tools, and methodologies to assist MSMEs in becoming more climate resilient in Latin America and the Caribbean. ROADAPT will work with a projected 2,000 MSMEs to develop new tools, business models, and knowledge that will increase their climate resilience—for example, their ability to anticipate damage from and minimize the effects of extreme weather events, modify production practices and value chains, withstand interruptions in basic services (such as electricity and water), and manage water at production sites. The facility will also work with MSME-related institutions, including local public authorities, to create greater awareness and knowledge of climate resilience among MSMEs. Participating MSMEs will receive support in identifying and accessing business opportunities that stimulate green growth. These opportunities are driven by the demand for new services and products that households, enterprises and public entities need to protect their businesses, personal property, communities and public assets. Enterprises with the right business models and know-how will tap a growing number of market opportunities as climate threats evolve.	
Public finance mechanisms (PFMs) and instrument types employed	
Category of investment vehicle:	Multi-donor fund
Category of PFMs / instruments:	Grant
Types of instrument employed:	Technical assistance, grants, matching grants
Institutional arrangements	
Name of entity promoting the initiative:	IADB
Entity type:	MDB
Donors	Norway and the Multilateral Investment Fund
Institutional structure:	[to be confirmed through consultation]
Scope	
Development area:	Building climate resilience
Target sectors:	Not specified
Geography:	Latin America
Category of private sector actors engaged:	Micro, small and medium sized enterprises
Scale (USD):	11.865 million
Timeframe:	2013 - 2018
Barriers addressed	
1. Commercial risks	Yes – overcomes lack of access to capital for implementation of adaptation planning and interventions
2. Technology and product risk	Yes –could allow for trial of new climate compatible technologies

3. Policy environment	Yes – the programme will work with MSME-related institutions, including local public authorities, to create greater awareness and knowledge of climate resilience among MSMEs.
4. Capacity and skills	Yes – the programme will work with MSME-related institutions, including local public authorities, to create greater awareness and knowledge of climate resilience among MSMEs.
5. Corporate maturity	Yes – the programme will develop new tools, business models, and knowledge that will increase their climate resilience.
6. Collaboration and partnership	Yes – the programme will help climate proof value chains and foster the necessary B2B partnerships necessary to do so.
7. Information and knowledge	Yes – the programme will share best practice examples across the region.
Partnership models realised	
Type of partnership:	Business to business and public-private partnerships
DRM / CCA intervention types	
Type of interventions supported:	Both primary and secondary. The programme will work with local MSMEs to enhance their ability to anticipate damage from and minimize the effects of extreme weather events, modify production practices and value chains, withstand interruptions in basic services (such as electricity and water), and manage water at production sites
Effectiveness	
Market transformation:	1. Is it replicable/ scalable? Yes. There are few programmes existing which look to target MSMEs specifically and therefore fill a key gap. This could be replicated in other geographic areas with high incidence of MSMEs. 2. Are their opportunities through the programme to engage the private sector? The programme directly targets engagement with MSME private sector actors. 3. How does the programme deliver wider development benefits? [To be confirmed through consultation with relevant stakeholders]
Private capital leverage:	Volume of private capital leveraged: [To be confirmed through consultation with relevant stakeholders] Public: private capital leverage ratio: [To be confirmed through consultation with relevant stakeholders]
Transactional efficiency:	Transaction cost as a % of total disbursals (USD): [To be confirmed through consultation with relevant stakeholders] Volume pledged versus volume disbursed (USD): 11.865 million pledged, 0 million disbursed to date (programme yet to become fully operational) Minimum disbursal volume: [To be confirmed through

	consultation with relevant stakeholders] Maximum disbursal volume[To be confirmed through consultation with relevant stakeholders] Average number of disbursals processed per year: too early to evaluate
Resilience impact:	Too early to evaluate
How could the programme better engage the private sector?	
The programme is being designed to engage the private sector. It is too early to evaluate how the effectiveness of this engagement could be improved.	
Sources of information	
• http://www5.iadb.org/mif/HOME/News/PressReleases/tabid/467/ArtMID/3819/ArticleID/73/language/en-US/Default.aspx (Accessed 01.05.13) • http://www.ndf.fi/index.php?id=197 (Accessed 01.05.13) • http://www.iadb.org/en/projects/project-description-title,1303.html?id=RG-X1167 (Accessed 01.05.13)	

8. Special Climate Change Fund (SCCF)	
Global Environment Facility operated fund established in 2001 to finance projects relating to adaptation; technology transfer and capacity building; energy, transport, industry, agriculture, forestry and waste management; and economic diversification.	
Public finance mechanisms (PFMs) and instrument types employed	
Category of investment vehicle:	Multi-donor fund
Category of PFMs / instruments:	Grant
Types of instrument employed:	Technical assistance, non-matching grants
Institutional arrangements	
Name of entity promoting the initiative:	Global Environmental Facility
Entity type:	International development institution
Donors	Belgium, Canada, Denmark, Finland, Germany, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, UK, and the United States.
Institutional structure:	The GEF is the administrator of the SCCF Fund, and the World Bank acts as trustee. Decisions on fund allocation are made by a board of 32 GEF member constituent representatives (14 developed, 18 developing).
Scope	
Development area:	Climate change adaptation, technology transfer, and poverty reduction
Target sectors:	Energy, transport, industry, agriculture, forestry, and waste management
Geography:	All Non-Annex 1 countries are eligible to apply, although the needs of the most vulnerable countries in Africa, Asia, and the Small Island Developing States (SIDS) are to be prioritised
Category of private sector actors engaged:	n/a
Scale (USD):	295.33 million (pledged)
Timeframe:	Operational since 2002
Barriers addressed	
1. Commercial risks	Yes – overcomes lack of access to capital for implementation of adaptation planning and interventions

2. Technology and product risk	Yes – supports technology transfer and demonstration
3. Policy environment	Yes – the SCCF supports the programmes that are host country-driven and integrated into national sustainable development and poverty-reduction strategies. They also take into account national communications or NAPAs and other relevant studies.
4. Capacity and skills	Yes – the SCCF fund provides capacity building support to national institutions during implementation of programmes.
5. Corporate maturity	n/a
6. Collaboration and partnership	Yes – supports inter-ministry planning. However it does not specifically look to develop public-private partnership models necessarily.
7. Information and knowledge	Yes – programme formulation process helps overcome challenges of interpretation of technical data by policy makers
Partnership models realised	
Type of partnership:	Public-Public, South-South, South-North
DRM / CCA intervention types	
Type of interventions supported:	Primary and secondary. Relevant to climate change adaptation across a range of sectors including: Energy, transport, industry, agriculture, forestry, and waste management.
Effectiveness	
Market transformation:	1. Is it replicable/ scalable? The SCCF is already operating at global scale. Opportunities to scale support for implementation of programmes could be explored. 2. Are their opportunities through the programme to engage the private sector? Not directly. The remit for exploring opportunities for working with the private sector lies with the respective host country governments through which programmes are designed and implemented. 3. How does the programme deliver wider development benefits? The programmes developed and implemented through the SCCF are aligned to national development objectives. Co-benefits include food security, ecosystem restoration, livelihood creation, biodiversity, and other ecosystem service restoration benefits.
Private capital leverage:	Volume of private capital leveraged: n/a Public: private capital leverage ratio: n/a
Transactional efficiency:	Transaction cost as a % of total disbursals (USD): Volume pledged versus volume disbursed (USD): 259.33 million versus 111.13 million. Minimum disbursal volume: 0.87 million (approved projects to date) Maximum disbursal volume: 13.13 million (approved

	projects to date) Average number of disbursals processed per year: 7 (based on disbursals made between 2006-2012)
Resilience impact:	[TBC]
How could the programme better engage the private sector?	
[TBC through consultation with Su-Lin's contacts]	
Sources of information	
• http://www.climatefundsupdate.org/listing/special-climate-change-fund#TOC-Administrating-Organisation (accessed 02.05.13) • http://unfccc.int/cooperation_and_support/financial_mechanism/special_climate_change_fund/items/3657.php (accessed 02.05.13) • http://www.thegef.org/gef/SCCF (accessed 02.05.13) • http://web.worldbank.org/WBSITE/EXTERNAL/EXTABOUTUS/ORGANIZATION/CFPEXT/0,,contentMDK:22468021~pagePK:64060249~piPK:64060294~theSitePK:299948,00.html (accessed 02.05.13)	

9. World Bank managed Global Facility for Disaster Reduction and Recovery (GFDRR)	
The Global Facility for Disaster Reduction and Recovery (GFDRR) is a partnership of 41 countries and 8 international organizations committed to helping developing countries reduce their vulnerability to natural hazards and adapt to climate change. The partnership's mission is to mainstream disaster risk reduction (DRR) and climate change adaptation (CCA) in country development strategies by supporting a country-led and managed implementation of the Hyogo Framework for Action (HFA).	
Public finance mechanisms (PFMs) and instrument types employed	
Category of investment vehicle:	Multi-donor fund
Category of PFMs / instruments:	Grant, and De-risking
Types of instrument employed:	Grant, matching grant, technical assistance, risk management, insurance products
Institutional arrangements	
Name of entity promoting the initiative:	World Bank
Entity type:	MDB
Donors	EC, Australia, Sweden, World Bank, UK, Germany , Denmark, Japan, Norway, Spain, Netherlands, Switzerland, Luxembourg, Italy, United States, Canada, Austria, Brazil, Ireland, France, South Korea, Nigeria.
Institutional structure:	The Secretariat carries out the mission of the GFDRR and manages its day-to-day operations. The GFDRR Secretariat provides an annual report on GFDRR activities to the Consultative Group through the Consultative Group Chair. It is housed at the World Bank headquarters. The Consultative Group (CG) is GFDRR's policy making body and creates the essence of most GFDRR long-term strategic objectives while overseeing expected results. The CG consists of official donors contributing at least USD 3 million in cash cumulatively over three consecutive years; recipient or developing country governments contributing at least USD 500,000 in cash cumulatively over three consecutive years; UNISDR as a non-contributing member; the Chair of the Results Management Council; and the UN Development Programme (UNDP) and the International Federation of Red Cross and Red Crescent Societies (IFRC) as permanent observers. In addition, the CG may invite up to six developing country governments to be members on a

	staggered rotation basis. The CG meets twice a year and is chaired by the World Bank's Vice President for Sustainable Development and co-chaired by a donor member. The Results Management Council (RMC) provides technical guidance to support GFDRR-financed activities. Members of the RMC have advised the GFDRR Secretariat and the Consultative Group on the establishment of a results framework for disaster risk reduction and continue to guide its implementation to ensure an effective framework remains in place. In addition, RMC members provide strategic advice on how best to disseminate knowledge and share best practices at the local, regional and international levels while leveraging their respective networks to broaden the scope and reach of GFDRR's activities
Scope	
Development area:	Climate change adaptation. Climate resilient development. Disaster risk management
Target sectors:	Technology, Agriculture , Coastal Zone Management , Fisheries , Forestry , Infrastructures , Natural Resource Management , Populations & Human Settlements , Sustainable Land Management , Tourism , Transport , Waste Management , Water
Geography:	Burkina Faso, Ethiopia, Ghana, Madagascar, Malawi, Mali, Mozambique, Senegal, Togo, Indonesia, Marshall Islands, Papua New Guinea, Solomon Islands, Vietnam, Kyrgyz Republic, Haiti, Panama, Djibouti, Yemen, Nepal, Mongolia, Lao PDR, Philippines, Vanuatu, Colombia, Costa Rica, Ecuador, Guatemala, Bangladesh, Pakistan, Sri Lanka
Category of private sector actors engaged:	[TBC]
Scale (USD):	350.053 million (pledged up to 2014)
Timeframe:	Operational since 2006
Barriers addressed	
1. Commercial risks	Yes – overcomes lack of access to capital for implementation of CCA/DRR planning and implementation
2. Technology and product risk	Yes – supports technology transfer and demonstration
3. Policy environment	Yes – the supports the programmes that are host country-driven and integrated into national sustainable development and poverty-reduction strategies. They also support initiatives to deliver policy co-ordination within regions (e.g. Pacific)
4. Capacity and skills	Yes – The new GFDRR capacity building and training strategy consolidates existing GFDRR learning efforts while facilitating the implementation of the disaster risk reduction learning agenda. It focuses on institutional capacity-building in line with the GFDRR mandate to strengthen national, regional, and global capacity for increased disaster resilience. This capacity building strategy addresses the human resource need of disaster risk reduction at all levels--national, regional and global, as derived from the comprehensive approach of the three tracks of GFDRR and integrated into the programmatic assistance to countries and institutions.
5. Corporate maturity	n/a

6. Collaboration and partnership	Yes – key objectives of the GFDRR are to enhance global and regional advocacy, strategic partnerships, and knowledge management for mainstreaming disaster risk reduction; and to promote the standardization and harmonization of hazard risk management tools, methodologies, and practices.
7. Information and knowledge	Yes – To help implement the Hyogo Framework for Action 2005-2015 (HFA), GFDRR established a program to strengthen weather and climate information and decision-support systems.
Partnership models realised	
Type of partnership:	Public-Public, South-South, South-North
DRM / CCA intervention types	
Type of interventions supported:	Primary. Interventions supported have included: regional disaster risk management planning, development of river defence systems, and multi-hazard risk assessment for urban areas.
Effectiveness	
Market transformation:	1. Is it replicable/ scalable? Could be expanded to additional priority countries. 2. Are their opportunities through the programme to engage the private sector? Yes – through opportunities to engage with the private sector in development of insurance products in particular. 3. How does the programme deliver wider development benefits? The programmes developed and implemented are aligned to national development objectives. Co-benefits include food security, ecosystem restoration, livelihood creation, biodiversity, and other ecosystem service restoration benefits.
Private capital leverage:	Volume of private capital leveraged: TBC Public: private capital leverage ratio: TBC
Transactional efficiency:	Transaction cost as a % of total disbursals (USD): Volume pledged versus volume disbursed (USD): Minimum disbursal volume: Maximum disbursal volume: Average number of disbursals processed per year:
Resilience impact:	[TBC]
How could the programme better engage the private sector?	
[TBC through consultation]	
Sources of information	
• https://www.gfdrr.org/node/1 (accessed 03.05.13) • http://www.climatefinanceoptions.org/cfo/node/207 (accessed 03.05.13)	

10. Caribbean Catastrophe Risk Insurance Facility (CCRIF)	
CCRIF is a risk pooling facility, owned, operated and registered in the Caribbean for Caribbean governments. It is designed to limit the financial impact of catastrophic hurricanes and earthquakes to Caribbean governments by quickly providing short term liquidity when a policy is triggered. Through risk pooling, CCRIF provides coverage to countries at a significantly lower cost than individual governments would incur if they had to maintain their own reserves or if they were to independently purchase insurance in the open market.	
Public finance mechanisms (PFMs) and instrument types employed	
Category of investment vehicle:	Risk Insurance Facility financed through a multi-donor trust fund and member country contributions.
Category of PFMs / instruments:	De-risking
Types of instrument employed:	Insurance products
Institutional arrangements	
Name of entity promoting the initiative:	CARICOM (members of the Caribbean Community) and the World Bank
Entity type:	Regional governments and MDB
Donors	Japan, EU, World Bank, Caribbean Development Bank, and the governments of Bermuda, Canada, France, Ireland, and the UK. (In addition 16 participating countries pay premiums)
Institutional structure:	The CCRIF is headed by an Executive Board made up of representatives from CARICOM, and the Caribbean Development Bank. The board oversees a team formed of risk management companies, asset management companies and re-insurance companies.
Scope	
Development area:	Climate change adaptation. Disaster risk management (especially hurricane and earthquake risks)
Target sectors:	The risk coverage for hurricane and earthquake events are paid out at national level, and therefore not sector specific. However, work is underway to develop insurance products specifically targeted at utilities and agriculture sectors.
Geography:	Anguilla, Antigua & Barbuda, Bahamas, Barbados, Belize, Bermuda, Cayman Islands, Dominica, Grenada, Haiti, Jamaica, St Kitts & Nevis, St Lucia, St Vincent & the Grenadines, Trinidad and Tobago, and Turks and Caicos Islands.
Category of private sector actors engaged:	Indirectly - multi-national insurance companies
Scale (USD):	67.6 million USD of funds committed (2007-2012)
Timeframe:	Operational since 2007
Barriers addressed	
1. Commercial risks	Yes – reduced country investment risk by making available fast-disbursing financial assistance to governments in the event of catastrophe following earthquake and hurricane.
2. Technology and product risk	n/a
3. Policy environment	Yes – the direct beneficiaries of the CCRIF are the 16 participating Caribbean host country governments. The function of the CCRIF plays an important role in DRM policy.
4. Capacity and skills	Yes – the CCRIF supports a regional scholarship programme to build technical capacity in DRM. The overall aim of the programme is to help Caribbean countries deepen their understanding of natural hazards and catastrophe risk, and the potential impacts of climate change on the region. This in turn will build capacity and knowledge bases for the development of adaptation strategies and building of regional climate change resilience through improved risk management.
5. Corporate maturity	n/a

6. Collaboration and partnership	Yes – the CCRIF is the first multi-country catastrophe insurance pool. The partnership structure allows them to secure insurance at approximately half the cost that would be incurred if each country accessed re-insurance directly.
7. Information and knowledge	Yes – CCRIF works with partner organisations such as the Caribbean Institute for Meteorology and Hydrology (CIMH) and the Caribbean Disaster and Emergency Management Agency (CDEMA) to provide data and other technical assistance for better planning for, response to, and recovery from natural catastrophes
Partnership models realised	
Type of partnership:	South-South.
DRM / CCA intervention types	
Type of interventions supported:	Primary intervention - insurance coverage for hurricane or earthquake events.
Effectiveness	
Market transformation:	1. Is it replicable/ scalable? Yes – the principles of risk pooling and insurance are of importance to small countries in regions prone to natural disasters (e.g. storm damage, drought, earthquake etc). The key is to ensure that the correlation between the risk being faced and the region concerned is sufficiently weak. Therefore likely to be more viable if for regional as opposed to sub-regional scale. 2. Are their opportunities through the programme to engage the private sector? Yes – the private sector is already engaged in management and delivery of the programme. Partnerships have also been developed for the development of new insurance products (e.g. CCRIF/Swiss Re Excess Rainfall Product) 3. How does the programme deliver wider development benefits? Indirect benefits achieved through public expenditures on repair of damaged public infrastructures
Private capital leverage:	Volume of private capital leveraged: n/a Public: private capital leverage ratio: n/a
Transactional efficiency:	Transaction cost as a % of total disbursals (USD): Volume pledged versus volume disbursed (USD): Since 2007 the Facility has made eight payouts totalling USD 32,179,470 to seven member governments Minimum disbursal volume: USD 418,976 (St Lucia, earthquake, 2007) Maximum disbursal volume: USD 8,560,247 (Barbados, tropical cyclone, 2010) Average number of disbursals processed per year: 1.4 (2007-2011)
Resilience impact:	

How could the programme better engage the private sector?
[TBC through consultation]
Sources of information
• http://www.un.org/en/development/desa/policy/wess/wess_current/2012wess_chapter3.pdf • http://www.gfdrr.org/sites/gfdrr.org/files/documents/DRFI_CCRIF_Jan11.pdf (accessed 03.05.13) • http://www.ccrif.org/ (accessed 03.05.13)

Appendix F: Private sector development initiatives

1. GAVI's Advance Market Commitment (AMC)	
The pneumococcal AMC accelerates the delivery of pneumococcal vaccines for children in developing countries. Donor commitments guarantee the price of vaccines once they are developed, and incentivize vaccine makers to invest in R&D and expand manufacturing capacity. In turn, companies sign a legally-binding 10 year commitment to provide the vaccines at an affordable price (no more than USD 3.50 per dose) to developing countries in the long-term (paid for by GAVI with co-financing from recipient country governments).	
Overview: institutional arrangements and scope	
Category of initiative	**Price support mechanism**
Category of instruments employed:	**Advance Market Commitment**
Entity promoting the initiative:	GAVI Alliance (The Gates Foundation, World Health Organisation, UNICEF, World Bank)
Entity type :	**Partnership Alliance**
Single or multi donor:	**Multi donor:** donors include the UK, Italy, Norway, the Russian Federation, and Canada; and the Gates Foundation
Implementing entities:	International Bank for Reconstruction and Development (IBRD); UNICEF
Partnership model (if any)	**Alliance** Donors make grant payments to the International Bank for Reconstruction and Development (IBRD). IBRD holds donor payments on its balance sheet. These are designated assets with a corresponding liability and are paid to GAVI under the AMC terms and conditions. UNICEF manages the procurement process by issuing 'Calls for Supply Offers' to manufacturers and arranging supplier agreements with manufacturers. Once developed, the vaccine are distributed by UNICEF. The World Health Organisation has established the minimum technical criteria for suitable pneumococcal vaccines.
Recipient of support:	Vaccine manufacturers National country governments
Development area:	**Health**
Target sectors:	Health: vaccine development and distribution
Geography:	Eligible developing countries (to date, 19 countries have been approved to receive support)
Category of private sector actors engaged:	MNCs and national companies (pharmaceuticals / vaccine manufacturers)
Scale:	USD 1.5 billion from initial donors (+ USD 1.3 billion GAVI endorsed budget). The pilot scheme aims to purchase 2 billion doses and save 7 million lives by 2030.
Timeframe:	2010-2015
Number of people/businesses reached:	A total of 96 million doses of pneumococcal vaccines have been contracted, to be supplied on an annual basis from 2014. Some 16 countries have to date introduced the vaccine with support from GAVI within 18 months from first product approvals, and an additional 10 countries are expected to introduce before the end of 2012.
Has the initiative reached its objectives (performance against initiative specific indicators):	N/A

Barriers: which barriers does the initiative seek to address	
Direct	**Commercial risks** and **technology and product risk:** pharmaceutical companies perceive there to be minimal return on investment in developing vaccine for developing country markets. Manufacturers are concerned that limited sales (due to the perceived limited ability of developing countries to pay for vaccines) will prevent them recouping initial upfront investment costs. Through GAVI AMC donors commit funds to guarantee the price of vaccines once they have been developed, providing vaccine manufacturers with the incentive they need to invest in vaccine research and development, and to expand manufacturing capacity.
Indirect	
Sector specific	
Sources of information	
• http://www.gavialliance.org/funding/pneumococcal-amc/ (accessed 28.02.13) • Advanced Market Commitment for Pneumococcal Vaccines: Annual Report 1 April 2011 – 31 March 2012 • http://www.unicef.org/supply/index_gavi.html	

2. Harnessing non state actors for the better health for the poor (HANSHEP) Health Enterprise Fund	
The Health Enterprise Fund is a challenge fund offering both grants and technical assistance to health enterprises that demonstrate the potential to create the biggest impact in uncovering innovative and replicable solutions that address critical health priorities in sub-Saharan Africa—high rates of maternal and child mortality, unmet need for modern family planning methods, and lack of access to HIV/AIDS testing, care, and treatment services.	
Overview: institutional arrangements and scope	
Category of initiative	Challenge fund
Category of instruments employed:	Grants, including grants for technical assistance from USD 100,000 to USD 200,000.
Entity promoting the initiative:	HANSHEP
Entity type :	**Alliance of development agencies and countries**
Single or multi donor:	Multi donor: USAID funded Strengthening Health Outcomes through the Private Sector (SHOPS) project; UK DFID
Implementing entities:	Abt Associates leads the project in collaboration with Banyan Global, Jhpiego, Marie Stopes International, Monitor Group and O'Hanlon Health Consulting
Partnership model (if any)	Alliance
Recipient of support:	Health enterprises that have developed low-cost health care delivery approaches. To be eligible enterprises must already have a sustainable, revenue-generating business model and provide goods or services that result in improved health outcomes among base of the pyramid population segments
Development area:	**Health**
Target sectors:	Health care provision
Geography:	Ethiopia Kenya
Category of private sector actors engaged:	Multinational organizations piloting low-cost health care devices Partnerships between multinational organizations and local manufacturers Social enterprises providing high quality health care services in peri-urban areas Faith based organizations delivering revenue generating health services to the poor Technology companies partnering with health care delivery organizations to pilot and scale low cost IT systems and platforms

	Multi-country and regional projects are also eligible.
Scale:	
Timeframe:	2010-
Number of people/businesses reached:	
Has the initiative reached its objectives (performance against initiative specific indicators):	
Barriers: which barriers does the initiative seek to address	
Direct	**Commercial risks:** Small, early stage entrepreneurial entities that do not qualify for commercial debt or private equity financing are often at a loss for financing opportunities to expand their businesses. To address this gap in health venture financing, the the Health Enterprise Fund aims to spur innovation in health care in Africa among earlier stage enterprises intending to serve the base of the pyramid. It will support for-profit business entities that are looking to scale up their health care models and will prepare enterprises to receive onward financing from other sources.
Indirect	**Capacity and skills:** shared learning, M&E
Sector specific	
Sources of information	
• http://www.hanshep.org/ • http://www.healthenterprisefund.org/background/ • http://www.shopsproject.org/sites/default/files/resources/Health%20Care%20Innovation%20at%20the%20Base%20of%20the%20Pyramid%20.pdf	

3. Construction Ideas Fund (CIF)	
The Construction Ideas Fund is a funding mechanism which shares the financial risk of innovative projects within the Construction and Real Estate Sector in Nigeria. The fund aims to increase income and employment opportunities within this sector for low-income groups in Nigeria. There are 5 funding windows which focus on: women's economic empowerment, skills development for construction, recruitment for construction, membership services and construction materials supply chain 'input supplies'.	
Overview: institutional arrangements and scope	
Category of initiative	**Challenge fund**
Category of instruments employed:	**Matched grants:** CIF provides matched grant financing (at either a 75:25% or 50:50% ratio depending on the funding window) from £25,000 up to a maximum of £250,000.
Entity promoting the initiative:	UK Department for International Development (DFID) The Fund sits within the wider Growth and Employment in States (GEMS) project, an employment project which is supported by Nigeria's Federal Ministry of Trade and Investment (FMTI) and funded by the World Bank and DFID.
Entity type :	**Bilateral donor agency**
Single or multi donor:	**Single donor**
Implementing entities:	Coffey International acts as programme and fund managers for FRICH
Partnership model (if any)	Public-private: the fund is managed by a specialist professional services consultancy with expertise in geosciences, international development and project management. The Fund manager has a non-investment role.
Recipient of support:	**Private sector**: Businesses with operations in FCT, Lagos, Kaduna or Kano State in Nigeria. Other organisations partnering with a business may also receive support, although the business must be the lead applicant in such a

	partnership.
Development area:	**Private sector development** **Infrastructure**
Target sectors:	Construction and the built environment
Geography:	Nigeria
Category of private sector actors engaged:	Construction companies Construction skills training providers Business Membership Organisations/trade associations for the construction sector
Scale:	million (GBP)
Timeframe:	2009-April 2015 Projects run for up to 25 months
Number of people/businesses reached:	
Has the initiative reached its objectives (performance against initiative specific indicators):	
Barriers: which barriers does the initiative seek to address	
Direct	**Capacity and skills:** There are limited private providers in the construction skills training market. Businesses are cautious in investing in training for informal and temporary workers and employees do not often have access to certified training services. The initiative seeks to facilitate greater provision of skills training to informal workers (including women) by private sector training providers. **Commercial risks:** access to capital that allows businesses to develop products in the construction material supply chain that use local raw materials and local labour as inputs. Provision of services to Business Membership Organisations/trade associations that could improve competitiveness and efficiency e.g. accreditation/certification of members trade skills; market research and advertising/promoting their members; effective internal communication with members **Policy environment**: supporting BMOs/trade associations in advocating at local and national government level for the needs of their members. **Collaboration and partnership:** The establishment of partnerships between construction firms, training providers and financial institutions leading to the development of commercially viable training services. Linking of intermediaries with businesses and workers in the construction sector to build more efficient procurement of labour by construction companies (i.e. matching supply and demand). Value chain partnerships linking construction companies with domestic construction material providers.
Sector specific	Construction sector: Skills and capacity; quality of material inputs.
Sources of information	
• www.coffey.com/Projects/BusinessProject.aspx?aProjId=345 (accessed 18.02.13) • www.dfid.gov.uk/Work-with-us/Funding-opportunities/Business/Construction-Ideas-Fund/(accessed 18.02.13)	

4. Emerging Africa Infrastructure Fund (EAIF)	
EAIF was established in 2002 and is now a USD753.2 million debt fund, which aims to address the lack of available long-term foreign currency debt finance for infrastructure projects in sub-Saharan Africa. EAIF lends to companies to develop new projects or upgrade and expand existing facilities through subordinated debt provided by development finance institutions (DFIs) and senior debt (provided by private sector lenders). Through its investments, EAIF intends to stimulate economic growth and contribute to the alleviation of poverty in Sub-Saharan Africa.	
Overview: institutional arrangements and scope	
Category of initiative	**Public-private partnership**
Category of instruments employed:	Debt instruments (including senior stand alone or syndicated loans, local currency loans and subordinated loans or mezzanine finance); grants (for technical assistance)
Entity promoting the initiative:	Private Infrastructure Development Group (PIDG)
Entity type :	**Public-private multi donor supported platform**
Single or multi donor:	Multi donor (Equity from PIDG Trust USD 202.1 million; Subordinated debt from Development Finance Institutions 'DFIs' e.g. IFC, AfDB, etc. USD 85.0 million; Senior debt from private sector commercial lenders e.g. Barclays, Standard Bank etc.USD 466.1 million)
Implementing entities:	EAIF's Fund Manager is Frontier Markets Fund Manager Limited (FMFML) a Mauritius incorporated fund management company jointly owned by Standard Bank Group, FMO (The Dutch Development Bank) and Emerging Markets Partners ("EMP"). The Fund Advisor is Frontier Markets Fund Manager (FMFM), a division of Standard Bank plc, which advises EAIF on deal origination, structuring and negotiating documentation, conducts due diligence, and monitors EAIF's portfolio.
Partnership model (if any)	EAIF was initiated by the Private Infrastructure Development Group ("PIDG") founding donor agency members. The Fund aims to leverage additional donor money to attract new private sector capital from commercial lenders that would otherwise be unlikely to be made available to the region. The EAIF works with some of its sister entities that are part of PIDG e.g. GuarantCo, which provides guarantees for local currency financing for infrastructure projects. GuarantCo is also advised by FMFM.
Recipient of support:	Majority private sector entities or majority public sector entities, provided that the private sector is responsible for developing and managing the assets of the public sector entity on a risk sharing basis. These entities can be special purpose vehicles or project companies, private operating infrastructure companies, or privatised companies or companies that are about to be privatised and where the Government has contractually committed to such privatisation.
Development area:	**Infrastructure**
Target sectors:	Energy supply (generation, transmission and distribution); Water/waste services; Transportation; Telecommunications; Gas (transportation, distribution and storage); Mining; Manufacturing (of components used in infrastructure e.g. cement, steel); infrastructure associated with agribusiness.
Geography:	47 countries in Sub-Saharan Africa
Category of private sector actors engaged:	MNCs, NCs
Scale:	USD 753.2 million (as of May 2013). The debt amount available from EAIF for any single transaction is limited to a minimum of USD 10 million and a maximum of USD 30 million.
Timeframe:	2002 – ongoing Investments of up to 15 years
Number of people/businesses reached:	41 projects: 47% in power; 23% telecoms; 13% manufacturing; 12% mining
Has the initiative reached its objectives	

(performance against initiative specific indicators):	
Barriers: which barriers does the initiative seek to address	
Direct	**Commercial risks:** Provision of long-term debt that is often unavailable from commercial banks due to limited liquidity or a lack of appetite from DFIs. **Capacity and skills** and **Information and knowledge**: Grants that are designed to help with the development costs of a project e.g. feasibility reports, environmental studies, infrastructure development strategies, consultancy fees or costs associated with capacity building that could be incurred by either the developer or relevant government party that is sponsoring the project. This grant funding is allocated to projects which FMFM consider there is a reasonable chance could require funding from EAIF at a later stage.
Indirect	
Sector specific	Infrastructure: critical financing gaps
Sources of information	
• http://www.emergingafricafund.com/Files/MediaFiles/EAIF%20Sep%202012.pdf • http://www.emergingafricafund.com/home.aspx	

5. Private Infrastructure Development Group (PIDG)	
The Private Infrastructure Development Group mobilises private sector investment to assist developing countries in providing infrastructure vital to boosting their economic growth, and combating poverty. PIDG has founded a range of specialised financing and project development companies designed to overcome the obstacles to generating private sector investment in infrastructure projects in poor countries by providing various types of financial, practical and strategic support.	
Overview: institutional arrangements and scope	
Category of initiative	**Public-private multi donor supported platform**
Category of instruments employed:	Loans; technical assistance; grants; local currency guarantees
Entity promoting the initiative:	
Entity type :	
Single or multi donor:	**Multi donor:** Austria, Germany, The World Bank, International Finance Corporation, Ireland, the Netherlands, Sweden, Switzerland, UK and Australia. The UK Department for International Development (DFID) is the lead donor. Donors invest in the PIDG facilities largely through an independently-managed trust fund which is 100% donor financed.
Implementing entities:	PIDG operates through a Governing Council, a Programme Management Unit (PMU) and the PIDG Trust
Partnership model (if any)	The Governing Council, the key decision-making body, represents the PIDG Members who provide grant and loan funding to the PIDG Trust. The PIDG Trust invests in, owns and manages the PIDG subsidiary companies. It is a Mauritian Trust, currently administered by a UK-based Principal Trustee, SG Hambros Trust Company Ltd. The PMU manages PIDG activities and is the central point of contact for all PIDG correspondence. The Governing Council has appointed MDY Legal (trading name of Marriott Davies Yapp LLP) as the current PMU. The PMU consists of an Executive Director and Chief Operating Officer who are supported by a Development Adviser, Technical Manager and administrative staff. Donors meet at least twice a year with the various PIDG facilities and the PMU to review progress and discuss and agree future policy and direction. At the facility level, funding from the PIDG donors can be supplemented with funding from private financial institutions and official Development Finance Institutions (DFIs). Further funding from third parties is achieved at the project level.

Recipient of support:	Developing country governments; financial institutions (international and national)
Development area:	**Infrastructure**
Target sectors:	Energy and power, transportation, telecommunications, agribusiness, housing, industry, urban infrastructure, water and sanitation.
Geography:	The PIDG facilities and programmes operate in the poorer developing countries, and only those countries included in the lower income categories of the Development Assistance Committee's List of Overseas Development Aid recipients are eligible for PIDG support.
Category of private sector actors engaged:	Financial institutions (international and national)
Scale:	As of June 2011, donors had disbursed USD 456 million to the PIDG. The PIDG facilities have helped 99 projects and 45 grants in 45 countries. Of these projects, 62 per cent were in Sub-Saharan Africa and 27 per cent in the Asia-Pacific region.
Timeframe:	2002 - 31/03/2015
Number of people/businesses reached:	182,656 people benefit from long-term employment opportunities created at Operational PIDG projects
Has the initiative reached its objectives (performance against initiative specific indicators):	
Barriers: which barriers does the initiative seek to address	
Direct	**Commercial risks:** GuarantCo provides guarantees to lenders to support local currency finance for infrastructure projects, promoting domestic infrastructure financing and capital market development; Infrastructure Crisis Facility provides direct finance to infrastructure projects in emerging economies. InfraCo Africa and Asia are designed to assume the risks and costs of early stage project development; the EAIF provides long-term debt or mezzanine finance on commercial terms to finance the construction and development of private infrastructure. **Capacity and skills:** The Technical Assistance Facility is a pool of funding within the PIDG Trust to assist PIDG companies to support capacity building and to help scope out potential investment opportunities. **Policy environment**: DevCo advises governments on structuring transactions to facilitate private sector participation in infrastructure.
Indirect	
Sector specific	
Sources of information	
• https://www.gov.uk/private-infrastructure-development-group-pidg • http://www.pidg.org/ • Multilateral Aid Review: Assessment of the PIDG	

6. The Public-Private Infrastructure Advisory Facility (PPIAF)	
The Public-Private Infrastructure Advisory Facility (PPIAF) is a multi-donor trust fund that provides technical assistance to governments in developing countries in support of the enabling environment conducive to private investment, including the necessary policies, laws, regulations, institutions, and government capacity. It also supports governments to develop specific infrastructure projects with private sector participation.	
Overview: institutional arrangements and scope	
Category of initiative	**Multi-donor trust fund**
Category of instruments employed:	Grants for technical assistance (enabling environment reform; project cycle-related assistance; capacity and awareness building; Sub-National Technical Assistance)
Entity promoting the initiative:	Asian Development Bank, Australia, Austria, European Bank for Reconstruction and Development, France, Germany, International Finance Corporation, Italy, Japan, Millennium Challenge Corporation, Netherlands, Sweden, Switzerland, United Kingdom, United States, and the World Bank.
Entity type :	**Multilateral and bilateral donors**
Single or multi donor:	**Multi donor:** 16 multilateral and bilateral donors:
Implementing entities:	PPIAF is governed by a Program Council composed of its donors. An independent technical advisory panel reviews PPIAF activities and provides strategic advice to the Program Council. The Project Management Unit (PMU) manages day-to-day operations. To facilitate outreach and monitoring of its technical assistance activities, the PMU maintains field offices in Nairobi and Dubai.
Partnership model (if any)	PPIAF partners with its donors, regional development banks, and other institutions to deliver technical assistance to developing country governments
Recipient of support:	Developing country national governments (low and middle income countries)
Development area:	**Infrastructure**
Target sectors:	Water and sanitation, solid waste management, telecommunications, transport, energy, and irrigation.
Geography:	Recipients of official development assistance (ODA) as defined by the Development Assistance Committee (DAC) of the OECD. Two-thirds of PPIAF's support goes to low-income countries and half of PPIAF support goes to Africa. Requests from low-income countries receive special consideration.
Category of private sector actors engaged:	None directly. MNCs and NCs indirectly.
Scale:	
Timeframe:	1999 -
Number of people/businesses reached:	
Has the initiative reached its objectives (performance against initiative specific indicators):	
Barriers: which barriers does the initiative seek to address	
Direct	**Policy environment:** assistance to governments to develop enabling environments that facilitate private investment in infrastructure e.g. preparing and reviewing policy frameworks; developing and implementing legal and regulatory frameworks; designing and strengthening new institutions to support private participation in infrastructure; and translating the enabling laws, regulations and policies into specific infrastructure transactions. **Capacity and skills (government):** assistance to governments to develop and transact projects that are "bankable" and capable of attracting private sector participation e.g. the preparation of financial models, contracts and bidding documents, and providing advisory support after transactions reach financial closure. Building capacity in public authorities to design public-private partnership projects, manage the award process and the service delivery, and partner with private investors.

	Information and knowledge (government): PPIAF identifies and disseminates knowledge by publishing best practices studied, developing toolkits, and conducting workshops and seminars. Organizing stakeholder consultation workshops. **Collaboration and partnership:** ability of government to build effective partnerships with private sector delivery organisations. Designing and implementing pioneering projects. Support for the negotiations of contracts to ensure adequate risk allocation between public and private parties.
Indirect	
Sector specific	Infrastructure: critical financing gaps
Sources of information	
• http://www.ppiaf.org/page/strategic-themes/climate-change/adaptation • http://www.ppiaf.org/ • http://www.ppiaf.org/page/results/monitoring-evaluation	

7. Food Retail Industry Challenge Fund	
The FRICH challenge fund is aimed at the European food sector and finds innovative ways to bring more African foods to the continent. The competitive fund supports new ideas that connect African farmers with global retailers through innovative business partnerships. FRICH achieves results by removing blockages to market access and making sure that European shoppers know that their purchases make a difference to poor farmers.	
Overview: institutional arrangements and scope	
Category of initiative	**Challenge fund**
Category of instruments employed:	**Grants**: matched grants between GBP 150,00 and GBP 600,000.
Name of entity promoting the initiative:	UK Department for International Development
Entity type promoting the initiative:	**Bilateral donor agency**
Single or multi donor:	**Single donor**
Implementing entities:	Nathan Associates London Limited acts as programme and fund managers for FRICH.
Partnership model (if any)	Public-private: the fund is managed by a global economic and management consultancy which specialises in innovative programs to reduce poverty and offers expertise in private sector development, trade policy, agriculture and rural and financial sector development. The Fund manager has a non-investment role.
Recipient of support:	**Private sector**: UK and EU retail businesses with an established share of the UK or other European market.
Development area:	Private sector development Food and nutrition
Target sectors:	**Agriculture and food**: Retail &Consumer, Fast Moving Consumer Goods (FMCG), agribusiness
Geography:	Sub-Saharan Africa (SSA) - Kenya, Burundi, Democratic Republic of Congo, Malawi, Mozambique, Rwanda, São Tomé and Principé, Ghana, Uganda, Senegal, Namibia, Zimbabwe and Ethiopia: producers UK and EU: retailers and businesses
Category of private sector actors engaged:	MNCs and national companies (retailers) SMEs (agribusinesses) Microenterprise (producers and small holder farmers)
Scale:	7.6 million (GBP)
Timeframe:	2008-2013/2014

Number of people/businesses reached:	26 projects; 36,654 small scale producers
Has the initiative reached its objectives (performance against initiative specific indicators):	FRICH is currently performing well, with Rounds 1 to 3 delivering results beyond expected levels (as per the Annual Review Feb/March 2013). Demonstration of impact and effectiveness is more difficult as FRICH was not designed to include a counterfactual.
Barriers: which barriers does the initiative seek to address	
Direct	**Commercial risks:** low competitiveness of African agricultural production compared to agricultural production in other regions. FRICH encourages supply chain innovations that enhance the competitiveness of African agricultural production and builds positive consumer perceptions of African sourced food products. **Collaboration and partnerships:** integration of African food producers into UK and EU business supply chains to ensure sufficient market demand for produce. **Information and knowledge:** sharing learning and experience from FRICH to develop and scale up new export supply chains.
Indirect	**Capacity and skills:** training and technical skills offered from UK and EU businesses to farmers and growers on sustainable agricultural practices that can improve yields.
Sector specific	Agriculture in SSA: smallholder production capacity and skills
Sources of information	
• www.nathaninc.com/projects-and-cases/africa-food-retail-industry-challenge-fund (accessed 18.02.13) • www.dfid.gov.uk/Work-with-us/Funding-opportunities/Business/FRICH/Projects/ (accessed 18.02.13) • www.dfid.gov.uk/Documents/publications1/press-releases/UK-helps-farmers-in-Africa-trade-their-way-out-of-poverty.pdf (accessed 18.02.13) • http://projects.dfid.gov.uk/project.aspx?Project=114009	

8. Global Agriculture and Food Security Programme	
The GAFSP is a multilateral mechanism to assist in the implementation of pledges made by G20 countries in Pittsburgh in September 2009. It aims to better coordinate donor support for strategic, country-led, agricultural and food security plans that produce results on the ground. Finance is available to the public and the private sector.	
Overview: institutional arrangements and scope	
Category of initiative	**Financial Intermediary Fund**
Category of instruments employed:	**Grants:** TA for country-led or regional programmes that result from sector-wide country or regional consultations and planning exercises; investments are complemented with advisory services for increasing access to agriculture finance, improving farmer productivity, standards and market links, risk reduction and climate change mitigation. **Debt:** Local intermediaries and agribusinesses are able to apply for debt financing to on-lend to smallholders and SMEs. **Equity:** Equity capital to strengthen agribusinesses' supply chains and reach out to SMEs **Financial de-risking:** Credit guarantees; first loss cover for loans taken out by smallholder farmers or SMEs
Entity promoting the initiative:	G20
Entity type :	**Multilateral forum**
Single or multi donor:	Multi-donor
Implementing entities:	World Bank/IFC

Partnership model (if any)	
Recipient of support:	Public and private sector
Development area:	**Agriculture and food security; economic growth and trade; environment**
Target sectors:	Agriculture
Geography:	Bangladesh, Burundi, Cambodia, Ethiopia, The Gambia, Haiti, Kyrgyz Republic, Liberia, Malawi, Mongolia, Nepal, Niger, Rwanda, Senegal, Sierra Leone, Tajikistan, Tanzania, Togo
Category of private sector actors engaged:	SMEs (agribusiness and farmers)
Scale:	Funds pledged: USD 1.3 billion (of which USD 940.8 million to the Public Sector Window, USD 308.7 million to the Private Sector Window, and USD 68.5 million remains unassigned). Funds received: USD 930.5 million (of which USD 757.6 million to the Public Sector Window, and USD 152.9 million to the Private Sector Window).
Timeframe:	Launched 2010
Number of people/businesses reached:	The Public Sector Window has allocated USD 658 million for recipient-executed grants in 18 countries. The Private Sector Window allocated USD 5 million to support the PRAN Group (an agribusiness firm in Bangladesh) and USD 5 million to support Root Capital (a social investment fund working with small- and medium enterprises and farmers' cooperatives).
Has the initiative reached its objectives (performance against initiative specific indicators):	
Barriers: which barriers does the initiative seek to address	
Direct	**Commercial risk:** Connects smallholders with credit to enable them to expand and leverage economies of scale. Also launches financial products such as first loss cover and weather insurance. **Technology and product risk:** Supports companies that develop technology and processes that increase productivity and lower use of water and other inputs
Indirect	**Commercial risk:** Invests in micro, small and medium-sized enterprise (MSME) funds to increase their ability to invest in MSMEs in riskier sectors that cannot attract investment capital through the usual channels.
Sector specific	**Agriculture:** Focus on smallholder farmers and MSMEs to help crowd-in private sector investment funding in projects that have a different risk/return profile.
Sources of information	
• http://www.gafspfund.org/sites/gafspfund.org/files/Documents/GAFSP%20PSW%20brief_April%202012%20v4.pdf • http://www.gafspfund.org/	

9. Africa Enterprise Challenge Fund	
The Africa Enterprise Challenge Fund (AECF) is a USD 205 million private sector fund, backed by some of the biggest names in development finance and hosted by the Alliance for a Green Revolution in Africa (AGRA). Our aim is to encourage private sector companies to compete for investment support for their new and innovative business ideas.	
Overview: institutional arrangements and scope	
Category of initiative	**Challenge fund**
Category of instruments employed:	**Grants and interest free loans:** USD 250,000 to USD 1.5 million per project
Entity promoting the initiative:	AGRA
Entity type :	The AECF is a special partnership initiative of AGRA that supports AGRA's mission. AGRA is an alliance jointly created in 2006 by The Rockefeller Foundation and the Bill & Melinda Gates Foundation aimed at improving agricultural productivity and small holder farmer well-being throughout sub-Saharan Africa. The Australian Government Aid Program, Danish International Development Agency (DANIDA), the UK Department for International Development (DFID), the International Fund for Agricultural Development (IFAD), the Netherlands Ministry of Foreign Affairs (NMFA), and the Swedish International Development Cooperation Agency (Sida) are the current funders of the AECF.
Single or multi donor:	Multi-donor
Implementing entities:	
Partnership model (if any)	KPMG International Development Advisory Services are the fund managers. The AECF operates from three regional hubs; Nairobi for the East and Central Africa, Accra for West Africa and Johannesburg for Southern Africa.
Recipient of support:	Private sector
Development area:	Agriculture and private sector development
Target sectors:	Agriculture; finance; renewable energy **Sector focus windows:** Research into Business (RIB) and Renewable Energy and Adaptation to Climate Technologies (REACT)
Geography:	Sierra Leone, Burkina Faso, Ghana, Nigeria, Cameroon, DRC, Mali, South Sudan, Uganda, Burundi, Malawi, Tanzania, Kenya, Rwanda, Mozambique, Zimbabwe, South Africa **Country focus windows:** Zimbabwe, Tanzania, South Sudan
Category of private sector actors engaged:	SMEs (agribusiness and farmers) NCs
Scale:	USD205 million
Timeframe:	2008-present
Number of people/businesses reached:	14 rounds of investment competition, supporting new investment in the agribusiness, renewable energy and adaptation to climate change technologies, rural financial services and media and information sectors, across Africa. Currently AECF has a portfolio of 33 projects in 22 countries in Africa.
Has the initiative reached its objectives (performance against initiative specific indicators):	To date over 4,230 applications have been received and 89 projects have been awarded funding (commitment USD 65 million). A further USD 24, 371, 658 million has been committed to these projects by the private sector. The AECF has grown from USD 30 million to USD 190 million (far exceeding target growth of USD 75 million), run 16 funding window competitions, received and processed 4,500 applications, and approved 133 projects in 22 African countries. Through this growth, the fund has had a positive impact on the lives of roughly 4 million poor people living in rural areas.
Barriers: which barriers does the initiative seek to address	
Direct	**Commercial risk** **Collaboration and partnerships:** Develop new markets for agricultural products along the value chain **Technology and product risk:** Supports companies that develop technology and processes that
Indirect	
Sector specific	

Sources of information
• http://www.gafspfund.org/sites/gafspfund.org/files/Documents/GAFSP%20PSW%20brief_April%202012%20v4.pdf • http://www.gafspfund.org/

10. Energy and Environment Partnership (EEP) Programme with Southern and East Africa	
A challenge fund which promotes renewable energy (RE), energy efficiency (EE), and clean technology investment through the fast tracking of renewable energy project demonstration and deployment, including through technology learning, donor co-ordination and private sector investment.	
Overview: institutional arrangements and scope	
Category of initiative	**Challenge Fund**
Category of instruments employed:	**Grants:** up to EUR 300,000 The contribution by applicants is set at a minimum of 10% of total project costs for not-for-profit organisations, NGOs and public institutions and a minimum of 25% for private entities.
Entity promoting the initiative:	The Ministry for Foreign Affairs of Finland (MFA); Austrian Development Agency (ADA); UK's Department for International Development (DFID); the Development Bank of Southern Africa (DBSA).
Entity type :	**Bilateral donor agencies; development bank**
Single or multi donor:	Multi donor
Implementing entities:	Managed by the EEP Regional Coordination Office (RCO), which is based in Johannesburg, South Africa. FCG International Ltd Finnish Consulting Group
Partnership model (if any)	EEP Southern and East Africa includes Southern Africa Development community (SADC) and East African Community (EAC) at the core of its governance arrangements. The programme is housed within the Development Bank of Southern Africa (DBSA) based in South Africa, which acts as the implementing agent and investment finance
Recipient of support:	The fund is open to the public and private sectors, research institutes, cooperatives and civil society organizations (at the local, national, or international level). 55 % of present project developers are private companies which is a special feature of EEP-S&EA when compared to other EEP programmes.
Development area:	**Energy**
Target sectors:	Renewable energy generation (solar thermal and photovoltaic; hydropower; wind power; geothermal; biofuels; and bio-energy sources). Additionally, projects must address one of the following areas: rural energy solutions; urban and peri-urban energy solutions; household and community electrification; commercial and industrial energy solutions; energy for productive uses; water supply; provision of health services; agricultural development; or waste management solutions. Innovative projects and projects involving the private sector will be given priority, together with initiatives addressing the cross-cutting issues of environmental sustainability; gender; good governance; HIV/AIDS; and poverty reduction.
Geography:	Seychelles, Lesotho, Uganda, Rwanda, Burundi, Botswana, Kenya, Mozambique, Namibia, South Africa, Swaziland, Tanzania and Zambia.
Category of private sector actors engaged:	
Scale:	The second phase has an approximate project support budget of EUR 36 million over four years.
Timeframe:	2010 - The project implementation period is limited to a minimum of 6 months and a maximum of 24 months.

Number of people/businesses reached:	82 projects including some regional projects.
Has the initiative reached its objectives (performance against initiative specific indicators):	
Barriers: which barriers does the initiative seek to address	
Direct	**Commercial risks:** EEP provides finance to cover start-up costs and bridge the gap between ideas and implementation (e.g. pre-feasibility, feasibility, pilot projects, demonstration and scale-up of existing projects). It also assists businesses to support themselves through the initial research and project development stage until projects become bankable and are able to secure additional financing to take the project into implementation. The final objective is for all initiatives to fund themselves after receiving support for some time.
Indirect	
Sector specific	
Sources of information	
• https://www.gov.uk/the-energy-and-environment-partnership-eep-programme-with-southern-and-east-africa • http://www.nation.sc/index.php?art=28262 • http://eepglobal.org/2012/07/12/planning-of-second-phase-of-eep-with-southern-and-east-africa-started-in-swaziland/	

11. Green Africa Power	
Green Africa Power is a GBP 98 million fund run by PIDG, to stimulate private investment in renewable energy, by providing early stage finance to private sector renewable energy generation projects in Sub-Saharan Africa.	
Overview: institutional arrangements and scope	
Category of initiative	**Single donor fund**
Category of instruments employed:	**Quasi capital (equity):** A tranche of long-term capital. A minimum coupon is paid as soon as Financing Agreements with other lenders allow but the remainder of the coupon (to achieve an overall reasonable return on capital established on a project by project basis) and the capital repayment, is not paid until a threshold IRR has been achieved by equity participants. **Contingent line of capital:** A guarantee that provides additional comfort to lenders on top of the debt service reserve account, to be drawn down in case of delays or cost over-runs in construction. **Technical assistance:** GAP will encourage host countries to move towards cost-reflective tariffs, providing them with support to do so and buying them time to build political and public support for tariff increases.
Entity promoting the initiative:	Private Infrastructure Development Group (PIDG)
Entity type :	**Public-private multi donor supported platform**
Single or multi donor:	DFID and DECC as part of UK's International Climate Fund
Implementing entities:	
Partnership model (if any)	GAP is expected to leverage twice as much private sector finance and an equal amount from Development Finance Institutions. As with all PIDG facilities, GAP enters into partnership with the project developer
Recipient of support:	As with all PIDG activities, GAP is aimed at supporting specific, discrete projects, in this case specific renewable energy projects.
Development area:	**Energy: renewable energy generation**

Target sectors:	Renewable energy generation (wind power, geothermal, hydro, solar Photovoltaic (PV) and concentrated solar power (CSP) or biomass).
Geography:	Sub-Saharan Africa
Category of private sector actors engaged:	Other commercial bank lenders loan to the project. Project sponsor and equity investors invest equity alongside the GAP.
Scale:	£98 million fund (DFID and DECC).N Norway and Sweden are also considering co-financing GAP.
Timeframe:	01/08/2010 - 31/03/2016. Expected to become operational in 2013.
Number of people/businesses reached:	
Has the initiative reached its objectives (performance against initiative specific indicators):	
Barriers: which barriers does the initiative seek to address	
Direct	**Commercial risks:** there are a lack of cost reflective tariffs and high upfront costs which makes projects more difficult to finance, particularly when only short term loans are available from local banks. Specific risks e.g. of construction delays and off-taker payment default, also deter potential financiers. GAP seeks to address these by reducing the upfront cost of capital, while maintaining overall commercial returns and providing cover for specific construction phase risks. **Policy environment:** policy dialogue to move towards cost reflective tariffs. **Collaboration and partnership:** GAP leverages other finance streams from private sector lenders i.e. commercial banks, in delivering these projects i.e. projects build relationships that would not have occurred without the input of GAP.
Indirect	**Technology and product risk** and **Information and knowledge**: GAP will invest in renewable energy projects to demonstrate the viability of renewable energy in Africa so that future projects are more likely to happen and attract private developers and investors.
Sector specific	
Sources of information	
• http://projects.dfid.gov.uk/project.aspx?Project=201931 • http://www.pidg.org/news/new-pidg-facility-green-africa-power • http://www.pidg.org/resource-library/other-documents/green-africa-power-overview.pdf	

12. EBRD Sustainable Energy Initiative	
Created in 2006 to address the challenges of climate change and energy efficiency, the EBRD's Sustainable Energy Initiative (SEI) aims to scale up the bank's sustainable energy investments, improve the business environment for sustainable investments and to address key barriers by working closely with donors.	
Overview: institutional arrangements and scope	
Category of initiative	**Multi-donor fund with co-financing from private sector**
Category of instruments employed:	**Grants:** TA to support the effective development and implementation of SEI projects in terms of policy, legal, regulatory, technical and organisational capacity. Selective and smart use of subsidies to address specific barriers and market failures. TA for developing carbon finance or other market-based systems which can provide additional revenues for projects. **Debt:** Private, non-sovereign and sovereign guaranteed loans **Equity:** Direct equity, equity funds and credit lines.
Entity promoting the initiative:	European Bank for Reconstruction and Development
Entity type :	**Multilateral development bank**
Single or multi donor:	**Multi-donor plus co-finance from private sector**
Implementing entities:	EBRD has an in-house Energy Efficiency and Climate Change Team of more than 30 specialists, including engineers, finance specialists and policy experts who work directly on projects with bankers and clients
Partnership model (if any)	
Recipient of support:	Private sector: industrial/manufacturing companies; infrastructure operators Public sector: municipalities, regional/national government Project level: renewable and energy efficiency projects
Development area:	Energy efficiency Renewable energy Low-carbon development Private sector development
Target sectors:	Industrial, manufacturing, utilities, construction, infrastructure, carbon markets, renewables
Geography:	Russia, Eastern Europe and the Caucasus, South-eastern Europe, Central Europe and the Baltics, Turkey, Central Asia
Category of private sector actors engaged:	MNCs and national companies (industrial/manufacturing/renewables) SMEs (industrial/manufacturing) Local/national financial institutions (small-scale renewables and energy-efficiency projects)
Scale:	Financing target for Phase 3 of €4.5 billion to €6.5 billion, with a target total project value range of €15 to €25 billion
Timeframe:	Phase 1: 2006-2008, Phase 2: 2009-2011, Phase 3: 2012-2014
Number of people/businesses reached:	Number of projects 552 in 30 countries SEI investment since 2006 €10 billion Total project value €56 billion Percentage of EBRD financing 21%
Has the initiative reached its objectives (performance against initiative specific indicators):	The target investment volumes in both Phase 1 and 2 were exceeded and Phase 3 has showed a strong start in its first year. The SEI also set a carbon emission reduction target range for Phase 2, which was met, and in 2012 the carbon reduction impact of SEI activities was estimated at 8.8m tonnes CO_2.
Barriers: which barriers does the initiative seek to address	
Direct	**Capacity and skills:** energy audits provide business owners with information on technical solutions and financial returns available; through SEI's projects, staff at local financial institutions learn about sustainable energy investments, prospective borrowers learn why they make good business sense, and local engineers become aware of best practise investment opportunities **Commercial risks:** development of financial products to improve access to capital
Indirect	**Policy environment:** donor funded policy engagement with governments to support the development of strong institutional and regulatory frameworks to incentivise sustainable energy

	Market infrastructure: carbon market development programmes working with local banks and project sponsors to structure carbon deals and stimulate demand for carbon credits
Sector specific	Policy environment: policy dialogue to support development of legislation for energy efficiency in, for example, the industrial and construction sectors
Sources of information	
• http://www.ebrd.com/pages/sector/energyefficiency/sei.shtml • http://www.ebrd.com/downloads/research/factsheets/sei.pdf • http://www.ebrd.com/downloads/research/brochures/sei.pdf	

13. Girls' Education Challenge (GEC)	
The Girls' Education Challenge is a £300 million challenge fund that aims to help up to one million of the world's poorest girls across 21 countries to have an opportunity to improve their lives through education. GEC awards grants to organisations and projects that are able to demonstrate new and effective ways to expand education opportunities to marginalised girls that can be robustly evaluated to widen their impact.	
Overview: institutional arrangements and scope	
Category of initiative	**Challenge fund**
Category of instruments employed:	**Grants**: between GBP 250,000 and GBP 2 million (Innovation window); match-funding between GBP 1 million and GBP 10 million (Strategic Partnerships window)
Entity promoting the initiative:	Department for International Development (DFID)
Entity type :	**Bilateral donor agency**
Single or multi donor:	**Single donor**
Implementing entities:	GEC is managed by PwC in alliance with FHI 360, Nathan Associates Ltd., and Social Development Direct Ltd.
Partnership model (if any)	The Alliance is responsible for managing the Girls' Education Challenge throughout application, selection, and implementation and will monitor all projects throughout the lifetime of the programme. In the Strategic Partnerships window, DFID will establish a partnership with successful Lead Partner organisations. DFID's specific role in each partnership will be determined on a case-by-case basis, and the emphasis is on the Lead Partner to communicate clearly what role they envisage DFID will play in order to achieve the partnership's objectives.
Recipient of support:	Specific focus on: • National/regional companies with strong local presence in the proposed countries of implementation • International companies that will engage with local private sector companies • British companies, as part of DFID's role in promoting British private sector investment in developing countries to drive economic growth and create jobs
Development area:	**Education**
Target sectors:	**Education**
Geography:	21 DFID priority countries in Africa and Asia (Afghanistan, Bangladesh, Burma, DR Congo, Ethiopia, Ghana, Kenya, Malawi, Mozambique, Nepal, Nigeria, Occupied Palestinian Territories, Pakistan, Rwanda, Sierra Leone, Somalia, South Sudan, Tanzania, Uganda, Zambia, Zimbabwe.)
Category of private sector actors engaged:	**Strategic Partnerships window** and **Innovation window:** MNCs, national or regional companies, for-profit social enterprises, private foundations (deriving the majority of their funding from one or more for-profit, commercial businesses)
Scale:	355 million (GBP)
Timeframe:	04/04/2011 – 31/03/2016
Number of people/businesses	The response for funding from the GEC Innovation Window has been very promising. Over 1,000 Project Concept Notes were received in August 2012.

reached:	Budget spent to date: GBP 3,879,775 (May 2013)
Has the initiative reached its objectives (performance against initiative specific indicators):	
Barriers: which barriers does the initiative seek to address	
Direct	**Collaboration and partnership:** through the initiative DFID will partner with companies in a new initiative**.** DFID is keen to attract multi-stakeholder coalitions where Lead Partners work with NGOs (local or national), local private sector organisations, social enterprises, universities, community groups and others in order to combine the specific expertise, experience and networks of different organisations in new and creative ways.
Indirect	**Commercial risks:** through the initiative DFID provides initial capital for new projects and initiatives
Sector specific	Girls' education: affordability, access and maintaining longer periods of schooling for girls (particularly focused on ages 10-19)
Sources of information	
• https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/192644/strategic-partnerships-second-round-FAQs.pdf • http://projects.dfid.gov.uk/project.aspx?Project=202372	

14. AfDB African Women in Business Initiative	
The African Women In Business Initiative (AWIB) emphasises the role of women in business and aims to empower women entrepreneurs, in particular SMEs, through better access to finance. It three key objectives are: a. Raise awareness among stakeholders and mobilize key players in the field of AWIB promotion; b. Reinforce the Business Support Provision and c. Develop concrete forms of support to enterprise education and entrepreneurship development.	
Overview: institutional arrangements and scope	
Category of initiative	
Category of instruments employed:	
Entity promoting the initiative:	African Development Bank (AfDB)
Entity type :	**Multilateral development finance institution**
Single or multi donor:	**Multi donor:** contributions from member countries
Implementing entities:	
Partnership model (if any)	
Recipient of support:	•
Development area:	**Private sector development/women's economic empowerment**
Target sectors:	
Geography:	
Category of private sector actors engaged:	
Scale:	
Timeframe:	
Number of people/businesses reached:	
Has the initiative reached its objectives (performance against initiative specific	

indicators):	
Barriers: which barriers does the initiative seek to address	
Direct	**Commercial risks:** The Private Sector and Microfinance Department (OPSM) aims to offer integrated financing programs for women's entrepreneurship development in order to develop SME financing instruments and mechanisms to enhance the financial market and assist successful SMEs to grow their enterprises. **Information and knowledge:** Build awareness through running seminars and conferences at national, regional as well as international levels; Assessing the feasibility of an African Training Institute Hub for Women Entrepreneurs with the aim to develop a two-way information and knowledge centre. **Capacity and skills:** strengthen the institutional and technical capacity of the national businesswomen associations / institutions that support the emergence and growth of women-owned SMEs; Improve access to national, regional and international business networks by Women-owned SMEs; Promoting the development of appropriate business structures for women and develop Business Incubators attached to technical schools and universities; Incorporating entrepreneurship development courses in university curricula; **Policy environment:** Helping to design the government's framework for entrepreneurship development programs, with special features for women;
Indirect	
Sector specific	
Sources of information	
• http://www.afdb.org/en/topics-and-sectors/initiatives-partnerships/african-women-in-business-initiative/private-sector-development/	

15. Business Innovation Facility (BIF)	
The Facility offers advice and technical assistance, at any stage of a business venture to develop or scale up inclusive business models. The Facility draws on a global network to find technical experts who can assess routes to market, develop supply chains or test and collaboratively develop and improve business models.	
Overview: institutional arrangements and scope	
Category of initiative	**Challenge fund**
Category of instruments employed:	**Grants for technical assistance:** Capacity development; facilitation; and analytical support; knowledge exchange
Entity promoting the initiative:	UK Department for International Development
Entity type :	**Bilateral donor agency**
Single or multi donor:	**Single donor**
Implementing entities:	BIF is implemented on behalf of DFID by a PwC-led management alliance (including International Business Leaders Forum, Accenture Development Partnerships, Imani Development, Intellecap, Renaissance Consulting Limited, The Convention on Business Integrity, Challenges Consulting).
Partnership model (if any)	**Management alliance:** Public-private: the facility is managed by a PwC-led alliance which brings skills and expertise in fund management (non-investment role). Alliance partners include not-for-profit organisations and private sector consultancies located in both the north and south.
Recipient of support:	**Private sector**: MNCs; national companies, SMEs, and microenterprises.
Development area:	**Private sector development** (Inclusive business model development)
Target sectors:	Non–exclusive sector focus. Businesses operating in the following sectors have been supported to date: energy, utilities, extractives, health, agribusiness, forestry, education, leisure and tourism. The majority of projects to date have focused in the agriculture and food sector

	(August 2012).
Geography:	Malawi, Bangladesh, India, Zambia and Nigeria.
Category of private sector actors engaged:	MNCs; national companies, SMEs, and microenterprises.
Scale:	7 million (GBP)
Timeframe:	January 2010 – December 2013 (Implementation started July 2010)
Number of people/businesses reached:	1.9 million base of the pyramid (BOP) people reached across the portfolio (33 projects as of August 2012).
Has the initiative reached its objectives (performance against initiative specific indicators):	Project numbers are on track, with numbers approved in line with overall targets. Facility indices include: Project Maturity Index, Commercial Viability Index, Development Index, Environmental Index. **Commercial viability:** 5 projects have reached breakeven (as of August 2012). **Development results:** 18 projects appear to have a fair likelihood of reaching the BOP at scale at some point. Taking into account significance per person, replication, and systemic results, at least 4 projects have truly substantial potential development impact (as of August 2012).
Barriers: which barriers does the initiative seek to address	
Direct	**Information and knowledge:** provision of sector specific expertise e.g. food production, education; analysis of consumer demand assessments to determine local willingness to pay among target consumer groups. **Capacity and skills:** Transfer of business knowledge through refinement and development of business plans, sales and marketing strategies. Facility Country Managers are present in each priority country to assist in developing applications. **Technology and product risk:** feasibility studies and assessments for new ventures e.g. testing a micro enterprise model for upscaling the mKrishi information technology tool **Collaboration and partnership:** identification, brokering and supporting partnerships with other businesses; mapping value chains and options for value chain enhancement i.e. identifying clusters of small holder farmers, assessing the existing production capacity, and developing a strategy for reliable smallholder production capacity and sales for larger agro-processors e.g. AACE Foods in Nigeria.
Indirect	**Commercial risks:** a developed business case and strategy can facilitate the raising of required capital and an effective marketing and branding strategy can introduce a business' products to the consumer mass market.
Sector specific	N/A - the programme is not designed to address sector specific barriers directly.
Sources of information	
• http://businessinnovationfacility.org/page/know-how-climate-smart-solutions (accessed 18.02.13) • Review of the Business Innovation Facility Project Portfolio 2012 (Year 2 of the three year pilot) August 2012 (accessed 29/4/2013) http://api.ning.com/files/tgmu1v00IQjRbofbV6y2sk75yhzD1FTAI1pN4aVmVxOjX46gjoyyEO2OR6WofBAvCEZDdnMPuDPxyZH7HC31NA__/BIFPortfolioReview2012FullReport.pdf	

16. Innovations Against Poverty (IAP)	
Innovations Against Poverty functions as a risk sharing mechanism for sustainable business ventures (commercial companies or market oriented organisations) which have a strong potential to reduce poverty. The initiative focuses on smaller organisations which have ideas with great potential but need support to penetrate new markets and also seeks to work with larger companies, to help support the development of "inclusive business" models. The Fund challenges the private sector to develop products, services and business models that can contribute to poverty reduction and combat climate change.	
Overview: institutional arrangements and scope	
Category of initiative	**Challenge fund:** small grants up to EURO 20,000 and large grants up to EURO 200,000
Category of instruments employed:	**Matched grants and grants for technical assistance**
Entity promoting the initiative:	Swedish International development Agency (SIDA)
Entity type :	**Bilateral donor agency**
Single or multi donor:	**Single donor**
Implementing entities:	PwC acts as programme and fund managers for IAP
Partnership model (if any)	Public-private: the fund is managed by a specialist professional services consultancy with expertise in international development and fund management. The Fund manager has a non-investment role.
Recipient of support:	**Private sector**: large and small companies based in both developed and developing economies
Development area:	**Private sector development** (inclusive business models and development of new products and services that can contribute to poverty reduction and build resilience to climate change)
Target sectors:	Non–exclusive sector focus. Businesses operating in the following sectors are most commonly represented in the IAP portfolio: agriculture and food; energy and infrastructure; water, sanitation and waste management; health; finance.
Geography:	Global – developing country contexts only.
Category of private sector actors engaged:	Non exclusive private sector actor focus. The programme targets larger MNCs and national companies and smaller SMEs and microenterprises to support in different ways. More than 90% of grantees are classified as small organisations (having less than 50 employees)
Scale:	5 million approx. (GBP)
Timeframe:	January 2011 – December 2013
Number of people/businesses reached:	29 projects (as at November 2012)
Has the initiative reached its objectives (performance against initiative specific indicators):	
Barriers: which barriers does the initiative seek to address	
Direct	**Collaboration and partnership** and **commercial risks:** Small grants can be used for travel and feasibility studies, stakeholder needs assessments, or for networking with local organisations. **Technology and product risk** and **commercial risks:** Large grants are aimed at developing a new product, service, system, business model or a concept ready to be tested in the market, or adaptation of existing products to be affordable and accessible by the poor.
Indirect	**Capacity and skills**: IAP offers companies advice in developing and rolling out business models that engage the BOP and deliver commercial returns. This advice may be provided by assisting applicants of large grants to develop their business ideas and practices.
Sector specific	N/A – the programme is not designed to address sector specific barriers directly.

Sources of information
• www.sida.se/iap (accessed 18.02.13) • www.inclusivebusinesshub.org (accessed 18.02.13)

17. UNDP African Facility for Inclusive Markets (including AFIM Catalytic Funding Programme)	
AFIM builds on the work of existing pro-poor national and regional initiatives and serves as a platform for coordinating inclusive growth activities between the UN, governments, regional economic communities, and the private sector. Through workshops and grants, AFIM facilitates knowledge sharing, access to finance, and the dissemination of best practices in inclusive market development with emphasis on creating opportunities for low-income and marginalized groups and promoting the development and expansion of regional value chains in job-creating sectors. AFIM Catalytic Funding is a sub-component Fund that focuses on initiatives in the agribusiness/agro-industries sectors (grains, horticulture and dairy/livestock)	
Overview: institutional arrangements and scope	
Category of initiative	**Regional programme/platform**
Category of instruments employed:	**Grants for technical assistance; partnerships support** **AFIM Catalytic Funding:** micro-capital grants up to USD 150,000 per year.
Entity promoting the initiative:	United Nations Development Programme (UNDP)
Entity type :	**International organisation (development network)**
Single or multi donor:	**Multi donor:** voluntary contributions from UN member nations
Implementing entities:	UNDP Private Sector Division and Regional Bureau for Africa
Partnership model (if any)	The Facility is part of the UNDPs Regional Bureau for Africa (RBA) which is supported by the Private Sector Division and coordinated from the UNDP's Regional Service Centre in Johannesburg with a satellite office in Dakar.
Recipient of support:	'Project promoters': NGOs including not-for-profit organisations; regional institutions operating in Sub-Saharan Africa (RECs – Regional Economic Communities e.g. EAC, ECOWAS, SADC, COMESA, WAEMU, CEPGL)
Development area:	**Private sector development** (Inclusive business model development)
Target sectors:	**Non exclusive sector focus**: support has been provided to businesses in agriculture, tourism, renewable energy, retail and mining **AFIM Catalytic Funding** focuses on initiatives in the agribusiness/agro-industries sectors (grains, horticulture and dairy/livestock)
Geography:	Over 30 countries in Africa. **AFIM Catalytic Funding**: Angola, Botswana, DRC, Madagascar, Mauritius, Malawi, Mozambique, Namibia, Lesotho, South Africa, Swaziland, Seychelles, Zambia, Zimbabwe
Category of private sector actors engaged:	SMEs and microenterprises
Scale:	USD 4.8 million seed funding; USD 4.8 million unmet needs
Timeframe:	October 2010 – October 2013
Number of people/businesses reached:	AFIM facilitated a **Public Private Dialogue** which led to Johannesburg Declaration calling for PPP during the AgriBusiness Forum 2011. AFIM **Weeks and Project Facilitation Platforms** helped the RECs to advance 6 regional food value chain projects in 2012. **Catalytic Grant Scheme** supports 3-4 Project Promoters to implement projects in East and West Africa aimed to bring new technologies and innovative solutions for the benefit of 10,000 farmers. **First Field Guide** on Inclusive Business Finance in Africa.
Has the initiative reached its objectives (performance against initiative specific indicators):	
Barriers: which barriers does the initiative seek to address	
Direct	**Collaboration and partnership:** Strengthen value chain linkages and

	facilitate public-private dialogues and cooperation; build a broad-based alliance of partners for inclusive market development in Africa (Private sector, regional institutions, UN agencies, donors and other development partners); develops value chains targeting low-income groups, especially women and youth; Convenes relevant partners, coordinates and supports private sector initiatives at the regional and country levels **Capacity and skills:** Build capacity of small producers and traders by providing support services in the focus sector/value chain; Supports UNDP Country Offices to strengthen existing and scale up new private sector initiatives; Increase private sector related capacity of targeted, regional institutions and governments; In addition to the grant funding, AFIM will provide a designated technical assistance advisor to assist in project design, requested components of implementation, monitoring and evaluation and quality assurance. **Information and knowledge**: dissemination of best practices in private sector led, market-driven solutions to poverty reduction, environmental sustainability, post-conflict recovery and gender equality; Disseminates knowledge and best practices of inclusive finance. IMD online resources. **Policy environment:** Builds and increases private sector related capacity of Regional Economic Communities (RECs) and governments; Strengthen regional and country level initiatives; support development of market infrastructure and advocate sector policies for inclusive economic growth.
Indirect	**Commercial risks:** Facilitate access to finance through knowledge dissemination of innovative financing such as value chain finance, venture capital, warehouse receipts, etc.
Sector specific	**AFIM Catalytic Funding** focuses on initiatives in the agribusiness/agro-industries sectors (grains, horticulture and dairy/livestock)
Sources of information	
• http://www.undp.org/content/dam/undp/library/corporate/Partnerships/Private%20Sector/UNDP%20AFIM%20Brochure%20April%202013.pdf	

18. Fund for Africa Private Sector Assistance (FAPA)	
The Fund provides technical assistance and capacity building to complement the Bank's financing operations, designed to strengthen the private sector in Africa and enhance the development impact of the Bank's private sector loans and investments.	
Overview: institutional arrangements and scope	
Category of initiative	**Multi donor trust fund**
Category of instruments employed:	Grants for technical assistance (capacity building)
Entity promoting the initiative:	African Development Bank (AfDB)
Entity type :	**Multilateral development finance institution**
Single or multi donor:	**Multi donor**: Government of Japan (USD 34 million), AfDB (USD 10.6 million), Government of Austria (EUR 1 million), and Development Bank of Austria (EUR 1 million)
Implementing entities:	African Development Bank (AfDB)
Partnership model (if any)	The FAPA trust fund has a dedicated secretariat and an established and functioning Technical Committee (TC) with broad representation from across the Bank. This ensures expert review of technical cooperation proposals and monitoring of implementation. An Oversight Committee composed of donor representatives is responsible for the general policy direction and governance of FAPA and the final approval of assistance requests. In addition, the Bank holds annual donor meetings to review progress and performance.
Recipient of support:	African governments, regional economic communities and similar

	intergovernmental organizations, business associations, market regulatory institutions, business development service providers, business training and research institutions, and public/private enterprises
Development area:	**Private sector development**
Target sectors:	Non exclusive sector focus: Finance, infrastructure, trade
Geography:	Africa (national and regional)
Category of private sector actors engaged:	Banks; Training providers; SMEs; MSMEs
Scale:	Current volume of the fund: USD 49 million Volume of funds committed: USD 30 million
Timeframe:	2005-ongoing
Number of people/businesses reached:	36 projects financed for a total of USD 29.7 million; USD 10 million projects in the pipeline MSME 35%; Finance 27%; Enabling environment 21%; Infrastructure 14%; Trade 3%
Has the initiative reached its objectives (performance against initiative specific indicators):	
Barriers: which barriers does the initiative seek to address	
Direct	**Policy environment**: reforming judicial system, strengthening economic and corporate governance, promoting fiscal responsibility, supporting transparency and accountability, consolidating property rights, mitigating risks for investors, supporting commercial law reform and improving security for goods and transactions; national strategy development e.g. upgrading the chartered accountant profession in Tunisia **Technology and product risk:** feasibility studies for infrastructure e.g. Rosso Bridge linking Mauritania and Senegal. **Capacity and skills:** training programs whether directly to SMEs or to banks lending to SMEs and MSMEs; promoting financial governance and building institutional capacity at the Development Finance Institution (DFI) and Financial Institution (FI) levels; program support (franchising, mutual guarantee mechanisms, and remittances) to SMEs that addresses key issues such as weak business support institutions, skill shortages and weak equity capacity **Collaboration and partnership:** support of local banks to establish relationships with foreign banks and increase financial capacity of local trade financing institutions.
Indirect	**Commercial risks:** increase capacity of participating financial institutions (PFIs) to provide long-term credit for agribusiness investments
Sector specific	
Sources of information	
• http://www.afdb.org/en/topics-and-sectors/initiatives-partnerships/fund-for-african-private-sector-assistance/ • http://www.afdb.org/fileadmin/uploads/afdb/Documents/Corporate-Procurement/Departmental_Annual_Reports/RAPPORT%20ANGLAIS.pdf	

19. Seed Capital Assistance Facility (SCAF)	
SCAF supports a number of cooperating investment funds to overcome early stage challenges in providing seed capital financing to clean energy projects and businesses in Africa and Asia.	
Overview: institutional arrangements and scope	
Category of initiative	**Regional facility**
Category of instruments employed:	**Grants:** to support the development of clean energy enterprises and subsidise some of the elevated project development costs associated with seed investments. Around 10-20% of the agreed seed funding investment can be provided in support, however the seed investment must usually be less than USD 500,000 to qualify.
Entity promoting the initiative:	United Nations Environment Programme, Asian Development Bank, African Development Bank
Entity type :	**Multilateral development institution/Regional development banks**
Single or multi donor:	Multi-donor
Implementing entities:	United Nations Environment Programme, Asian Development Bank, African Development Bank with support from the Frankfurt School of Finance and Management
Partnership model (if any)	**Public-private:** SCAF has entered into Cooperating Fund Agreements with a number of investment managers whom they then provide support to. SCAF also works with fund managers to set up new funds focussed on early stage investments.
Recipient of support:	**Private sector:** SMEs, entrepreneurs (support is also provided to the cooperating funds themselves to help identify enterprises)
Development area:	**Private sector development**
Target sectors:	Renewable energy
Geography:	Asia and Africa
Category of private sector actors engaged:	SMEs (renewable energy businesses and project developers)
Scale:	USD 9 million in early stage public funding which aims to catalyse USD 63 million in seed investment and USD 895 million in private equity investment
Timeframe:	6 years (launched in 2010)
Number of people/businesses reached:	Partnerships have been set up with three funds in Asia and two funds in Africa. SCAF aims to support at least 7 projects through one of the African funds and 4-5 projects through the other African fund. Further objective for Asia and as a whole are not clear.
Has the initiative reached its objectives (performance against initiative specific indicators):	Unclear
Barriers: which barriers does the initiative seek to address	
Direct	**Commercial risk** – SCAF helps to reduce the cost and risk associated with financing early stage energy projects and companies in two ways: 1) by cost-sharing some of the elevated sourcing and training costs associated with identifying and developing seed scale investments; 2) covers some of the elevated costs involved in developing the projects/businesses themselves, such a technical assistance, contract negotiations, permitting etc.
Indirect	
Sector specific	
Sources of information	
• http://scaf-energy.org/index.html • http://www.afdb.org/en/topics-and-sectors/initiatives-partnerships/seed-capital-assistance-facility-scaf/ • http://scaf-energy.org/news/pdf/UNEP,%20ADB%20and%20AfDB%20announce%20new%20Seed%20Capital%20Assistance%20Facility%20October%202010.pdf • http://scaf-energy.org/news/pdf/Catalyzing%20Early%20Stage%20Investment.pdf	

20. Business Call to Action	
The Business Call to Action (BCtA) is a global leadership platform that challenges companies to accelerate progress towards the Millennium Development Goals through creating commercially viable business ventures that engage low-income people as consumers, producers, suppliers and distributors of goods and services.	
Overview: institutional arrangements and scope	
Category of initiative	**Fund**
Category of instruments employed:	**Technical assistance:** provision of a global leadership platform and opportunities to share expertise, knowledge and best practices; development advice and assistance for BCtA initiatives; and linkages with companies, donors and other stakeholders.
Entity promoting the initiative:	Australian Agency for International Development, Dutch Ministry of Foreign Affairs, Swedish International Development Cooperation Agency, UD Department for International Development, US Agency for International Development, United Nations Development Programme
Entity type :	**Bilateral donor agencies and multilateral development institutions**
Single or multi donor:	Multi-donor
Implementing entities:	United Nations Development Programme
Partnership model (if any)	Also supported by the UN Global Compact, the International Business Leaders Forum and the Clinton Global Initiative who provide strategic guidance, collaboration on events and the broadening of the network.
Recipient of support:	**Private sector:** MNCs, national companies and SMEs
Development area:	**Agricultural development, financial inclusion, health and nutrition, access to energy, livelihoods/employment**
Target sectors:	Food and beverage, financial services, healthcare, energy, ICT
Geography:	Latin America and the Caribbean, Middle East, Africa, Asia and Pacific
Category of private sector actors engaged:	Large MNCs (29 member companies) Small and Medium sized MNCs (15 member companies) Small and medium sized nationals (14 member companies) Large nationals (5 member companies)
Scale:	63 member companies, 40% of members headquartered in developing countries, initiatives in 43 low- and middle-income countries. Aim to have 150 member companies by 2015.
Timeframe:	2008 - ongoing
Number of people/businesses reached:	Expected impact by 2020 based on pledges: 330,000 jobs created; 550,000 people experiencing better agricultural yields, 8 million people with improved nutrition; 57 million people with increased access to financial services; 1.5 million people benefiting from training and capacity building; 50 million people with improved health outcomes; 89 million people with improved access to energy; 1 million people with improved access to water; 5 million tCO_2 avoided; 740,000 women with increased productivity; 7.6 million people with improved access to technology.
Has the initiative reached its objectives (performance against initiative specific indicators):	Due to publish impact report in 2013. At the moment, little information available on what has actually been achieved so far. They are making progress towards their goal of having 150 member companies by 2015, having increased their membership by around 50% in 2012. They will need to continue at this rate for the next two years to meet this goal.
Barriers: which barriers does the initiative seek to address	
Direct	**Capacity and skills:** provides development advice and assistance to member companies with regards to their initiatives.
Indirect	**Collaboration and partnership:** provides a platform to link companies, donors and other stakeholders together. **Information and knowledge:** provides a platform for member companies to share expertise, knowledge and best practice.
Sector specific	

Sources of information
• http://www.businesscalltoaction.org/ • http://www.businesscalltoaction.org/wp-content/uploads/2013/05/BCtAAnnualReport2012_Print.pdf

21. Private Sector Investment Programme	
The Private Sector Investment Programme (PSI), formerly known as PSOM, is a subsidy programme supporting innovative investment projects in developing countries. The objectives of PSI are to stimulate financial growth, create employment opportunities and generate income.	
Overview: institutional arrangements and scope	
Category of initiative	**Fund**
Category of instruments employed:	**Grant:** Up to 750,000 Euros per innovate pilot project to cover cost of both capital goods and technical assistance. Usually covers 50-60% of the project budget. Insurance costs can also be subsidised.
Entity promoting the initiative:	Dutch Ministry of Foreign Affairs
Entity type :	**Bilateral Donor Agency**
Single or multi donor:	Single donor
Implementing entities:	NL Agency (division of the Dutch Ministry of Economic Affairs)
Partnership model (if any)	
Recipient of support:	Private sector (Dutch and non-Dutch companies, working in collaboration with a local business partner)
Development area:	**Private sector development; economic growth and trade**
Target sectors:	All sectors
Geography:	59 countries across Africa, Middle East, Latin America, Central & Eastern Europe and Asia.
Category of private sector actors engaged:	MNCs (Dutch and non-Dutch companies) SMEs (Partner businesses in developing country)
Scale:	EUR 90 million budget for 2013, divided over two tenders
Timeframe:	Ongoing
Number of people/businesses reached:	Approximately 500 investment projects carried out over the last 10 years
Has the initiative reached its objectives (performance against initiative specific indicators):	Not clear what any specific performance indicators are, but the large number of projects that have been carried out suggests that it has been successful in driving employment/trade in developing countries.
Barriers: which barriers does the initiative seek to address	
Direct	**Commercial risk:** PSI supports companies that are considering investing in higher risk markets (developing countries).
Indirect	
Sector specific	
Sources of information	
• http://www.agentschapnl.nl/en/node/50050	

22. Grassroots Business Fund	
The Grassroots Business fund (GBF) partners with businesses in emerging markets, and provides them with both the long-term investment capital and the business advisory services they need to scale, become sustainable and attract other investment partners.	
Overview: institutional arrangements and scope	
Category of initiative	**Public-private impact investment**
Category of instruments employed:	**Grants:** TA provided to help with the business expertise needed to grow and scale, including financial management, operations and supply chain, strategic planning, governance as well as environmental and social aspects. **Equity:** Equity and mezzanine equity **Debt:** Mezzanine debt and straight debt investments
Entity promoting the initiative:	Independent (previously set up by the International Finance Corporation)
Entity type :	
Single or multi donor:	Multi-donor plus private sector investment
Implementing entities:	Self-implementing
Partnership model (if any)	
Recipient of support:	Private sector
Development area:	**Economic growth and trade; private sector development**
Target sectors:	Agribusiness, 'Base of the Pyramid' services (e.g. low-energy lighting, mobile banking, cooking stoves), Artisanal, Finance
Geography:	Kenya, Tanzania, India, Indonesia, Bolivia, Peru
Category of private sector actors engaged:	Microenterprise (farmers/artisans) SMEs (agribusiness, artisans, technology, manufacturing)
Scale:	Target Investment Range: USD 500,000 and USD 2,000,000. USD 47 million already committed to the fund and USD 12 million committed to the non-profit
Timeframe:	Average Investment horizon: 6-8 years
Number of people/businesses reached:	The GBF's high impact business have generated economic opportunities for over. 1.9 million people and improved the lives of an additional 8.5 million people.
Has the initiative reached its objectives (performance against initiative specific indicators):	It's portfolio and the number of people impacted has been continuing to grow, with the current fund totalling USD 14 million. GBF's own assessment indicated that the fund is performing well and generating significant social impact.
Barriers: which barriers does the initiative seek to address	
Direct	**Capacity and skills:** GBF targets growth stage businesses that have several years of track record. By providing a combination of business advisory services they enable small businesses in emerging markets overcome the business expertise challenges that they face in growing and scaling up their operations. **Commercial risk:** In addition to providing business advisory services, the GBF also provides investment capital to those smallholders and SMEs that show potential for growth and commercial success.
Indirect	
Sector specific	**Agribusiness:** Through the provision of long-term investment capital and related capacity building programmes, GBF helps agribusinesses grow and achieve a greater social impact. **Artisanal:** Technical assistance and investment capital provided to help artisans increase production, improve financial management and access global markets.
Sources of information	
• http://www.gbfund.org/ • http://www.gbfund.org/sites/default/files/2012AnnualReport.pdf • http://www.gbfund.org/sites/default/files/GBF_AR_2011.pdf	

23. Business Linkages Challenge Fund (BLCF)	
A challenge fund aimed at improving business competitiveness and ability to access markets, enabling benefits of globalisation to be secured for and by the poor. The Fund aimed, through its projects, to facilitate linkages between corporate business (MNCs) and small and medium enterprises, and also between SMEs within a country or between countries.	
Overview: institutional arrangements and scope	
Category of initiative	**Challenge Fund**
Category of instruments employed:	Matching grants: between GBP 50,000 and GBP 1,000,000
Entity promoting the initiative:	Department for International Development (DFID)
Entity type :	**Bilateral donor agency**
Single or multi donor:	**Single donor**
Implementing entities:	Deloitte and Touche
Partnership model (if any)	Public-private
Recipient of support:	Private sector led initiatives; business and civil-society organisation in the UK and selected countries in Africa and the Caribbean.
Development area:	**Private sector development**
Target sectors:	SMEs
Geography:	MNCs based in the UK; MNCs and SMEs based in Africa and the Caribbean
Category of private sector actors engaged:	MNCs and SMEs
Scale:	GBP 18,207,835
Timeframe:	01/07/2000 - 30/10/2009
Number of people/businesses reached:	From the first six rounds (GBP 10.7 million committed), the aggregate number of jobs created or retained by the projects was estimated at 106,678 (16,362 direct jobs and 90,316 indirect jobs).
Has the initiative reached its objectives (performance against initiative specific indicators):	
Barriers: which barriers does the initiative seek to address	
Direct	**Collaboration and partnership:** supports the formation of business linkages by enterprises in developing countries with each other and/or with international partners. Approved linkages will mobilise enterprises and their representatives by, for example, transferring skills, information and technology, improving sourcing, product supply and market access.
Indirect	**Capacity and skills** and **commercial risks:** a private-sector led initiative entitled the Malawi Cotton Seeding Treatment Programme (MCSTP), invested a grant of £290,000 to provide capital and training to poor farmers, thereby reducing the risk to processors providing business development services to smallholders on credit. The number of smallholder farmers involved in the MCSTP amounted to 62,000 farmers in the first year of the programme, and 180,000 farmers in the second year.
Sector specific	
Sources of information	
• http://projects.dfid.gov.uk/project.aspx?Project=113155 • http://www.enterprise-development.org/page/framework-ppp-firm-behaviour • http://www.odi.org.uk/events/2263-promoting-business-linkages-role-trade-policy-industrial-policy-donor-agencies	

24. USAID Development Credit Authority	
USAID's Development Credit Authority (DCA) uses risk-sharing agreements to mobilise local private capital. Partial credit guarantees encourage private lenders to extend financing to borrowers in new sectors and regions that they would not otherwise lend to. It seeks to prove the commercial viability of undeserved markets so that lending and investment can continue after USAID leaves.	
Overview: institutional arrangements and scope	
Category of initiative	**Guarantor**
Category of instruments employed:	**Partial credit guarantees:** used to mobilize financing in developing countries where lenders would not otherwise provide credit. USAID charges banks fees to avoid guaranteeing loans banks would have made without the guarantee.
Entity promoting the initiative:	USAID
Entity type :	**Bilateral donor agency**
Single or multi donor:	Single country
Implementing entities:	USAID
Partnership model (if any)	
Recipient of support:	**Private sector:** SME, microenterprise
Development area:	Private sector development Economic growth and trade
Target sectors:	Agriculture, health environment, small business, microfinance, housing, water, energy, infrastructure, education
Geography:	Latin American and the Caribbean, Africa, Asia, Eastern Europe
Category of private sector actors engaged:	SMEs Microenterprise (microfinance) Local/national financial institutions (to provide funding for projects in renewables, agriculture, health, water)
Scale:	USD 2.7 billion in credit made available between 1999 and 2012. USD 11 million in bank fees received and USD 9.1 million in claims paid over the period.
Timeframe:	1999 – ongoing
Number of people/businesses reached:	Projects across 70 countries. In 2012, anticipated 39,000 loans to be made improving the lives of 1.35 million people.
Has the initiative reached its objectives (performance against initiative specific indicators):	Not clear what targets are or whether they have been met.
Barriers: which barriers does the initiative seek to address	
Direct	**Commercial risk:** DCA acts to overcome country and project risks which would normally mean that credit is not extended to projects.
Indirect	
Sector specific	
Sources of information	
• http://www.usaid.gov/news-information/press-releases/usaid-mobilizes-record-amount-private-capital-support-small • http://www.usaid.gov/what-we-do/economic-growth-and-trade/development-credit-authority-putting-local-wealth-work • http://transition.usaid.gov/our_work/economic_growth_and_trade/development_credit/pdfs/2012/1210-usaid-onepager-v5-4_2.pdf	

25. African Guarantee Fund for Small and Medium-sized Enterprises	
The AGF, designed and funded by the AfDB in partnership with the governments of Denmark and Spain, provides guarantees to financial institutions to stimulate financing to African SMEs and unlock their potential to deliver inclusive growth in the region. The provision of partial guarantees for financial institutions in African countries incentivizes them to increase debt and equity investments into SMEs.	
Overview: institutional arrangements and scope	
Category of initiative	**Public-private partnership**
Category of instruments employed:	**Partial credit guarantees**: portfolio and individual loan guarantees to Partner Lending Institutions (PLIs); financial guarantees to PLIs (Bank fund raising guarantees and equity guarantees); funds mobilization (i.e. issuance of bonds) by financial institutions in support of their SME financing activities (limits of USD 2.5 million for loan portfolio guarantee; USD 0.5 million for individual guarantee; USD 0.5 million for equity capital guarantee; USD 1 million for resource mobilisation guarantee). **Technical assistance** – capacity development support for PLIs and SMEs
Entity promoting the initiative:	African Development Bank (AfDB); Danish and Spanish governments
Entity type :	**Multilateral development finance institution** and **bilateral donor agencies**
Single or multi donor:	**Multi donor:** contributions from member countries of the AfDB (USD 10 million); The Danish International Development Agency (DANIDA): USD 20 million; and The Spanish Agency for International Development Cooperation (AECID): USD 20 million.
Implementing entities:	The AGF is set up as a company headquartered in Mauritius. Its operations are managed out of its Nairobi, Kenya branch office. A second branch is likely to be set up in a West African francophone country within a few years. AGF operates as a non-bank financial institution with a Board of Directors responsible for the overall management and a Chief Executive Officer heading the operations. The AGF Board of Directors has representatives from each of AfDB, DANIDA and AECID. An Advisory Panel was composed of African and non-African bankers, central bank representatives, SME representatives, and other specialists in fields central to AGF, which will be maintained. Other stakeholder representatives have been consulted during missions, in individual meetings, and through consultancies.
Partnership model (if any)	**North-south:** partnership between AfDB, DANIDA and AECID.
Recipient of support:	**Financial institutions (Partner Lending Institutions)** and **SMEs**
Development area:	**Financial market strengthening**
Target sectors:	AGF will target all African SMEs with a valid operating license regardless of sector, industry, location, and ownership. Sectors include: agriculture, agro-processing, small and medium scale mining, oil trading, manufacturing, building and construction, renewable energy, telecommunications, transport, tourism and trade. AGF will have a rigorous partner selection process, with partner financial institutions demonstrating a clear commitment to growing their SME portfolio and improving financial product offerings to this segment.
Geography:	AGF products will be rolled out in nine to fourteen countries in Africa within the first two years with the objective to cover the entire continent by year 2016. AGF will roll-out its operations in these regions in three phases. Phase I countries have been identified through the AGF preparation phase and are characterized as 'transition economies' in terms of economic diversification and export orientation, including: Ghana, Mali and Senegal in West Africa, Cameroun in Central Africa, Kenya, Tanzania and Uganda in Eastern Africa, and Mozambique and Zambia in Southern Africa.
Category of private sector actors engaged:	**Local banks** **SMEs**
Scale:	USD 50 million (Over the next 3 to 5 years, this is scheduled to increase to USD 500 million, with additional capital coming from bilateral donors, private investors as well as from DFIs).
Timeframe:	2010-2016

Number of people/businesses reached:	AGF anticipates that it will generate approx. USD 2 billion of new lending to SMEs in the medium term and reach some 10,000 African SMEs.
Has the initiative reached its objectives (performance against initiative specific indicators):	
Barriers: which barriers does the initiative seek to address	
Direct	**Capacity and skills (local banks):** Increase banks' capacity to appraise SMEs and manage SME portfolios by providing technical assistance and strategies to further develop SME engagement. **Capacity and skills (SMEs):** capacity development support for SMEs, increasing productivity and competitiveness. **Technology and product risk:** Expand bankable SME segments by changing bank's perception of bankable SMEs and permanently increasing their exposure to SMEs.
Indirect	**Commercial risks:** Through the supply of these products and services, the AGF will help improve access to credit for SMEs as they start and grow their businesses. Capacity development of SMEs is managed and implemented through existing local service providers.
Sector specific	
Sources of information	
• http://www.afdb.org/en/topics-and-sectors/initiatives-partnerships/african-guarantee-fund-for-small-and-medium-sized-enterprises/ • http://www.africanguaranteefund.com/	

26. Financial Deepening Challenge Fund (FDCF)	
The Financial Deepening Challenge Fund (FDCF) was designed in the late 1990's to encourage formal financial sector organisations in selected developing countries in Africa and South Asia to design and deliver a range of innovative, pro-poor financial services, products and delivery mechanisms to poor and previously excluded groups and to enterprises that employ poor people.	
Overview: institutional arrangements and scope	
Category of initiative	**Challenge Fund**
Category of instruments employed:	Matching grants: between GBP 50,000 and GBP 1 million
Entity promoting the initiative:	Department for International Development (DFID)
Entity type :	**Bilateral donor agency**
Single or multi donor:	**Single donor**
Implementing entities:	Coffey International acted as programme and fund managers for FDCF / Enterplan, which is private firm that provides management and advisory services for public, private and voluntary sector organizations operating in developing countries
Partnership model (if any)	**Public-private**: the fund was managed by a specialist professional services consultancy with expertise in geosciences, international development and project management. The Fund manager had a non-investment role. Coffey assisted with the design of new applications, monitored and supervised projects to ensure they reached their targets, and provided on-going support to enable grantees to resolve implementation problems.
Recipient of support:	Local and regional banks, SACCOs, MFIs and Foundations in consortium with for-profit private sector entities
Development area:	**Finance**
Target sectors:	Banking and financial services

Geography:	Sub-Saharan Africa , India and Pakistan
Category of private sector actors engaged:	Local and regional banks and building societies, SACCOs, MFIs
Scale:	GBP 17,868,123
Timeframe:	01/01/2000 - 30/10/2009. Projects maximum of 3 years.
Number of people/businesses reached:	28 Fund projects
Has the initiative reached its objectives (performance against initiative specific indicators):	Launching of Vodafone's M-PESA mobile money service According to independent evaluations, FDCF appears to have achieved its objectives.
Barriers: which barriers does the initiative seek to address	
Direct	**Capacity and skills:** Strengthened capacity in local financial institutions for more effective financial intermediation **Technology and product risk:** Development and introduction of new financial products and services including credit, savings, insurance, health coverage, housing finance, pensions, leasing working capital, remittances **Policy environment:** Improved operational infrastructure and regulatory and legislative framework in the financial sector
Indirect	
Sector specific	
Sources of information	
• http://projects.dfid.gov.uk/project.aspx?Project=113154 • http://www.coffey.com/our-projects/manager-of-the-financial-deepening-challenge-fund • http://www.nathaninc.com/projects-and-cases/design-financial-deepening-challenge-fund	

27. USAID Development Innovation Ventures	
Through DIV, USAID seeks to identify and test new projects with the potential to significantly improve development outcomes and then helps replicate and scale those that are successful. Projects are chosen through a quarterly competition for innovative ideas.	
Overview: institutional arrangements and scope	
Category of initiative	**Fund(?)**
Category of instruments employed:	**Grants:** Funding is provided in three project stages: 1) proof of concept; 2) scaling and impact evaluation; and 3) transitioning projects to large scale. Projects can apply for funding at any of the stages.
Entity promoting the initiative:	USAID
Entity type :	**Bilateral donor agency**
Single or multi donor:	Single donor
Implementing entities:	USAID
Partnership model (if any)	
Recipient of support:	Private Sector, NGOs, Academic institutions
Development area:	**Agriculture and food security; democracy, human rights and governance; economic growth and trade; education; energy; environment and climate change; gender equality and women's empowerment; global health; water and sanitation.**
Target sectors:	Agriculture, technology, energy, health, education, finance
Geography:	Afghanistan and Pakistan, Africa, Asia, Europe and Eurasia, Latin America and the Caribbean, Middle East.
Category of private sector actors engaged:	SMEs (technology, health, finance, energy) Microenterprises (agriculture, technology)
Scale:	Phase 1 funding approximately USD 100,000 per project, Phase 2 funding up to USD 1 million, Phase 3 funding up to USD 15 million.
Timeframe:	Launched in October 2010
Number of people/businesses reached:	Investing in 60 solutions in 8 sectors across 22 countries
Has the initiative reached its objectives (performance against initiative specific indicators):	Unclear what specific objectives are, in terms of project number/impact
Barriers: which barriers does the initiative seek to address	
Direct	**Commercial risk:** funding provided to test and potentially scale-up innovative solutions that may otherwise not have access to capital. **Technology and product risk:** by funding a testing process for innovative solutions, successful new technologies can then demonstrate their functionality and apply for further funding.
Indirect	
Sector specific	
Sources of information	
• http://www.usaid.gov/div • http://www.usaid.gov/sites/default/files/documents/1880/aps-oaa-13-000004%20v2.pdf	