



**UN-OHRLS**

United Nations Office of the High Representative for the  
Least Developed Countries, Landlocked Developing Countries





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**The Impact of Climate Change, Desertification and Land Degradation on the Development Prospects of Landlocked Developing Countries**

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<b>ADB</b>	Asian Development Bank	<b>DLDD</b>	Desertification, land degradation and drought
<b>AfDB</b>	African Development Bank	<b>EAC</b>	East African Community
<b>AMCOW</b>	African Ministers' Council on Water	<b>ECA</b>	Economic Commission for Africa
<b>AMU</b>	Arab Magreb Union	<b>ECOWAS</b>	Economic Community of West African States
<b>APoA</b>	Almaty Programme of Action	<b>EEP</b>	Energy and Environment Partnership
<b>AU</b>	African Union	<b>EI</b>	Environment Initiative
<b>AWF</b>	African Water Facility	<b>ENSO</b>	El Nino Southern Oscillation
<b>CAADP</b>	Comprehensive Africa Agriculture Development Program	<b>EU</b>	European Union
<b>CAF</b>	Cancun Adaptation Framework	<b>FAO</b>	Food and Agricultural Organization
<b>CBD</b>	Convention on Biological Diversity	<b>FDI</b>	Foreign Direct Investment
<b>CCAP</b>	Climate Change Action Plan	<b>FINIDA</b>	Finnish International Development Agency
<b>CEIF</b>	Clean Energy Investment Framework	<b>FIP</b>	Forest Investment Program
<b>CIDA</b>	Canadian International Development Agency	<b>FHHs</b>	Female Headed Households
<b>CIFOR</b>	Center for International Forestry Research	<b>GCCA</b>	Global Climate Change Alliance
<b>CILSS</b>	Permanent Inter-State Committee on Drought Control in the Sahel	<b>GDP</b>	Gross Domestic Product
<b>CRGE</b>	Climate Resilient Green Economy	<b>GEF</b>	Global Environment Facility
<b>CRMA</b>	Climate Risk Management and Adaptation	<b>GLADA</b>	Global Land Degradation Assessment
<b>COP</b>	Conference of Parties	<b>GM</b>	Global Mechanism
<b>DANIDA</b>	Danish International Development Agency	<b>GTZ</b>	German Technical Cooperation Agency
<b>DFID</b>	Department for International Development (UK)	<b>HIPC</b>	Heavily Indebted Poor Country



Landlocked developing countries (LLDCs) are disadvantaged in a myriad of ways and they have special needs which require special attention. Challenges such as undiversified economies, vulnerability to climate change and climate variability, land degradation and desertification, among others, are undermining the economic potential of many LLDCs. This has been exacerbated by weak export base of many LLDCs centered on a few primary agricultural and/



## Priority 2: Agriculture and Food Security

### **Agriculture, livelihood sustenance and food security remain top priority in LLDCs**

Agriculture remains the linchpin of the economies of many LLDCs offering the most feasible strategy to promote economic development of these countries. Further, agricultural development and advancement also offers the desired pathway to poverty reduction and food insecurity improvement – two vices which remain unacceptably high in LLDCs. However, agriculture is one of the sectors worst affected by climate change, land degradation and desertification. Unless these challenges are seriously addressed, achieving the full potential of the agricultural sector in LLDCs could prove difficult.

### **Encourage investment in climate-smart agriculture in LLDCs**

Climate-smart agriculture is one new approach that is increasingly gaining recognition as an innovative approach to addressing challenges of climate change, land degradation and food security. It calls for enhanced agricultural productivity and sustainable land-use management through minimal water depletion and soil-disturbing cultivation practices. It is recommended that the UN leads international efforts in promoting adoption of climate-smart agriculture amongst LLDCs with a well-defined plan of action.

### **Strive to diversify the economic base of LLDCs**

Most LLDCs are characterized by over-dependence on the production of a single or a few primary commodities of either agricultural or mineral in nature. This leaves many of them highly vulnerable to natural shocks, particularly climate change-related risks. There is a need to assist LLDCs build diversified economies that are resilient to economic shocks and that are capable to produce a range of value-added goods that are competitive on the world market. Impact of climate change, desertification and land degradation can be reduced by encouraging households to adopt live-lihood systems that are less dependent on traditional land uses and less demanding on local land and natural resource use, yet can provide sustainable income. The international community should play a decisive role in assisting the LLDCs to build



## 1.1 Background

Landlocked developing countries (LLDCs) are faced with a myriad of challenges linked to their geography which grossly undermine their overall economic development. This in turn has undermined their capacity to achieve the Millennium Development Goals. By definition, LLDCs are countries whose territorial boundaries lie inland with no outlet to the sea. Any physical outlet to the sea has to be “negotiated” with neighbouring coastal countries. There are 32 LLDCs whose distribution is shown in Table 1.

**Table 1. LLDCs and their regional location**

<b>Sub-Saharan Africa</b>	Botswana Central Africa Republic Lesotho Niger Uganda South Sudan	Burkina Faso Chad Malawi Rwanda Zambia	Burundi Ethiopia Mali Swaziland Zimbabwe
<b>Asia</b>	Afghanistan Bhutan Lao Peoples' Democratic Republic Tajikistan		

Henderson *et al* (2000:10) estimates that high transport costs can decrease a country's trade volume by about 80 percent. Because of high transport cost, most LLDCs are at a distinct disadvantage as they face expensive imports. This in turn pushes high the local prices of goods and services, rendering most commodities too expensive for a majority of poor households to afford. On the export front, high transport costs reduce competitiveness of exported goods on the international markets. Hence the prohibitive geography of LLDCs constitutes an inherent trade barrier whose adverse effects on international trade are worse than those caused by tariffs and other forms of trade barriers.

**Table 2. Average distances from the sea and percent of paved roads in LLDCs by sub-regions**

Sub-region LLDCs	Average percent of paved roads	Average distance from the sea (km)
Southern Africa	32.2	819
East Africa	9.0	1,272
Sahel	7.9	1,983
Latin America	28.7	718
Europe	75.1	170
East Asia	26.3	1,062
Central Asia	79.1	2,328

Source: UNCTAD, 2006

LLDCs are disadvantageded not only by their distance from the sea but also by other international trade challenges which they have no control over. They are only able to trade less when compared to transit/coastal countries. Their access to international overseas markets is based on the goodwill of the transit country as well as the prevailing political stability and peacefulness of the neighbouring transit countries. Faye *et al* (2004) discuss four types of dependence which include: neighbour's infrastructure, sound cross-border political relations, peace and stability and administrative practices. In situations where these factors are compromised, these can cause severe harm to the economic prospects of the affected LLDC. Chowdhury and Erdenebileg (2006) maintain that the challenges encountered by LLDCs manifest themselves in the following:

- regardless of whether a LLDC possesses world class infrastructure, it's economic growth and trade potential will be hamstrung if the transit country has not invested sufficiently in its infrastructure,
- LLDCs often find themselves subject to border blockages or other impediments to trade should they be in conflict with their transit neighbours;
- When transit neighbours suffer from strikes, natural disasters, civil or economic upheavals, the transit routes used by LLDCs may become, unsafe, damaged or even closed; and
- Passing through the territory of transit neighbours invariably results in significant administrative burdens on LLDC traders.

## 1.2 Brief overview of Almaty Programme of Action and of the economies of LLDCs

In view of these challenges, the Almaty Ministerial Conference (held in Kazakhstan, 2003) was the first to make a global call that formally recognized the need to address the unique problems affecting the LLDCs. It brought together landlocked and transit developing countries, donor countries, and international financial and development institutions and crafted a plan of action – Almaty Programme of Action (APoA). Central to the APoA's mission was to address five priority areas which include addressing (a) fundamental transit policy issues; (b) infrastructure development and maintenance; (c) international trade and trade facilitation; (d) international support measures; and (e) implementation and review.

The programme of action intended to achieve the following objectives:

- Secure access to and from the sea by all means of transport according to applicable rules of international law
- Reduce costs and improve services so as to increase the competitiveness of their exports

- Address problems of delays and uncertainties in trade routes
- Develop adequate national networks
- Reduce loss, damage and deterioration *en route*
- Open the way for export expansion
- Improve safety of road transport and security of people along the corridors

Overall the LLDCs made some improvements in their economic growth under the APoA. According to the 2013 *Report of the Secretary General on the Implementation of the APoA*, international financial support to the LLDCs increased substantially since 2003. Flows of official development assistance from traditional donors increased substantially from US\$ 11.1 billion in 2000 to US\$ 24.3 billion in 2011 and Aid for Trade disbursements to LLDCs rose from US\$ 4.7 billion in 2006 to US\$ 6 billion in 2010. Foreign Direct Investment net inflows to LLDCs increased from US\$ 3.9 billion in 2000 to US\$ 35.0 billion in 2011.

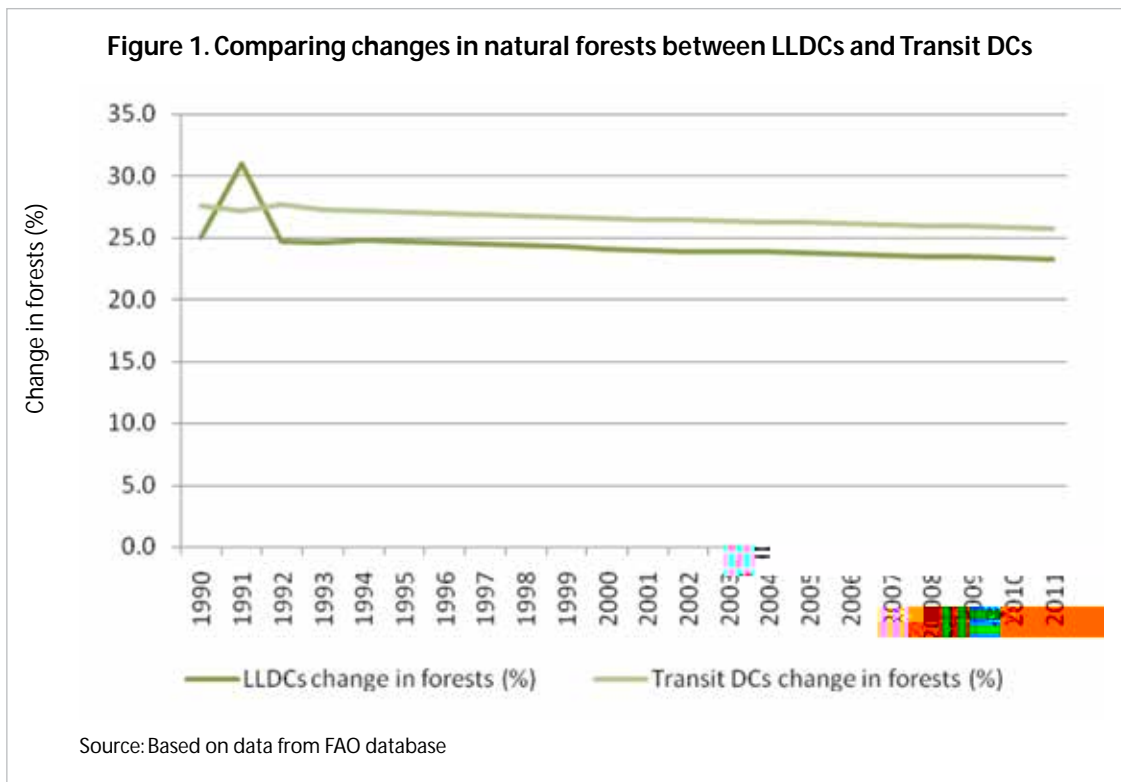
Although LLDCs' share of world trade remains small, at a little under 1.2 percent in 2013 it has nonetheless increased from the 2001 share of just over 0.5 percent. Comparatively, the transit countries have a much higher share at about 6 percent. A major lesson learnt from the implementation of the APoA is that climate change, land degradation, and desertification are important issues that affect the development prospects of the LLDCs. This call emanates from the severe impact that climate change, land degradation and desertification are inflicting on the development imperatives of LLDCs. The international community is becoming increasingly concerned with the impacts of these factors on the development prospects of LLDCs. Many studies indicate that the collective impact of these factors is projected to have more disproportionate effects on the economies of LLDCs for a number of reasons:

- LLDCs are largely characterized by limited productive capacity and non-diversified economies – typically concentrated on one or few bulky primary agricultural and mining commodities – making them highly vulnerable to climate change and climate variability and other external shocks.
- Climate change, desertification and land degradation pose potentially permanent and serious threats to the economic and social development of LLDCs as they are the most vulnerable and least prepared to confront these challenges (as discussed later).
- LLDCs contain a subset of the poorest and geographically disadvantaged countries in the world, and countries whose plight is worsened by lack of human, institutional, capital and financial resource depth to deal effectively with the challenges posed by climate change, desertification and land degradation.
- The global food price hikes tied to bio-fuels and persistent rise in international oil prices are “newly emerging challenges” which threaten to derail the limited progress achieved by most LLDCs. Given many LLDCs are net importers of major cereal crops (wheat, rice, maize), food price hikes translate into severe shocks that will hurt the economies of LLDCs to the core in both short and long run.

Today, most of the LLDCs are among the most disadvantaged and impoverished countries in the entire world. It is not by coincidence that their economies continue to perform so poorly

The remainder of the report is structured as follows: section 2 provides a comprehensive discussion of the impacts of climate change, desertification and land degradation on the economies of LLDCs; section 3 discusses the policy interventions implemented at national, regional and international level including a critical analysis of the strengths and short-comings; section 4 presents the lessons learnt, policy gaps and emerging opportunities; section 5 discusses the way forward including priorities, recommendations and conclusions.





To facilitate discussion, the section below is divided into two parts: the first part discusses the vulnerability of LLDCs to climate change, desertification and land degradation and the second part discusses the impact of climate change, desertification and land degradation on LLDCs' economies.

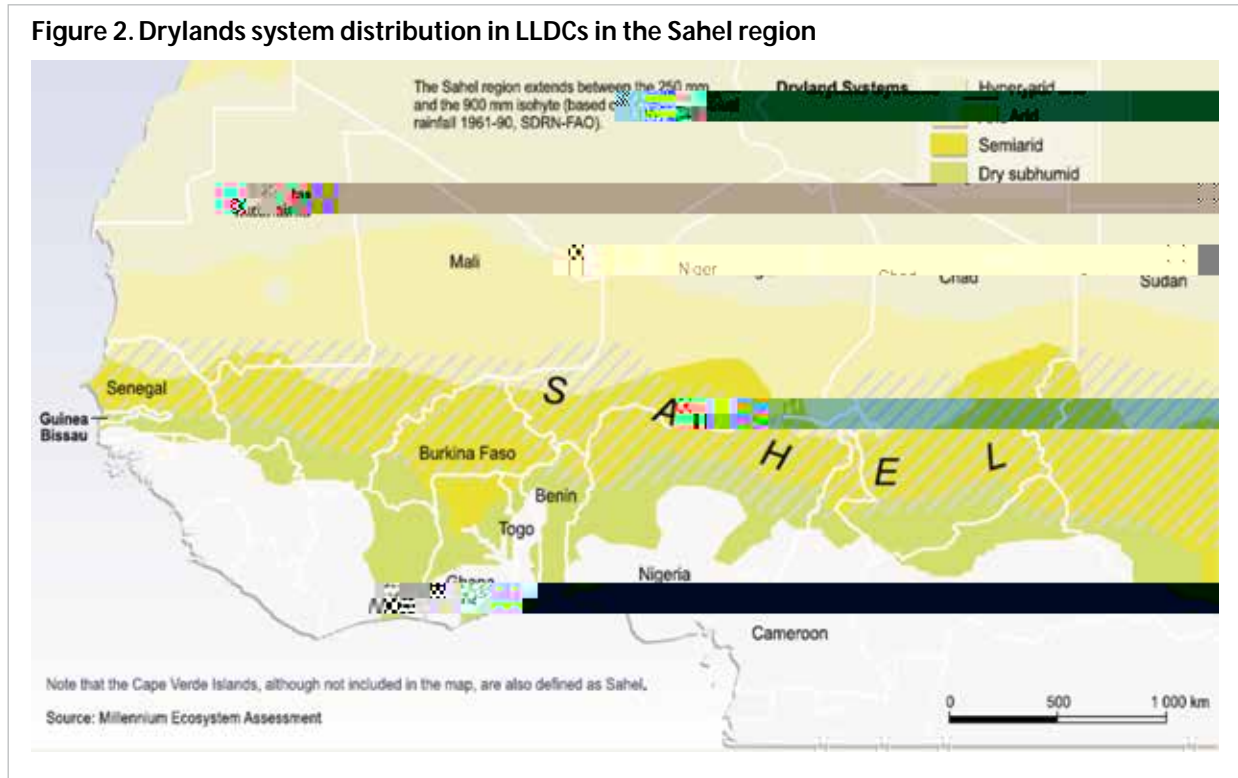
## 2.1 Vulnerability of LLDCs to climate change, desertification and land degradation

Climate change, desertification and land degradation are global challenges with severe implications for worldwide eco-safety, food security, socio-economic stability, and sustainable development. Among the most affected countries are the LLDCs because



Finally, many LLDCs are located in dryland regions where the impacts of climate change, desertification and land degradation are more pronounced. Indeed it is in drylands – where the soils are very fragile, vegetation is sparse and the climate is particularly unforgiving that desertification wreaks havoc. Drylands are unevenly distributed between developing and developed countries: 72% of the global dryland areas are in developing countries compared to 28% in industrialized countries. About 15% of drylands globally are found in LLDCs. In total, 54.4% of total land in LLDCs is classified as dryland compared to 30.3% in transit countries.

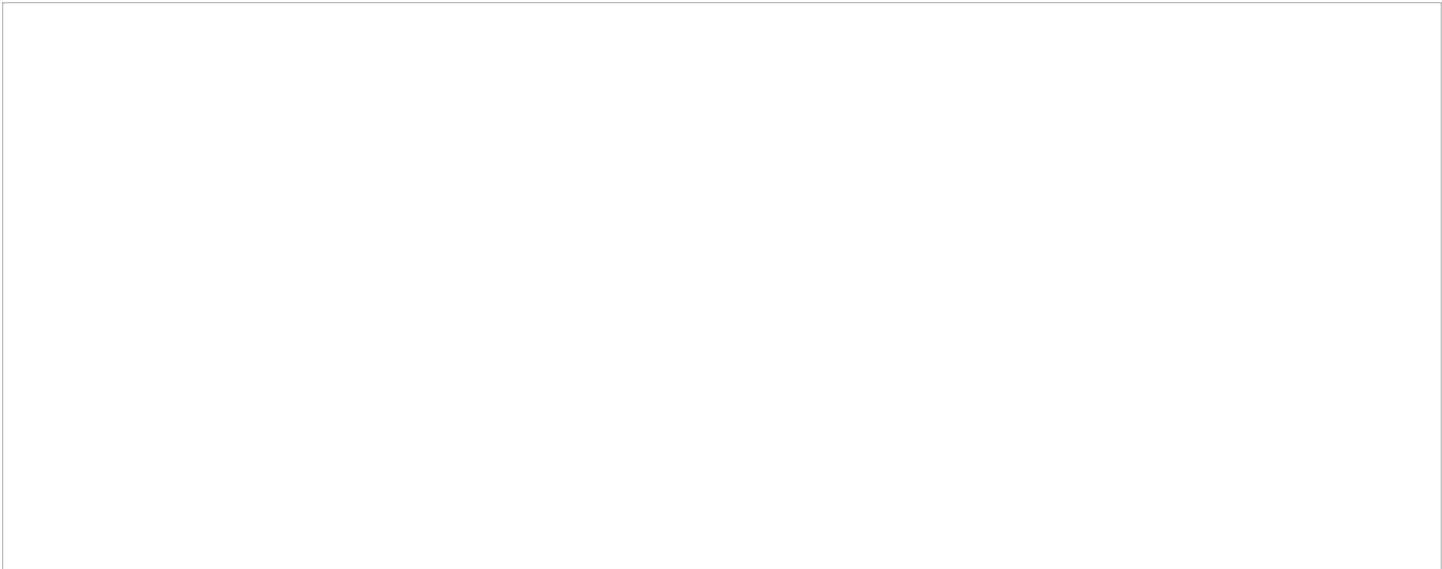
The drylands are home to more than 2.1 billion people. Further, about 60% of the population in LLDCs is located in drylands area compared to 35.4% in counterpart transit countries. The largest proportion of people (>90%) living in dryland area is found in Sahel. In particular, as shown in Figure 2, a significant proportion of dryland areas within the LLDCs in the Sahel region fall under the extreme hyper-arid and arid conditions (e.g. Chad, Niger, Central African Republic).



In general, dryland populations, on average lag far behind the rest of the world in human development indicators and face poorest economic conditions (Middleton et al 2011). For instance, the average infant mortality rate (about 54 per 1,000) for all dryland developing countries exceeds that for non-dryland countries by 23% or more. The difference is even worse –10 times higher – when compared with the average infant mortality rate in industrial countries. Thus the location of LLDCs in drylands makes them more vulnerable to the impact of climate change, desertification and drought.

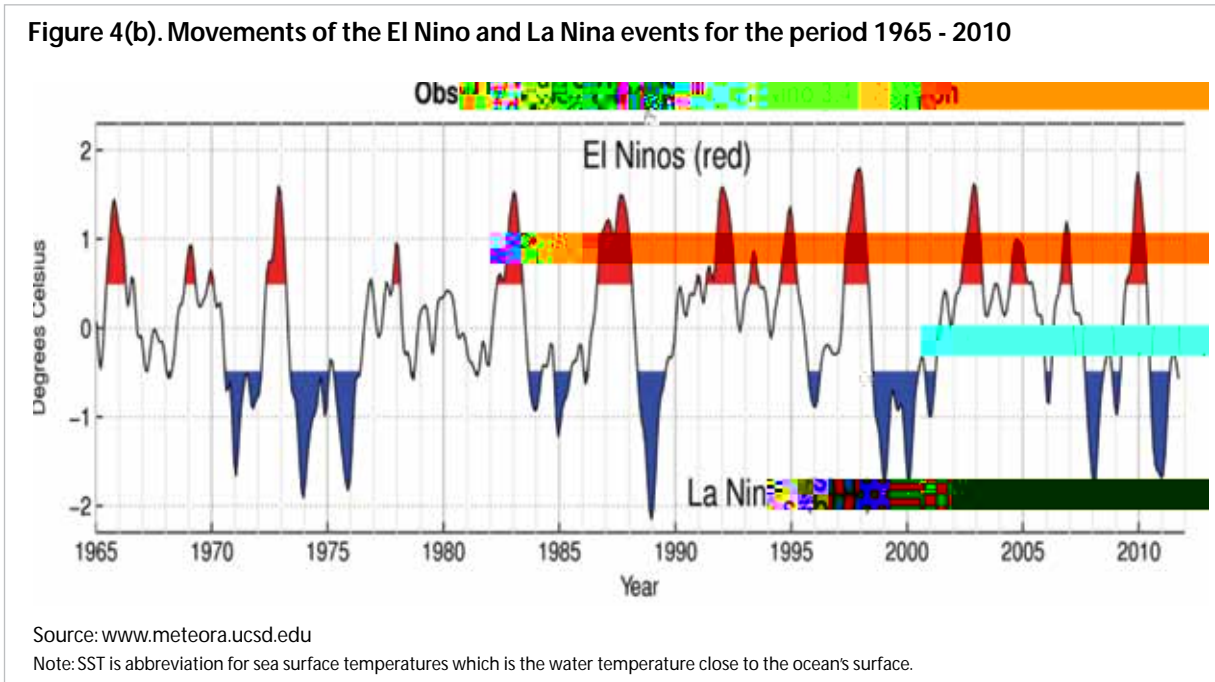
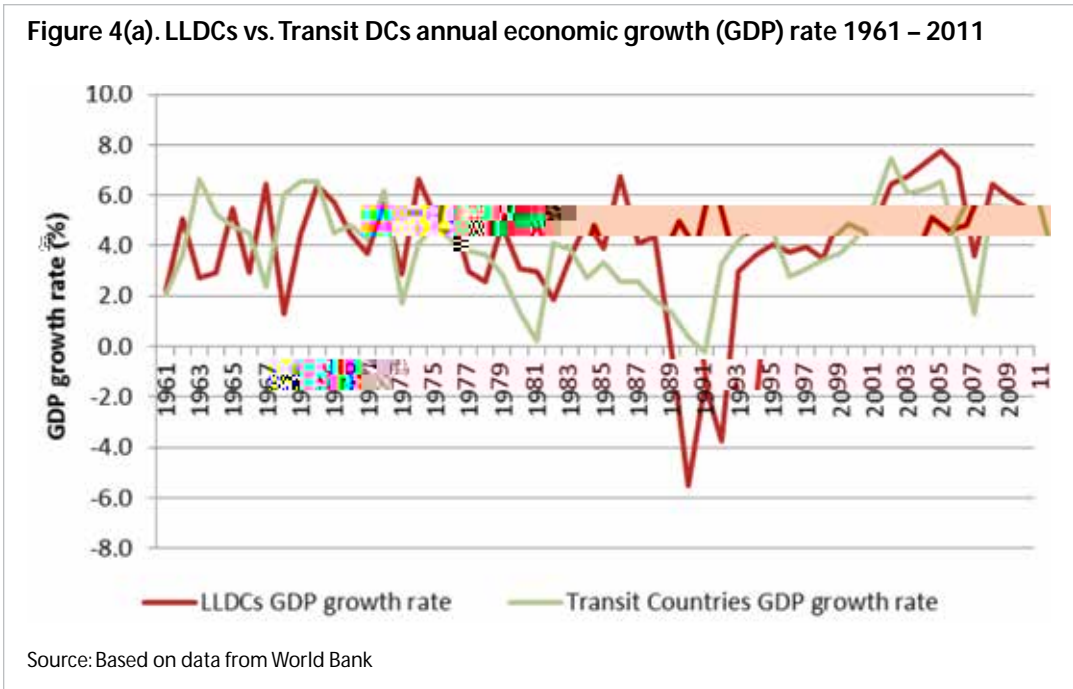
## 2.2 Impacts of climate change, desertification and land degradation

### 2.2.1 Overall economy



countries like Malawi (-7.3%), Ethiopia (-8.7%), CAR (-6.4%) and Mongolia (-9.3%) were among the worst affected. In Zimbabwe, the situation was worse as the drought caused: a 45% drop in agricultural production; a 62% decline in the value of the stock market; a -9% drop in manufacturing output and -11% drop in GDP (see Appendix A).

Extreme events like the devastating droughts (e.g. 1991/92, 2008/09) can help to amplify the impact of climate change-related events on economies of LLDCs. Using El Nino events as proxy variables underlying climate change, Figures 4(a) and (b) demonstrate close movements between El Nino Southern Oscillation (ENSO) events and GDP growth rate for both LLDCs and transit developing countries. Figure 4(a) shows annual GDP growth rate for a period of 50 years (1961 – 2011), while on the other hand Figure 4(b) shows movements of El Nino events for the same period. What is striking to observe is the plunge in GDP largely precipitated by 1991/92 extreme drought episode that affected most LLDCs. The transit developing countries were not spared either as many experienced a huge slump in their GDPs though to a lesser degree than LLDCs.



The movement in key variables (underpinning economic performance of LLDCs) is closely associated with El Nino episodes as indicated by correlation matrix in Table 4. The table shows pair-wise correlation for a few selected variables. The results underlie some important implications: (i) El Nino, a proxy for climate change is negatively correlated with GDP growth rate for LLDCs (-0.26); (ii) economies of Transit developing countries are equally affected by climate change though to a lesser extent as implied by a low correlation value (0.15); (ii) across LLDCs crop yields are significantly correlated with GDP volume (0.89) and GDP growth (0.22); this is also the case with Transit developing countries showing high correlation between crop yield and GDP volume (0.93) but low correlation with GDP growth (0.07). This underscores some important insights – because most LLDC economies are agro-based, climate change impacts affects not only volume of GDP but also GDP growth. For Transit developing countries on the other hand, climate change negatively impact GDP volume but not necessarily GDP growth – a result not surprising since economies of the latter countries are more diversified and not predominantly agro-based. (iii) the result is further supported by the low correlation observed between El Nino and crop yield (-0.09) across Transit developing countries implying less severe impact of climate change on crop yield.

**Table 4. Correlation matrix of a few selected variables**

	El Nino	LLDCs GDP (volume)	LLDCs (GDP growth)	LLDCs (yield)	Transit Countries GDP (volume)	Transit Countries (GDP growth)	Transit Countries (yield)
El Nino	1.00						
LLDCs GDP(volume)	- 0.13	1.00					
LLDCs(GDP growth)	- 0.21*	0.26*	1.00				
LLDCs (yield)	- 0.13	0.89**	0.22*	1.00			
Transit Countries GDP(Volume)	- 0.15	0.98**	0.26*	0.93**	1.00		
Transit Countries (GDP growth)	- 0.15	0.10	0.76**	0.07	0.11	1.00	
Transit Countries (yield)	- 0.09	0.85	0.19	0.98**	0.90**	0.03	1.00

\* Significant at 0.1% level

\*\* Significant at 0.05% level

Having discussed the impact at the aggregate level, the following sections will discuss in more detail impact on different sectors.

## 2.2.2 Agriculture and food security

The IPCC Fourth Assessment report (2010) on climate change asserts that agriculture, the mainstay for most of LLDCs, is hardest hit sector – by the rising temperatures, loss of suitable agricultural land, increases in soil erosion, land degradation and desertification, shortening of growing season, reduction in crop yields and high frequency and intensity of extreme events and etc, are all affecting agriculture at unprecedented levels. As discussed earlier agriculture is the most dominant economic sector contributing the largest share (%) to GDP for most LLDCs and in some LLDCs it contributes more than 30 per cent to GDP (e.g. Ethiopia, Burundi; see Appendix A). Agriculture is not only a dominant economic sector but also a pillar of livelihood support for millions of small scale farmers and largest employer. Across most LLDCs a majority of the households (> 60%) consists of rural-based smallholder farmers practicing rain-fed agriculture in dry/semi-arid and marginal lands that are highly susceptible to soil erosion and rainfall scarcity. The vulnerability of these farmers is worsened by poor resilience and low adaptive capacity; over-dependence on climate-sensitive sectors (e.g. livestock, forestry, fisheries and water); non-diversified system of livelihood centred on peasant-type of agriculture; production system concentrated on a few crops of low commercial value; lack of human, institutional and technical capacity; poorly developed infrastructure and limited access to information technology, financial services and market outlets.

The negative impact of drought becomes more complex when it occurs with lagged effects which spill over into subsequent years. The situation can be compounded by the occurrence of successive sequential extreme events such as drought-to-drought; drought-to-flood or flood-to-flood series. The 1991/92 and 1993/94 provide good examples of drought-to-drought series to affect southern Africa in a double sequential fashion (see appendix A). Figure 5 compares the volume of GDP in US\$ million (at current) between LLDCs and the transit developing countries for the period 1960 - 2012.

Figure 5. GDP (US \$m) comparison between LLDCs vs. Transit Developing Countries for period 1960 – 2012 (at 2005 constant prices)

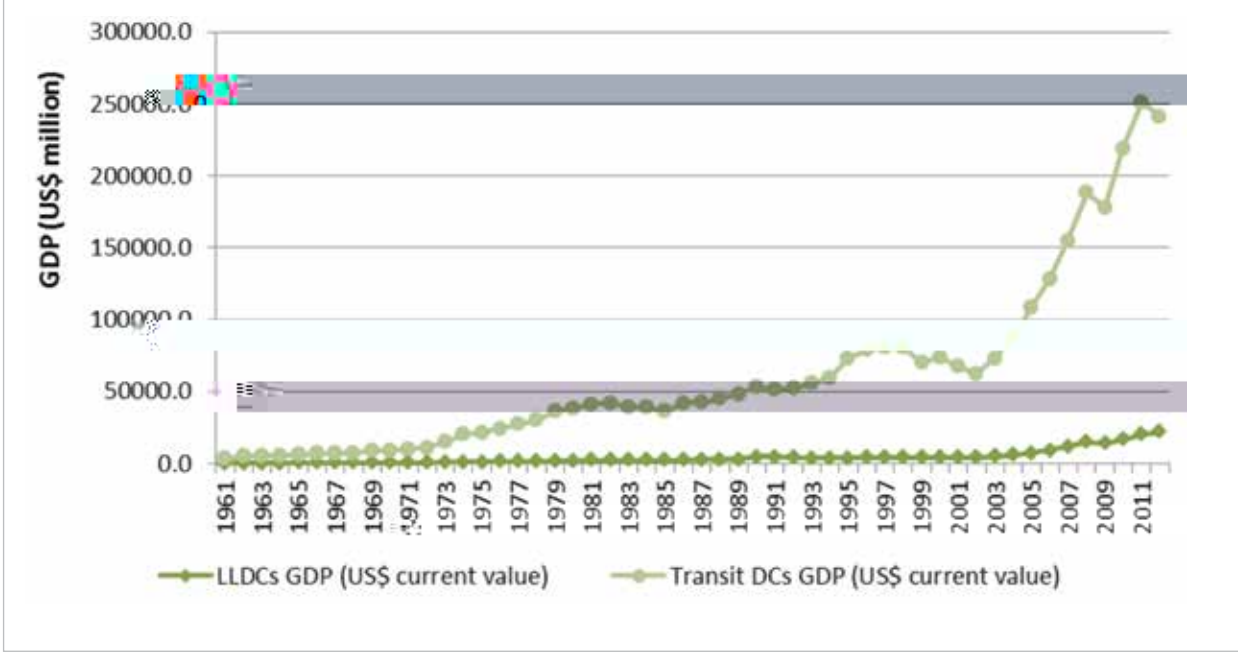


Figure 6. Cereal yield (kg/ha) comparison between LLDCs vs. Transit Developing Countries (1961- 2011)

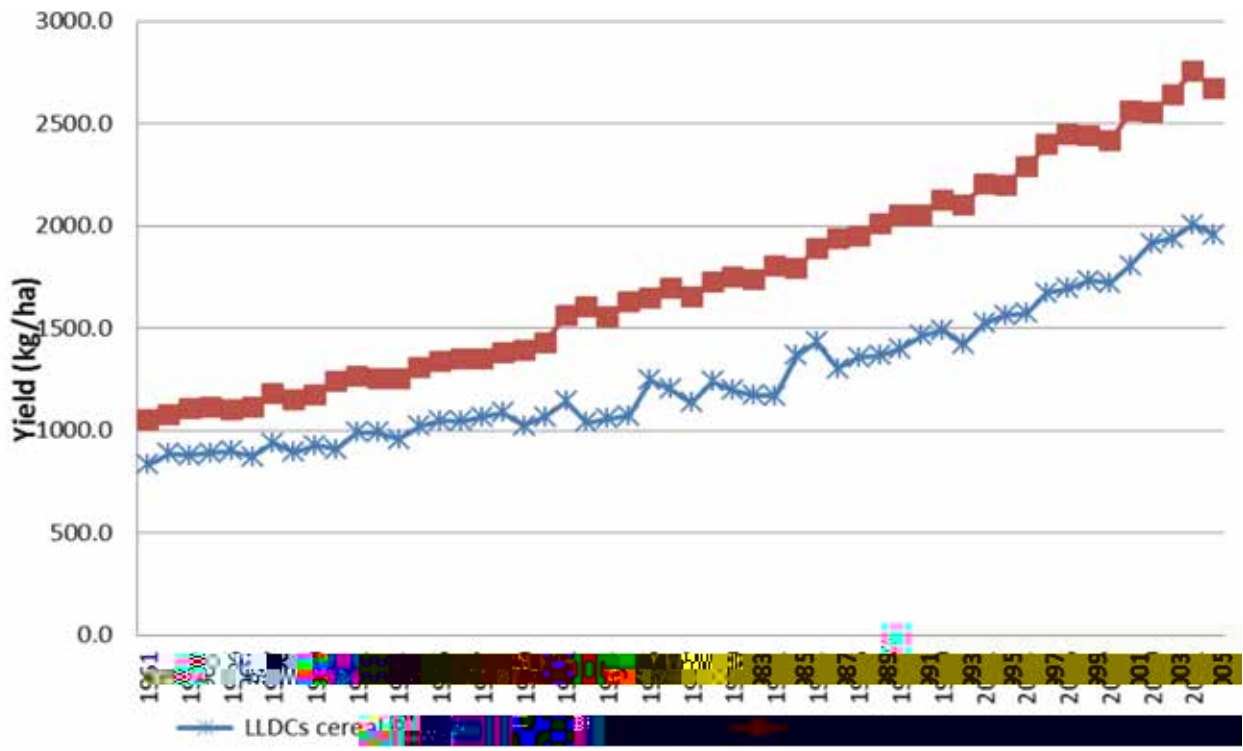


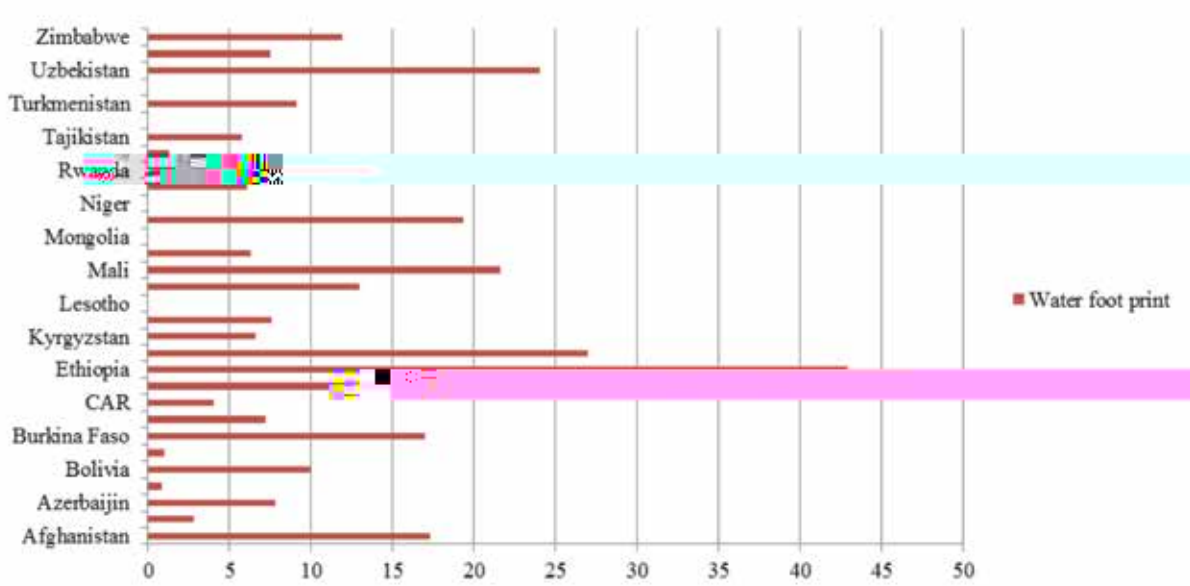
Table 5. Assessment of the impact of climate change and adaptive capacity in LLDCs

Region	Climate variability factor	Impact on sectors		Adaptive capacity

As shown in the diagram, the volume of GDP across all LLDCs remains pathetically low compared to Transit developing countries. This does not only reflect relatively weaker economies per se, but also underlies deep seated challenges and constraints affecting LLDCs economies alike. Because many LLDCs' economies are predominantly agro-based, climate change, desertification and land degradation are indeed part and parcel of these challenges. As summarized in Human Development Report (2008), climate change, desertification and land degradation have become the "defining human development issue of our generation."

Multiple studies have sought to highlight the potential impact of land degradation and desertification on food security in developing economies. These studies suggest that poor households particularly those located in dryland ecosystems in LLDCs will

Figure 7(a). Water footprint (in Gm3/year) in LLDCs



Data source: UNEP Geo data (www.geodata.grid.unep.ch)

Note: Gm3 means billion cubic metres

Figure 7(b). Water footprint (in Gm3/year) in Transit Developing Countries



Source: UNEP Geo data www.geodata.grid.unep.ch)



of the agricultural sector to the country's GDP has declined drastically from 30 percent at independence to 13 percent in 1989 and it fell further to 10 percent in 2009 (Swaziland's Second National Communication to the United Nations Framework Convention on Climate Change).

This impact of climate change on Swazi economy was reiterated by the Minister of Tourism and Environmental Affairs, at the COP 17 meeting (held in South Africa, 2011) to the effect that: *"The Kingdom of Swaziland is highly vulnerable to the impacts of climate change and has the least capacity to adapt... Already we are experiencing the severe negative impacts of climate change which have manifested themselves in incessant drought, wildfires, soil erosion, erratic rains, and wind storms. Therefore, urgent and immediate decisions must be taken here in Durban to avoid further loss and damage arising from the impact of climate change."*

In Malawi, a large proportion of over 90 percent of the people, mostly based in rural communities, earn their livelihood through subsistence farming (United Nations LDC Expert Group; 2011:51). However, the agricultural sector has become increasingly affected by climate change and DLDD. In particular, extreme drought and flood events are the main challenges affecting Malawi and often culminate in decline in GDP growth.

Ethiopia, has suffered severely due to climate change and climate vulnerability, land degradation and drought. Following a series of drought events that hit Ethiopia in 2003, 2009 and 2011, more than 7 million people were left in dire need of food aid and/or food assistance (Republic of Ethiopia; 2011:7). The country also experiences disastrous floods which destroy infrastructure, particularly roads, rails, dams and buildings. As a result, the country often incurs huge and unbudgeted costs to repair the flood-damaged roads and rails which often run into billions of dollars amounting to 11 percent of GDP (World Bank, 2010). Crop and livestock sector are not spared as they often die in large numbers as a result of droughts and floods.

Uganda is one of the LLDCs whose economy depends primarily on coffee exports. It is one of the largest producers of coffee in the world accounting about 2.5 percent of the global coffee production (World Bank: 2011). Coffee is essentially grown by millions of small scale farmers and hence it plays a pivotal role in sustaining the livelihoods of rural populations. In 2008-2009, coffee exports accounted about 25 percent of the country's total export earnings (Republic of Uganda, 2009). However, coffee production in Uganda has been adversely affected by the outbreak of pests and diseases such as coffee wilt, coffee borer, and leaf rust. In 2009 for instance, coffee wilt disease destroyed over 50 percent of robusta trees. This has been compounded by increasing episodes of drought and erratic rain influenced by climate change.

In Latin America, Bolivia is one LLDC that has suffered the disproportionate impact of climate change. In particular, the agricultural sector is one of the most vulnerable sectors to the effects of climate change. The Bolivian agricultural sector, like other LLDCs, is rain-fed and largely subsistence oriented, supporting millions of smallholder farmers. Major crops include potato, maize, soybean and quinoa. Extreme drought and flood events are largely responsible for the losses experienced in Bolivia. In 2002 and 2003, the country experienced a severe drought resulting in severe loss in agricultural production. In 2006 hundreds of thousands of hectares were damaged by floods and according to UN Office for the Coordination of Humanitarian Affairs (2006), more than 100,000ha of agricultural land was washed away by extreme floods along with a total of 64,000ha of maize, soy, rice and sorghum and 30,000 ha of pasture land.

In Asia, Uzbekistan (a double land-locked country), is one country enduring the heavy impact of desertification. Almost 80% of the land area of the country is comprised of deserts and semi-deserts, with Kyzylkum being the largest desert of Central Asia. By virtue of being located in the most arid belt of Asia, Uzbekistan is highly susceptible to desertification, land degradation and climate change. It is estimated that more than 52% of the arable lands and 73% of grasslands are presently undergoing degradation. The situation is aggravated by the fact that local farmers have limited experience and knowledge on how to use soil and water conservation technologies for promoting the best practices of sustainable land management.

In Nepal, agriculture is the dominant sector as it employs more than 65 percent of the total population and it accounts for around 33 percent of the country's GDP. However, the sector is vulnerable to recurring climate related events such as flash floods, landslides, intense rains, droughts, hailstorms, cold and heat waves, soil erosion and mass movements. These events have severely undermined cereal production in the country. Table 6 illustrates the loss of agricultural land and cereal due to climate related extreme events from 1971 to 2007.

**Table 6. Loss of agricultural land and crops to climate-related extreme events in Nepal 1971-2007**

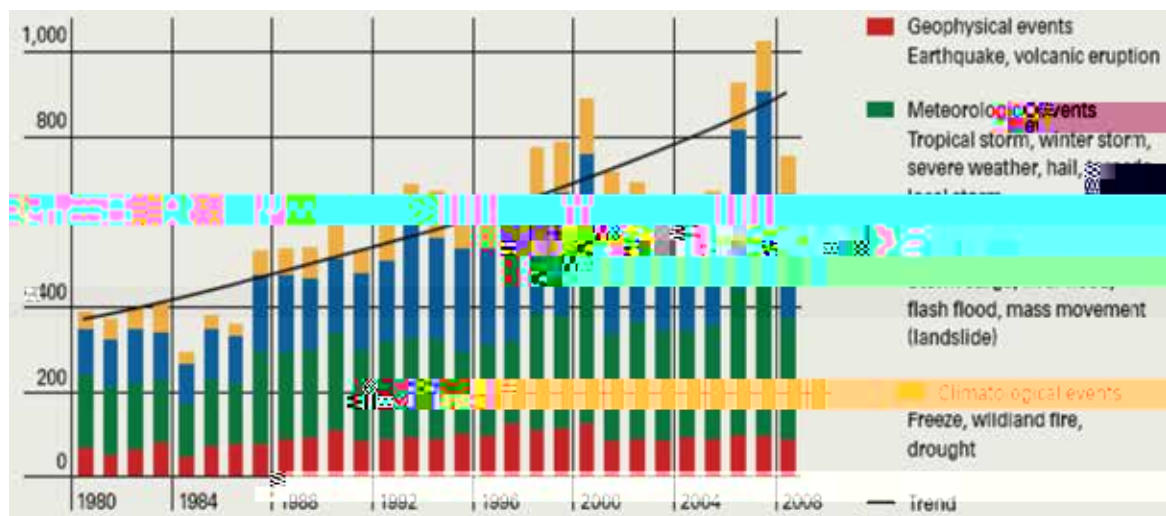
Event	% Loss of agricultural land and crops
Droughts	38.8
Floods	23.2
Hailstorms	13.8
Rains	6.5
Strong winds	2.7
Cold waves	2.6
Others (forest epidemic, snow storm, fire, storm, thunderstorm, avalanche, plague, etc.)	9.8
<b>Total</b>	<b>100</b>

Source: Nepal National Report to UNFCCC (2007)

### 2.2.3 Extreme climate events

Climate change is strongly associated with the occurrence of extreme weather events such as droughts, floods, cyclones, typhoons, and other destructive weather disasters. The observed trend in the occurrence of extreme events worldwide, bear testimony to the increasing frequency and intensity of climate change related calamities (see Figure 8). Extreme events are hugely disruptive as they cause a trail of extensive damage and destruction of properties, infrastructure particularly roads, bridges and dams, and even more tragically, the loss of human life and livestock. Extreme droughts necessitate the intervention of the international community as the affected countries become so overwhelmed and unable to contain the nation-wide emergency situation. This involves emergent and massive importation of grain cereals whose transportation costs from ports to inland destinations are prohibitively high and unaffordable as many of these LLDCs are too poor. Worse still, because often the entire region becomes affected by a catastrophic drought/flood event, this means the affected LLDC cannot import from within the region. Rather the imports are only sourced from remote international markets and the costly burden of transporting the bulky food commodities and the handling of logistics are beyond the reach of an individual LLDC. It's not surprising that under emergency food-aid situations, many LLDCs rely on the goodwill of non-governmental organizations, development agencies and the international community at large.

**Figure 8. Trends of catastrophes worldwide 1980-2008**



Source: Dixit *et al.* 2009

The Sahel is one region in Africa that has experienced the ravages of extreme events. For instance a series of severe droughts hit the region during the 1970s in what has come to be coined “the quintessence of a major environmental emergency” (World Meteorological Organization; 2005: 17). It is estimated that close to a quarter of a million people lost their lives in the Sahel as a result of these extreme drought events (Gonzalez; 2002:2).

In Asia, Mongolia provides a typical example of an LLDC that has experienced an array of climate change-related disasters characterized by snowfalls, sandstorms, aggressive winds, snowstorms, hail, and floods. These harsh climatic conditions pose the most formidable challenge to the development of Mongolia. Climate change and climate variability has badly affected nomadic pastoralism which is one of the key agricultural sectors in the country. In particular recurrent droughts and dzud are some of the severe challenges which have affected nomadic livestock agriculture. Dzud is a local term used to describe the extremely cold winter marked by heavy and protracted snowfall, low cold temperatures and wind storms. The dzud deprives livestock of grazing and drinking water and animals die in scores as a result. The dzud does not only affect livestock but also causes a drastic drop in crop yields. This also gives rise to socio-economic problems such as increase in unemployment, poverty, massive rural-to-urban migration which largely emanates mostly from remote and underdeveloped regions.

Extreme events have also undermined the health status of many people in other LLDCs particularly those located in remote rural and often inaccessible areas. In Tajikistan, extreme floods caused by climate change (during periods 1998 and 2000), resulted in an increase in outbreaks of water-borne diseases (especially malaria, cholera and dysentery). In 1998, the number of cases of malaria increased by 11% (from 11,000 to 12,200) and the number of cases of cholera increased by 3.8% (from 11,000 to 11,380) (World Bank; 2002:17).

## 2.2.4 Environment and biodiversity

Biological diversity is important in a range of respects including cultural, economic, social, recreational, scientific, educational, genetic and ecological functions. According to the Millennium Ecosystem Assessment, climate change has the potential to

Most of the mountainous LLDCs are endowed with dry forests, woodlands and scrubland including multiple endemic plants and species diversity. For instance the hyper-arid mountains of the Sahel region are the home to Acacia wood lands and some very threatened endemic and relic tree species (FAO, 2011:32). Dryland mountain forest can contribute to livelihood diversification and can play a significant role in the uplifting of rural economies across mountainous LLDCs. Products such as gums, resins, honey, cork, medicinal plants and mushrooms are probably the most feasible and easily marketable products obtainable from dryland mountain. Medicinal and aromatic plants are important components of these forest landscapes and can play a significant role in the economy of rural households, both for self-consumption and trade in ways that promote the much-needed livelihood

communities). Climate change also negatively impacts the quality of water. Reduced water quality increases incidences of water borne diseases such as diarrhoea, cholera, bilharzia, etc.

Lesotho is experiencing severe depletion in water resources particularly its wetlands. It is endowed with alpine wetlands which are a rare ecological feature in Southern Africa. They have an essential hydrological role and they directly and indirectly sustain the livelihoods of many people in the country. However, these wetlands have been exposed to increased stress due to climate-related events such as siltation, erosion, encroachment by cultivation, increased pressure on resources and bad land use practices. There is a rise in the degradation of wetland vegetation cover and this causes increased deterioration of wetlands.

Armenia has vast water resources which are increasingly under threat due to climate change. For instance, Lake Sevan, one of the largest fresh water sources, has experienced dwindling river flows due to climate change projected to decrease by 6.7, 14.5 and 24.4 percent by 2030, 2070 and 2100 respectively (Republic of Armenia, Ministry of Nature Protection; 2010). In 2001, the World Bank, after observing a sharp 44 percent decline in water levels, declared Lake Sevan an environmental disaster.

Bolivia, like Armenia, possesses abundant water resources. However, climate variability due to erratic precipitation, high temperatures and high frequency of extreme events are putting water resources under increasing pressure. Bolivia has some glaciers which has sustained the livelihoods of many people especially in rural areas. However, in recent years the glaciers have begun to melt primarily due to the rise of temperatures and this is negatively impacting on the country's water resources. According to Weinberg (2010), the country has experienced the following challenges;

- In 2009 the 18 000 year old Chacaltaya glacier overlooking the country's capital city disappeared thereby threatening water supplies to the city
- In the same year, the water levels in lake Titicaca (which supports about 2.6 million people) dropped 2.6 feet, reaching its lowest level since 1949 and
- The rain season in the Altiplano has shifted from six to three month period thereby prompting drastic water rationing in Altiplano towns and cities.

The negative impact of desertification extends beyond the affected dryland areas (ECA, 2007:14). As the level of land degradation and desertification exceed beyond the redeemable threshold, the affected households will be forced to migrate. Desertification is increasingly displacing a large mass of people – forcing them to leave their homes and lands in search of better livelihoods. In recent literature such migrants are referred to as 'environmental refugees'. At greatest risk are the poor who constitute a majority in LLDCs. In LDCs and LLDCs, the migrants often settle on the outskirts of urban areas or coastal zones (Chan, 1995, in ECA 2007:14). They frequently settle on areas ill-suited for human settlement where water and sanitation provision is a challenge. Migration is viewed as a coping mechanism that takes place only when the hopes of continual sustenance of livelihood at current locations are completely shattered due to long-run land degradation, desertification and drought.

Pastoralists provide a good example in this regard. In LLDCs like Ethiopia and Uganda, deterioration of pastures due to land degradation and desertification forces pastoralists to migrate hundreds of kilometers away in search of better pastures. This raises competition over finite pastoral resources and increases conflicts (Meier and Bond, 2005, in ECA 2007:14). ECA estimates that 60 million will move from the desert-prone areas of Sahel towards Northern Africa and Europe by the year 2020. In Burkina Faso, desertification has been identified as the main cause of migration. Currently most of the urban centers are swelling with people, a majority (60 percent) being "environmental refugees". The swelling population in city centers will put additional strain on already stretched public infrastructure especially water and sanitation provision.

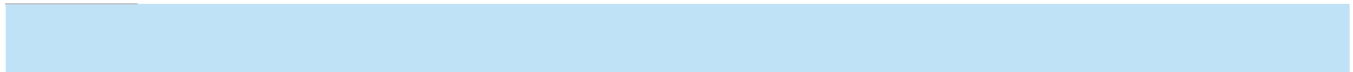
## 2.2.6 Transport and Energy

Changes in temperature, sea-level rise, precipitation, and storm activity all may have significant implications for transport infrastructure design, operations, and maintenance. In particular the degradation of road infrastructure due to climate change presents a serious economic threat to many LLDCs whose road network remains largely undeveloped. For instance, excessive precipitation can cause severe damage particularly on unpaved roads, while on the other hand extreme temperatures (cold/hot) can cause severe damages especially on paved roads. Some studies have shown that maintenance for precipitation-damaged roads can account for 4% of total maintenance costs while temperature-damaged maintenance can account for 36% of costs (Miradi, 2004, in Chinowsky et al, 2011). The African Development Bank has called for an estimated US\$40 billion per year to help African nations address the challenges associated with climate change – transport sector included.

Since most of the roads are unpaved across many LLDCs (as discussed earlier), this means that road infrastructure in these countries is highly susceptible to climate change-related damages, e.g. excessive precipitation and extreme temperatures. Improved climate-proof roads will provide a lifeline to the economies of most LLDCs and will play a crucial role in national poverty reduction and alleviation programmes. For instance, an improved and expansive road network, especially one that taps deep into remote rural areas, will provide an essential link to commodity markets for millions of smallholder farmers– a majority currently lacking such access.

In their study, Chinowsky et al, (2011) illustrate the impact of climate change on road infrastructure based on “with and without” adaptation scenarios. For instance Table 9 shows the impact results for Ethiopia. As illustrated, the data indicate that initially maintenance costs rise for existing paved roads which are not designed for climate change effects. However results indicate that costs decline as adaptation takes roots and the effect of climate change is moderate through 2050. Thereafter, as climate change effects increase a greater proportion of the expenditures is needed to offset the potential damage to the roads. The key message to note is how adaptation significantly decreases the cost of climate change as paved roads are constructed with “enhanced drainage, permeable bases and asphalt mix designs” among other adaptations that accommodate the precipitation and temperature increases.

**Table 9. Illustrating climate change impact costs for Ethiopia by decade through 2100**



LLDCs like Tajikistan have declared the development of hydro-energy its top priority. The development of hydro-energy and renewable energy will ensure environmental sustainability and reduce the detrimental carbon emissions – key in addressing climate change. Tajikistan possesses a huge hydro-energy potential which needs to be tapped so as ensure universal access to modern and cost efficient energy services as well as enlarging its share of renewable energy and increase investments in this sector. In particular, the declaration by UNGA (2012) provides a unique window of opportunity to assist LLDCs in developing renewable energy.

## 2.3 Summary

This section has highlighted the social, economic and environmental impacts of climate change, desertification and land degradation on the economies of LLDCs. The section has also highlighted that LLDCs have special vulnerabilities to climate change and DLDD because of their geographical location in drylands and the fact that they are already economically disadvantaged as they are not able to fully harness their development potentials particularly trade due to substantially higher trade transaction costs as a result of being landlocked. The next section discusses the interventions and support measures to help mitigate the impacts.



# 3

## National, Regional and International Programmes and Support Measures on Climate Change, Desertification and Land Degradation in LLDCs

### 3.0 Introduction

Climate change, desertification and land degradation have become major contemporary challenges to the development agenda of the global community. The imperative to fight climate change continues to attract global attention. At the international level, UN and other international development agencies are leading the efforts towards mobilizing financial, capital, institutional and technical resources directed at assisting developing countries to tackle the urgent problems of climate change, desertification and land degradation. At the regional level, developing countries are joining hands to find a common ground, and to chart regional strategies to combat climate change. At the national level, countries have adopted a myriad of measures intended to ameliorate and strengthen their capacity to mitigate and adapt to the impacts of climate change. In this section, interventions on climate change, desertification and land degradation are discussed and analysed at three broad levels – international, national, and regional.

### 3.1 National interventions on Climate Change

Article 4 of the UNFCCC mandates Parties to consolidate their Commitments by way of “formulating, implementing, publishing and regularly updating national measures to facilitate adequate adaptation to climate change”. The Article under clause 8 provides for Parties to “give full consideration to meet specific needs and concerns of developing country Parties arising from the adverse effects of climate change and/or the impact of the implementation of response measures, especially on” countries that are highly vulnerable to climate change including “countries with fragile and mountainous eco-systems” as well as “land-locked and transit countries”. Additionally, provisions of Article 12 (4) provides for 8(er)-3.9(ns of de)27es aronsideran91.9(aly)56(,)on of ,effods mobimplementi



The discussion below draws on a few LLDCs to demonstrate how they have developed their NAPAs in alignment with national development programs. In Southern Africa Lesotho is one of the LLDCs most vulnerable to climate change. It has embraced the NAPA as one of the key elements for national poverty reduction. The Lesotho NAPA process identified and prioritized the eleven adaptation activities which it seeks to implement in the various vulnerability zones. These projects will address the adaptation needs of communities within, and shall build capacity within designated vulnerable communities. These projects have been organized in a hierarchy of importance and order of priority as listed in Table 12. The first three are the most “urgent and immediate” priority activities that the country seeks support and would like to implement as a baseline adaptation measure followed by other subsequent priority activities.

Like other LLDCs, agriculture is the backbone of Uganda's economy as it contributes about 42% of GDP, over 90% of export earnings and employs over 80% of the labor force. Uganda has adopted NAPA and completed its preparation in 2007. To ensure implementation and coordination of NAPA projects and activities, Uganda founded the Climate Change Coordination Unit in 2009. The mandate of the unit is to ensure that climate change issues are integrated into the national budget, establish a strategy for communicating issues of climate change to the national community, adopt a training programme on climate change and embark on a public awareness campaign on climate change mitigation and adaptation strategies. NAPA preparation was guided by two considerations: the need for Uganda to achieve the Millennium Development Goals (MDGs) and the country's development objectives as enshrined in Poverty Eradication Action Plan (PEAP, 2004).

In Ethiopia, the government adopted the Climate Resilient Green Economy (CRGE) strategy which seeks to address the impact of climate change and improve the living standards of the people of Ethiopia. According to the Republic of Ethiopia (2011: 9), the strategy to build a climate resilient green economy is four-pronged:

- Improving crop and livestock production practices to increase food yields, hence food security and farmer income, while reducing emissions
- Protecting and re-establishing forests for their economic and ecosystem services, including as carbon stocks
- Expanding electric power generation from renewable sources of energy fivefold over the next five years for markets at home and in neighbouring countries.
- Leapfrogging to modern and energy-efficient technologies in transport, industry and buildings.

Under the CRGE strategy, the government has introduced a range of adaptation initiatives with the view to reduce the country's vulnerability to the effects of climate change. The country has identified sectors which are more vulnerable to climate change and is giving them priority in as far as implementation of adaptive initiatives is concerned. These sectors are agriculture, water, health, buildings and transport. The country has also embarked on major forestation and reforestation initiatives and it has developed a range of adaptation activities to support natural ecosystems.

In 2002, Niger formulated its national policy on Poverty Reduction Strategy (PRS) and Rural Development Strategy (SDR) – articulating the strategic framework and policy actions towards sustainable development in the country. By 2006 the country completed its NAPA which was developed in alignment with the national development priorities as outlined in PRS and SDR. The NAPA adaptation measures match the orientations of the PRS and SDR with regards to food security, capacities building, water



**Table 15. Vulnerability and adaptation measures for agriculture in Armenia**





**Table 17. Profile of AfDB climate change programmes**

Climate resilient development	Low carbon development	Financing platform
Promoting sustainable land use and water resources management	Enhanced investments in Clean Energy and Energy Efficiency	Mobilizing concessionary resources
Building resilience of key infrastructure and urban systems	Promoting sustainable transport	Catalyzing private capital
Climate proofing of AfDB's Projects	Promoting sustainable land and forestry management	Maximizing market mechanisms

Source: AfDB, 2011

The African Water Facility (AWF) was established in 2004 to assist African countries to meet the growing investment need for the development as well as management of water resources in Africa. It was initiated by the African Ministers' Council on Water (AMCOW). The facility is funded by the AfDB, European Commission, Bill and Melinda Gates Foundation and other partners. The facility is a portfolio of many water-related projects which are targeted at the effective management of water resources in Africa. Its activities cover issues such as the management of national and trans-boundary water resources, the management of water resources information, water for agricultural use climate-resilient sanitation and water supply. Table 18 shows some of the projects implemented under this facility covering a number of LLDCs.

**Table 18. Projects which were implemented under the African Water Facility**



The AWF has been instrumental in improving the governance of water resources in Africa. A significant number of LLDCs have benefited from the facility. However, there are some improvements which need to be done in order to maximize benefits for LLDCs. It is recommendable for the facility to initiate a specific facility which exclusively targets LLDCs. The Operational Effectiveness Assessment of the AWF (OEA 2010) came up with the following recommendations:

- Increased focus on supervision and support of project implementation thereby improving quality of projects and improved level of disbursement.
- Strengthen leadership and management capacities of the facility.
- The prioritization of projects and thematic areas should respond to African priorities and put particular focus on fragile states and those countries that are in greatest need for support.
- Strengthen AWF's monitoring and evaluation systems to improve communication of project outcomes and impact.

The Asian development Bank (ADB) has many initiatives intended to assist countries in the region including LLDCs to cope with climate change which are highlighted in Table 19.

**Table 19. Profile of ADB climate change programmes**

Mitigation	Adaptation
The Carbon Market Program – a financing scheme that supports the development of greenhouse gas mitigation projects (e.g. renewable energy, energy efficiency) in developing countries in Asia and the Pacific.	Initiative for Land Management aimed at restoring, maintaining, and enhancing the productive functions of land in Central Asia.
Cities Development Initiative for Asia to promote investment in urban infrastructure development in Developing Member Countries in Asia	Climate Change Adaptation for the Pacific Islands
The Energy for All Initiative – aimed at scaling up access to affordable, modern and clean energy among the region's poor.	"Water for All" for Asia and the Pacific
Clean Energy Program using the Clean Energy Financing Partnership Facility to increase regional energy efficiency in energy, transport and urban sectors; to adopt renewable energy sources.	Promoting Climate (ansp)ulimate (ansp)ulimate (ansp)2e (anic I Td[(





## The Special Climate Change Fund Trust Fund

The GEF also administers the Special Climate Change Fund (SCCF) that was established under the UNFCCC in 2001 to finance projects relating to: adaptation; technology transfer and capacity building; energy, transport, industry, agriculture, forestry and waste management; and economic diversification. The LLDCs that are not LDCs can access funds from the SCCF to help support preparation of their national adaptation plans and implement other climate change related activities. In 2013 the SCCF has approved 40 national projects on climate change totaling US\$140 million of which 9 are in LLDCs amounting to US\$23.8 million (see Table 22 for details).

**Table 22. Allocation of SCCF Funds to LLDCs' projects on climate change USD**

	Project Name	US\$
Zimbabwe	Scaling up adaptation in Zimbabwe, with a focus on rural livelihoods, by strengthening integrated planning systems	3,980,000
Tajikistan	Increasing climate resilience through drinking water rehabilitation in North Tajikistan	2,727,070
Ethiopia	Coping with drought and climate change	995,000
Zimbabwe	Coping with drought and climate change	983,000
Kyrgyz Republic	Promoting climate resiliency of water supplies in Kyrgyzstan	5,000,000
Mongolia	Mongolia livestock sector adaptation project	1,500,000
Azerbaijan	Integrating climate change risks into water and flood management by vulnerable mountainous communities in the greater caucasus region of Azerbaijan	2,700,000
Moldova	Climate resilience through conservation agriculture	4,260,000
Swaziland	To promote the implementation of national and transboundary integrated water resource management that is sustainable and equitable given expected climate change	1,670,000
	<b>Total</b>	<b>23,815,070</b>

Source: GEF Website

## The UN-REDD program

The UN-REDD Programme is the United Nations Collaborative initiative on Reducing Emissions from Deforestation and Forest Degradation (REDD) in developing countries. The Programme was launched in September 2008 to assist developing countries prepare and implement national REDD+ strategies, and builds on the convening power and expertise of the Food and Agriculture Organization of the United Nations (FAO), the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP).

The Programme currently supports 44 partner countries spanning Africa, Asia-Pacific and Latin America, of which 16 are receiving support to National Programme activities. Of the 16 countries 3 are LLDCs: Bolivia, Paraguay, and Zambia. To-date, the UN-REDD Programme's Policy Board has approved a total of US\$67.3 million for National Programmes in these 16 partner countries. These funds help to support the development and implementation of national REDD+ strategies.

## Green Climate Fund

The purpose of the Fund is to make a significant and ambitious contribution to the global efforts towards attaining the goals set by the international community to combat climate change in the UNFCCC. In the context of sustainable development, the Fund will promote the paradigm shift towards low-emission and climate-resilient development pathways by providing support to developing countries to limit or reduce their greenhouse gas emissions and to adapt to the impacts of climate change, taking into account the needs of those developing countries particularly vulnerable to the adverse effects of climate change.

The Fund will provide simplified and improved access to funding, including direct access, basing its activities on a country-driven approach and will encourage the involvement of relevant stakeholders, including vulnerable groups and addressing gender aspects. The Green Climate Fund was designated as an operating entity of the financial mechanism of the UNFCCC, in accordance with Article 11 of the Convention. The fund is still in its formative stage and it is early to look into its achievements. In 2009 developed countries committed to raising US\$100 billion a year by 2020 to help poorer countries cope with global warming.

## The Energy and Environment Partnership

The Energy and Environment Partnership (EEP) program, funded by Finland, Australian Development Agency and the UK's Department of International Development, is a program that aims to promote renewable energy, energy efficiency and clean technology investment to developing countries, including LLDCs. The programme seeks to assist poor people with sustainable energy services while combating climate change. Some LLDCs which include Botswana, Swaziland, Rwanda, Lesotho, Uganda, and Zambia are beneficiaries of this programme. A majority of households in these countries depend on traditional energy such as firewood and in worst cases cow dung.

## The Climate Investment Funds

The funds are administered by the World Bank in partnership with regional development banks including the African Development Bank (AfDB), the Asian Development Bank (ADB), the European Bank for Reconstruction and Development (EBRD), and the Inter-American Development Bank (IDB). This fund is two-pronged. It composes of a 5 billion to 6 billion dollars Clean Technology Fund which finances scaled-up demonstration, deployment and transfer of clean technologies by providing investments in those countries or regions with high potential for greenhouse gas abatement. There are 15 Clean Technology Fund country investment plans including 1 from an LLDC – Kazakhstan, and 1 regional plan.

The Climate investment funds also consists of the Strategic Climate Fund which finances three programs which are the Pilot Programme for Climate Resilience, the Forest Investment Programme, and the Scaling up Renewable Energy for Low Income Countries (SREP). The Pilot Programme for Climate Resilience (PPCR) funds technical assistance and investments to support countries' efforts to integrate climate risk and resilience into core development planning and implementation. There are 19 PPCR pilot countries including 5 LLDCs (Bolivia, Nepal, Niger, Tajikistan and Zambia) and 2 regional pilots. The Forest Investment Programme (FIP) supports developing country efforts to reduce deforestation and forest degradation and promote sustainable forest management that leads to emissions reductions and enhancement of forest carbon stocks (REDD+). There are 8 FIP pilot countries including 2 LLDCs (Laos and Burkina Faso).

The SREP was established to scale up renewable energy solutions and expand renewables' markets in the poorest countries. SREP financing supports a range of technologies such as solar, wind, bio-energy, geothermal and hydro-technologies. The SREP is being implemented in 10 pilot countries including 4 LLDCs Armenia, Ethiopia, Mali, Nepal. The annual disbursements of the Climate investment funds are shown in Table 23.

**Table 23. Annual Disbursements of Climate investment Funds US\$ Million**

Fiscal year	Clean Technology Fund	Pilot Programme for Climate Resilience (PPCR)	Forest Investment Programme	SREP

of climate change. It is envisaged that by 2015, the programme would have been extended to 3 million beneficiaries comprising the country's poorest and most vulnerable people (DFID; 2012). The UK is also supporting the Nepal Multi-Stakeholder Forestry Programme whose objective is to help local institutions and the forestry industry to promote the sustainable management of forests in adapting to climate change.

## The Global Climate Change Alliance

The Global Climate Change Alliance (GCCA) was founded in 2007 by the European Union with the view to consolidate cooperation and dialogue on climate change with developing countries most vulnerable to climate change, in particular LDCs and Small Island Developing States (SIDS). It provides financial and technical support to developing countries in order to assist them to mainstream climate change into their national development plans and budgets. The GCCA has five priority areas which are: mainstreaming climate change into poverty reduction and development efforts; adapting to climate change; reducing emissions from deforestation and forest degradation; enhancing participation in the global carbon market and disaster risk management (European Union; 2011).

These initiatives have been implemented in a number of LLDCs that are LDCs including Bhutan, Ethiopia and Nepal. An overview of GCCA priority programmes, budgets and project duration in some LLDCs is shown in Tables 24.

**Table 24. Overview of GCCA national programs in LLDCs**

Country	GCCA priority areas	Budget (Euros)	Duration
Bhutan	Mainstreaming	Total value: 4.40 million (GCCA including 0.8 million fast start funding from Estonia)	2012-2016
Ethiopia	Mainstreaming and adaptation; CDM	Total value: 13.7 million (GCCA, including 8 million EC fast start funding)	2011-2015
Mali	REDD	Total value: 6.215 million (GCCA: 5.65 million and Government of Mali 0.565 million)	2010-2016
Nepal	Mainstreaming and Adaptation	Total value: 19.4 million (GCCA 8.6 million including 0.6 million fast start funding from Cyprus and DFID: 10.8 million)	2011-2014
Rwanda	Adaptation	Total value: 4.555 million (GCCA)	2010-2012
Uganda	Mainstreaming and Adaptation	Total value: 11 million (GCCA fast start funding from Ireland)	2012-2016

Source: GCCA website

## 3.5 National Action Programmes (NAPs) to combat desertification and land degradation

The United Nations Convention for Combating Desertification (UNCCD) came into force in 1996, and today it's the centrepiece organization galvanizing effort around the globe involving coordinating, facilitating implementing and monitoring action programs and strategies aimed at tackling desertification and land degradation problems. According to ECA (2007), the fundamental objective of UNCCD is to "combat desertification and mitigate the effects of drought in countries experiencing serious drought and/or desertification." All LLDCs countries are contracting parties to the convention and many of these countries are engaged in various activities and at various stages in meeting their obligations. The discussion below looks at some of these activities at national, regional and international level.

Many LLDCs with support from development partners are at different stages in developing and implementing their National Action Programmes (NAPs) to combat desertification and land degradation. Since inception, the guiding principle is outlined in Agenda 21 of the Convention which requires "effective participation of the local, national or regional level of non-governmental organizations and local populations, both women and men, particularly resource users, including farmers and pastoralists and their representative organizations in policy planning, decision-making and implementation and review of National Action Programs".

**Table 25. Implementation of NAPs: Case of Niger**

The 'African Land and Water Initiative', for which the 2004-2005 pilot project was financed with 515,000 dollars obtained from the World Bank and under the UNCCD.
The 'Natural Forests Management Project', financed with about 15.6 million dollars from the AfDB and UNCCD during 2000-2005.
An institution-building project to support the National Action Plan to Fight Desertification and Manage Natural Resources, financed

**Table 26. Successes and challenges associated with NAPs by LLDCs**

Item	Description
Successes	<ul style="list-style-type: none"> <li>• NAPs have been implemented based on bottom-up approach which seeks to empower local communities</li> <li>• NAPs have created greater awareness and consciousness among the affected communities about severity of desertification and land degradation in LLDCs</li> <li>• NAPs have helped galvanize global effort to combat land degradation and desertification</li> <li>• Most LLDCs have developed NAPAs in alignment with national development policy strategies</li> <li>• NAPs can be used to build synergies with programs of similar nature especially NAPAs</li> </ul>
Challenges	<ul style="list-style-type: none"> <li>• Actual implementation of NAPs has been minimal due to lack of human capacity and financial resource commitments</li> <li>• Many LLDCs have channeled low volume of resources towards NAP activities</li> <li>• NAPs have been largely donor-funded and tend not to be integrated into mainstream national policy programs</li> <li>• No clear indications of national budget commitment</li> </ul>

Source: Nkonya et al (2011)

The LLDCs have also implemented specific measures to address desertification and land degradation which are presented below.

### **Sustainable land use management**

Sustainable integrated land and water management are key solution to prevention of desertification and land degradation prevention. Efforts are being made in LLDCs to promote sustainable land use management. Good management practices include measures which aim to spread and reduce the pressures of human activities using rotational use, appropriate stock-ing rates matched to the carrying capacity of ecosystems, and diverse species composition (MA, 2005). Table 27 provides the various types of land degradation, possible solution and potential impact. For instance, zero tillage can result in 30-40 per cent reduction in labor costs and 50 per cent increase in gross margin compared to hand-plowing (Haggblade and Tembo, 2003 cited in Nkonya et al, 2011).

To preserve soil productivity, sustainable long-term practices must be applied. UNCCD Best Practice approaches focus on (Kirby and landmark, 2008):

- Sustainable Land Management (SLM) technologies, including adaptation;
- capacity-building and awareness-raising at various levels;
- desertification, land degradation and drought, and SLM monitoring and assessment /research;
- knowledge management and decision support;
- the policy, legislative and institutional framework;
- funding and resource mobilization; and
- participation, collaboration and networking.



**Table 27. Types of land degradation, solution and potential impact**

Type of land degradation	Solution	Potential impact and profitability*
Water induced soil erosion	<ul style="list-style-type: none"> <li>• Mechanical methods: soil and water conservation structures; drainage structures</li> <li>• agronomic management methods: mulching; crop management; planting pattern</li> <li>• soil management methods: minimum tillage or no tillage; ridge tillage</li> </ul>	<ul style="list-style-type: none"> <li>• standing crop residues are 5-10 time more effective in controlling wind erosion than flattened crop residue</li> </ul>
Water-induced soil erosion	<ul style="list-style-type: none"> <li>• windbreak and dune stabilization using trees and other vegetation cover</li> <li>• no till rotational grazing to improve land cover</li> </ul>	
Salinity	<ul style="list-style-type: none"> <li>• prevention of salinity</li> <li>• amelioration using intermittent or continuous leaching</li> <li>• breeding for saline-resistant crop varieties</li> </ul>	
Compaction/crusting	<ul style="list-style-type: none"> <li>• soil management methods: periodic deep tillage, controlled farm equipment or livestock traffic, conservation tillage</li> <li>• agronomic methods: intercropping or rotational cropping alternating shallow-root and deep-root crops</li> </ul>	<ul style="list-style-type: none"> <li>• No tillage can save 30-40% of labor</li> <li>• gross margin of minimum tillage can be 50% more than plowing using hand-hoe</li> </ul>
Loss of biodiversity	<ul style="list-style-type: none"> <li>• prevention of land use conversion that lead to biodiversity loss</li> <li>• afforestation and reforestation programs</li> <li>• promotion of diversified cropping and livestock systems</li> </ul>	
Soil fertility mining	<ul style="list-style-type: none"> <li>• integrated soil fertility management (ISFM)</li> </ul>	<ul style="list-style-type: none"> <li>• ISFM is more profitable than use of fertilizer or organic soil fertility alone</li> </ul>
Soil pollution	<ul style="list-style-type: none"> <li>• reduced use of agrochemicals</li> <li>• integrated pest management (IPM)</li> <li>• proper use of agrochemicals</li> </ul>	<ul style="list-style-type: none"> <li>• IPM is more profitable than conventional plant protection</li> </ul>
Overgrazing	<ul style="list-style-type: none"> <li>• rotational infrastructure</li> <li>• drought resistant crop varieties</li> <li>• mulching and other carbon-sequestering management practices</li> </ul>	<ul style="list-style-type: none"> <li>• compared to continuous grazing rotational grazing can increase live weight up to 30% in the Sahel region</li> </ul>
Drought	<ul style="list-style-type: none"> <li>• development of irrigation infrastructure</li> <li>• drought resistant crop varieties</li> <li>• mulching and other carbon-sequestering management practices</li> </ul>	

Source: Nkonya et al. 2011

\*Empirical evidence cited in various source

## Increase population resilience

One valuable way of reversing land degradation is to reduce people's vulnerability by increasing the availability of alternative livelihoods and strengthening their resilience. Promoting agricultural risk management insurance schemes that target smallholder farmers can help offer the necessary risk protection tools while at the same time providing incentive to adopt high risk but high return technology. A number of countries (Malawi, Ethiopia, Mali, etc) are piloting weather index insurance schemes in Africa with a view to increase people's resilience to catastrophic climate events particularly drought (Makaudze, 2012).

One good example is Mongolia which started an index-based livestock insurance in 2005. It's a financial insurance scheme offered to pastoralists in Mongolia's drylands. It covers herds of livestock against natural hazards including catastrophic risks posed by extreme winter weather. A basic commercial insurance policy is sold by insurance companies that pay out when livestock mortality exceed a certain level. However should the mortality rate exceeds a predetermined maximum, then the government compensates all herders regardless of whether they bought insurance or not. This means the largest losses are transferred to the government using a public safety net program (Mahul and Skees, 2007 in Makaudze 2012).

Other programs that can increase people's resilience include land reform as this can play a major part in improving people's ability to cope. But this must be accompanied by a land tenure security system that guarantees land rights use and land transfer



Conservation agriculture is an example of climate-smart agriculture. It is a farming practice based on three key characteristics: minimal mechanical soil disturbance as it involves no tillage; maintenance of a mulch of carbon-rich organic matter covering and feeding the soil; and rotations or sequences of crops including trees which could include nitrogen-fixing legumes. In essence conservation agriculture provides the essential climate change adaptation and mitigation solutions while improving food security through sustainable production and enhanced productivity of resource (Lipper et al, 2010).

Uzbekistan is one of the few LLDCs experimenting with conservation agriculture. With assistance of FAO, the country is improving mono-cropping of cotton through conservation agriculture including zero-tillage, diversification (rotation with wheat and grain legumes) and selected cover crops. Some demonstration plots have been established and training in soil water dynamics, organic matter improvement and related soil stability measures has been offered. The results have been encouraging as farmers have demonstrated willingness to adopt conservation agriculture practices with well-tested crop rotation system.

Farmers in Lesotho have managed to boost agricultural yields and increase food production by adopting conservation agriculture (Lipper et al, 2010). The practice, locally known as "likoti", has also proven essential in combating soil erosion and enhancing fertility. This has helped poor households particularly in rural communities to rehabilitate and strengthen their livelihoods and ultimately building strong resilience in the face of widespread poverty and increasing vulnerability affecting the country. Results show that those farmers who attend training are more likely to adopt likoti. Further, other important determinants include the level of education and economic incentives provided to vulnerable households (Lipper et al, 2010).

Agroforestry is another example of climate-smart agriculture. It is a practice that involves the use of trees and shrubs in agricultural crop and/or animal production and land management systems. Trees on farms are particularly prevalent in Southeast Asia and Central and South America. Agroforestry practices come in many forms such as improved fallows, home gardens, growing multipurpose trees and shrubs, boundary planting, farm woodlots, orchards, plantation/crop combinations, shelterbelts, windbreaks, conservation hedges, fodder banks, live fences, trees on pasture and tree apiculture (Nair, 1993 and Sinclair, 1999 in Lipper et al, 2010).

Water harvesting provides another example of climate-smart agriculture. Improved water harvesting techniques and water-use efficiency (irrigation systems) are fundamental for increasing production and reducing soil erosion (Lipper et al, 2010).

(ECOWAS) for West Africa and Chad subregion; the Arab Maghreb Union (AMU) for the AMU sub-region; the Southern African Development Community (SADC) for the Southern Africa subregion; and the Intergovernmental Authority on Development (IGAD) for the Eastern Africa subregion.

Under the auspices of the Regional Coordination Unit (RCU) hosted by the AfDB, a RAP has been initiated and is based on six Thematic Programme Networks including: Integrated management of international river, lake and hydro-geological basins; Promotion of agro-forestry and soil conservation; Rational use of rangelands and promotion of fodder crops development; Ecological monitoring, natural resources mapping, remote sensing and early warning systems; Promotion of new and renewable energy sources and technologies; and Promotion of sustainable agricultural farming systems. The RCU plays a critical role including the exchange of information on combating desertification between regional and global level.

In 2003 the landlocked developing Sahel countries of Burkina Faso, Chad, and Niger benefited from the pilot project: Operation Acacia, implemented under the auspices of FAO with financial support from the Italian government. The project, hailed as one of the classically successful project, has helped local farmers to restore degraded land by planting native Acacias that produce gums and resins – popular products for people in the Sahel region. Other positive impacts of the project include (ECA, 2007) the training of about 56 000 producers of gum Arabic and resin and the restoration of more than 13 000 hectares of degraded.

Various programs have been implemented at sub-regional level. For Instance the *NEPAD Environment Initiative (EI)* which includes combating desertification as one of its priority program has been developed by UNEP. UNEP also works closely with sub-regional organizations including CILSS, IGAD, Sahara and Sahel Observatory (OSS), SADC, UMA, and ECOWAS, to finalize sub-regional action plans for the NEPAD Environment Initiative. Ethiopia is being assisted by UNEP to develop its national action plans for the NEPAD EI on a pilot basis. If successful this will provide key lessons for further implementation in other countries in Africa.

*The Green Wall for the Sahara Initiative*, a program initiated by the African Union (AU) in collaboration with ECA, FAO, UNEP and UNCCD is another example showcasing a subregional action program. It covers a wide group of countries, including Mali, Niger, Chad, Ethiopia, and Burkina Faso, among others. The main goals of the programme are: to slow the advance of the Sahara Desert, enhance environmental sustainability, control land degradation promote integrated natural resources management, conserve biological diversity, contribute to poverty reduction, and create jobs (ECA, 2007:29).

The Sahara and Sahel Observatory has initiated the need to establish a long-term Ecological Monitoring and Observatory Network. The network covers 12 affected countries in the Sahara/Sahel subregion and it gathers environmental data for use by decision makers. This initiative has seen 11 countries operate and gather high quality information on the evolution of natural resources and the effectiveness of management systems.

The need for up-to-date information on land degradation continues to receive serious attention. In this regard GEF funded the Land Degradation Assessment (LADA) project, a global initiative implemented by UNEP and executed by FAO with support of the UNCCD, the Global Mechanism and the International Soil Reference and Information Centre. Once successful the LADA project will be scaled-up to produce important statistics on Global Land Degradation Assessment. This will allow Parties to the UNCCD to have an overview of the status of land degradation and to identify the areas where intervention may be needed to stop and/or reverse land degradation.

### **Comprehensive Africa Agricultural Development Program (CAADP)**

Comprehensive Africa Agricultural Development Program (CAADP), launched in 2003 under the umbrella of NEPAD, is a regional program that envisions an African continent built on strong sustainable agricultural developmental pathway free of hunger/starvation, poverty and food insecurity. CAADP hinges on four commonly identified pillars/objectives which include: improve land and water resource management (pillar 1), improve rural infrastructure, market access and trade capacities (pillar 2), enhance food security and improve disaster risk management (pillar 3) and improve agricultural research and extension system (pillar 4).

In addition, included under CAADP are specific goals/targets set to guide country strategies and stir investment programs which are: (i) to achieve a 6% average annual growth rate target for the agricultural sector at national level; (ii) to allocate 10% of national budget to the agriculture, (iii) the exploitation of regional complementarities and cooperation to boost growth, and (iv) the principle of partnerships and alliances to include farmers, agribusiness and civil society communities. A number of African LLDCs are parties to the CAADP initiative.



Some individual countries are also playing a role in supporting energy development particularly in Africa. For instance Norway has committed about \$140 million over five years to help scale up access to sustainable energy in rural areas of Ethiopia.

One important intergovernmental organisation set up in 2009 to promote renewable energy is the International Renewable Energy Agency (IRENA), located in Abu Dhabi. It supports countries in their transition to a sustainable energy future, and serves as the principal platform for international cooperation, a centre of excellence, and a repository of policy, technology, resource and financial knowledge on renewable energy. IRENA promotes the widespread adoption and sustainable use of all forms of renewable energy, including bioenergy, geothermal, hydropower, ocean, solar and wind energy in the pursuit of sustainable development, energy access, energy security and low-carbon economic growth and prosperity. IRENA encourages governments to adopt enabling policies for renewable energy investments, provides practical tools and policy advice to accelerate renewable energy deployment, and facilitates knowledge sharing and technology transfer to provide clean, sustainable energy for the world's growing population. The Abu Dhabi Fund for Development has made available US\$350 million in support of innovative renewable energy projects under IRENA.

### 3.8 Summary

This section has highlighted the interventions and support measures to address climate change, desertification and land degradation at national, regional and international levels. The LLDCs have developed national adaptation plans for addressing

## 4.1 Lessons learnt





Improved land management and rehabilitation, the cornerstone of the UNCCD national action programmes (NAPs), can be re-energized. By strongly linking the UNCCD NAPs with the UNFCCC national adaptation programmes of action (NAPAs), the necessary bridges between development and adaptation initiatives can be built, notably in the drylands.

## 4.2 Policy gaps – what LLDCs ought to do

The UNCCD stipulates specific requirements to be undertaken by the affected country parties which include the following: (a) give due priority to combating desertification and mitigating the effects of drought and allocate adequate resources in accordance with their circumstances and capabilities; (b) establish strategies and priorities within the framework of sustainable development plans and/or policies, to combat desertification and mitigate the effects of drought; (c) address the underlying

#### **4.3.4 Promote awareness about land use suitability and best SLM involving the participation of local populations, particularly women and youth, in an effort to combat desertification and mitigate the effects of drought**

One driving force behind land degradation is putting land to use for which it is not suitable, a common problem across many

### 4.3.3 There is a need to develop a stronger early warning system for monitoring desertification based on remote sensing and satellite technology

The need to develop strong indicators for monitoring desertification and land degradation based on satellite technology is not new. In 1987 the World Commission on Environment and Development suggested that land use in agriculture and forestry should be based on a scientific assessment of land capacity and monitoring of the annual depletion of topsoil. These issues received further attention in the JPoI and WSSD. The UNCCD suggests the adoption of two mandatory impact indicators: land cover status and the proportion of the population living below the poverty line. Strengthening the scientific base of the UNCCD on land degradation, desertification and drought issues is an important prerequisite to meeting the new LDNW policy.

Various indicators have been suggested and recently the Committee on Science and Technology, recommended the provisional use of a set of eleven impact indicators that closely match the goals of UNCCD. Two of the eleven measures are mandatory and similar to those mentioned above. Though the indicators are not exhaustive, they provide an important starting point for capturing the necessary data essential for monitoring the conditions of the populations and ecosystems affected by desertification. This indicator-based monitoring approach is expected, over time, to lead to simple, verifiable, measurable, and comparable information for the reporting process.

Other proposed indicator systems include four aspects:

- *Pressure indicators* – characterize driving forces both natural and man-made, affecting the status of natural resources and leading to desertification. They can be used to assess desertification trends and for early warning.
- *State indicators* – characterize the status of natural resources including land.
- *Desertification impact indicators* – can be used to evaluate the effects of desertification on human beings and environment.
- *Implementation indicators* – can be used to assess the actions taken for combating desertification and to assess its impacts on natural resources and human beings.

## 5.1 Conclusion

This study established that climate change, land degradation and desertification are seriously impacting the development prospects of many LLDCs. Following the APoA (2003), the international community is increasingly becoming aware of the developmental difficulties being faced by LLDCs as a result of climate change, desertification and land degradation. Unless bold steps and strategies are undertaken to address these challenges, LLDCs will suffer unprecedented economic losses and continue to languish in vicious cycle of un-development, and under-development characterized by poverty, food insecurity, malnutrition, high mortality, and etc. As a result, these challenges will see many countries failing to achieve the Millennium Development Goals.

Drawing on lessons learnt, policy gaps and new opportunities, the study identifies a number of priorities and recommendations aimed at building the resilience of LLDCs to climate change, desertification and land degradation. Major policy interventions at national, regional and international level are required to mitigate and reverse the impact of climate change, desertification and land degradation in LLDCs. Assessment of future scenarios (MA, 2005) shows that major interventions and shifts in ecosystem management will be needed to overcome challenges related to desertification and land degradation. More importantly reversing desertification and land degradation facilitates eradication of extreme poverty and hunger, as envisioned in the MDGs. Hence in conclusion, addressing climate change, desertification and land degradation in LLDCs is critical and essential to help these countries meet their internationally agreed development goals.

## 5.2 Priorities and Recommendations

Based on the findings made in this study, the following specific recommendations are proposed for the development of LLDCs:

### Priority 1: Strengthening National Plans

#### **Strengthening of the development and implementation of National Plans**

Several LLDCs have developed and are implementing national adaptation plans for climate change and national action plans to fight desertification and manage natural resources. However, it is clear that considerably more efforts are required along with added capacity building and technology transfer in order to meet the needs to successfully develop and implement the plans. Greater emphasis ought to be placed on developing the plans in a holistic way and incorporating climate change and desertification into development priorities at the national and regional levels. Additional resources, earmarked to address national and regional levels, are required to support these efforts.

Conservation agriculture is an example of climate-smart agriculture which involves: minimal mechanical soil disturbance as it involves no tillage; maintenance of a mulch of carbon-rich organic matter covering and feeding the soil; and rotations or sequences of crops including trees which could include nitrogen-fixing legumes. In essence conservation agriculture provides the essential climate change adaptation and mitigation solutions while improving food security through sustainable production and enhanced productivity of resource. There are other adaptive methods (agroforestry, water harvesting, etc) that have already proved to be effective– these needs to be replicated or scaled up. It is recommended that the UN leads international efforts in crafting a special comprehensive climate-smart smallholder agricultural concrete plan of action targeting LLDCs with a well-defined set of goals and objectives.

### **Strive to diversify the economic base of LLDCs**

LLDCs continue to rely heavily on a single or in some cases just a few primary export commodities and hence they are highly vulnerable to climate change, desertification or external shocks. There is a need to assist LLDCs to build a strong diversified economic base that is resilient to absorb economic shocks and capable to produce a range of value-added goods which are competitive on the world market. The international community should play a decisive role in assisting the LLDCs to build diversified economies. In this regard, it is recommended that UN offers specialized assistance directed at assisting LLDCs develop highly unique niche areas for which they are well-endowed and command comparative advantage. For instance, special assistance could be offered to support LLDCs' mountainous ecosystems establish commercial forest trees of high medicinal, pharmaceutical or cosmetic value or cut-flower production – all with high export value.

### **Promote regional and sub-regional integration among LLDCs**

Regional integration, cooperation and collaboration among LLDCs themselves is very essential in prioritising needs, facilitate policy dialogue and establish common ground in tackling common challenges such as climate change, desertification and land degradation affecting their economies. This can be achieved through, inter alia, the establishment of firm multilateral and bilateral pacts and the development of regional modern climate-proof road and rail infrastructure and regional water resource management. It is recommended that regional integration among LLDCs could prove more effective in tackling problems of climate change, desertification and land degradation.

## **Priority 3: Water security**

## Priority 5: Disaster risk reduction and early warning systems

### Establish 'climate disaster insurance facility' fund for LLDCs

There tends to be a fragmented approach with no single well-coordinated fund to cover or protect LLDCs against extreme catastrophic events. Extreme climate events such as floods, droughts, cyclones, etc can cause massive destruction to property, infrastructure such as roads, bridges, rails, telecommunication and etc in a way that can overshadow the commendable progress so far achieved in LLDCs. Despite the escalating losses associated with these events most LLDCs have yet to find effective ways of reducing and managing the risks they pose. For instance, economic losses due to floods in South Asia are in absolute terms far smaller than those in the OECD. Relative to the size of LLDCs South Asia's GDP, however, flood losses are approximately 15 times greater than losses in the OECD. Thus, although economic loss risk in the OECD may be increasing faster, such losses threaten OECD countries' economies far less than they do those of most LLDCs. Larger economies tend to be more diverse geographically and economically, and are thus better able to compensate for losses in any one region or sector. LLDCs have least capacity to absorb and recover from drought or flood-inflicted economic losses. UNCCD can lead the effort in the establishment of such a global comprehensive climate insurance funding facility especially for LLDCs with the financial support of international partners. It is therefore recommended that the international community helps establish a special climate disaster insurance fund that target LLDCs as they are extremely vulnerable to extreme climate events.

The Bali Action Plan (2007) calls for "consideration of risk sharing and transfer mechanism, such as insurance" as a means to address losses in developing countries due to climate change. Article 4.8 of the UNFCCC allows room for insurance to be included as a tool to combat the impacts of climate change. Catastrophic disaster insurance is one of the few specific policy instruments for adaptation that can be considered as a special provision for LLDCs. A leaf can be taken from the Caribbean countries which established a common "disaster risk management fund" as a regional collective response to the challenges posed by extreme climate events (typhoons, hurricanes, tsunamis, etc).

### Strengthen early warning systems

Using remote sensing and satellite technology can boost early warning systems in LLDCs. They are capable of providing rapid and effective detection of hazards such as wildfires, deforestation, drought, floods, changes in water levels, and natural hazards. With rapid advances in data collection, analysis, visualization and dissemination, including technologies such as Geographical Information Systems (GIS), telecommunications and internet, it is now feasible to deliver relevant information on a regular basis and reach wider audience relatively inexpensively.

It is critical that national and regional early warning systems be strengthened across LLDCs. For instance Southern African Regional Climate Outlook Forum (SARCOF) is regional organization that has interactively worked with national meteorological departments within SADC region in monitoring ENSO signals and issuing seasonal climate forecasts. Despite their potential, forecasts have been of minimal impact for a number of reasons: they are poorly communicated; too wide and unrealistic; difficult to understand the probabilistic undertones; broadcasted too late and etc. In short there is a need to revamp early warning mechanism across many LLDCs where either poorly developed or non-existent. The absence of early warning systems that monitor desertification and deforestation on long term basis across many LLDCs in a way that informs policy makers should be very disturbing. It is recommended that national and regional early warning systems must receive high priority as climate change mitigation tools.

## Priority 6: Information system and research

### Raise public awareness and access to information

LLDCs are among the countries with the least awareness of issues of climate change, land degradation and desertification. This is exacerbated by the majority view that these countries are the most vulnerable and have the least adaptation capacity. In fact, a low level of awareness undermines the country's capacity to adapt and mitigate these factors. The struggle against climate change, land degradation and desertification cannot be won without ensuring the awareness of communities regarding not only impacts of these factors on socio-economic development of the LLDCs but also the projected impacts. UNFCCC underscores the essence of public awareness and encourages, inter alia, the need to adopt educational public awareness programmes with the view to inform the public on climate change and its consequences.

A majority of the people who are hardest hit by the impacts of these factors have little or no understanding of their impacts. It is difficult for such populations to adopt the best practices as far as mitigation and adaptation are concerned. Public access to information encourages mass participation in national mitigation and adaptation strategies. It is therefore essential for LLDCs to establish awareness programmes which target specific stakeholders.

### **Establish strong links with research think-tanks**

There is little and in most cases fragmented information regarding effects of climate change on LLDCs. Research plays an important role in informing LLDCs on the degree and scope of the effects of climate change, land degradation and desertification on their economies and the livelihoods of their populations. This research information can be used for policy formulation and deciding the best practices which LLDCs should adopt in order for them to cope with a changing climate. Currently there is dearth of think tanks in LLDCs which can carry out consistent, reliable and cutting-edge research into these issues. It is also essential for the international community, particularly the UN, to establish international centres of excellence whose purpose is to conduct such studies.

It is important to note that the research and interventions on climate change, land degradation and desertification is dominated by governments. There is little participation of private institutions, particularly the civil society in LLDCs. The civil society can play an essential role, particularly in the fields of research, advocacy and information dissemination. It is essential for the international community to assist in the establishment of research and development institutions in LLDCs which will play a titanic role in conducting research on climate change, land degradation and desertification. These institutions can be helpful in identifying the special needs, priorities and interests of LLDCs within the context of their national circumstances. For instance, the development of indices for monitoring and evaluation of desertification and land degradation processes within LLDCs could be conducted via academic research centres.

## **Priority 7: Capacity building**

### **Institutional and human capacity building**

Generally, LLDCs have poor human and institutional capability to deal with the causes and effects of climate change, desertification and land degradation. LLDCs are characterized by weak capacities, institutions and adaptation and mitigation policies and practices. Mitigation and adaptation should be firmly embedded into the development policies and programmes of LLDCs. Different countries have different national circumstances, needs and priorities. There is need for LLDCs to strengthen their institutional capabilities in order for them to be able to identify best initiatives to combat climate change, desertification and land degradation that best suit their circumstances, priorities and interests. The Institutions of LLDCs should have the capacity to conduct cutting-edge research which will enable the countries to develop a set of vulnerability indicators which can be used to develop an early warning framework.

In order to be effective, the fight against climate change, land degradation and desertification needs to involve a multiplicity of actors and institutions. Mitigation and adaptation priorities and programmes are largely monopolized by government ministries and agents. It is important for LLDCs to seriously consider the role of non-state actors, especially the private sector and Non-governmental organizations not only in formulating the best practices but also in the implementation of these practices. These actors, including universities, are capable of conducting cutting-edge research and proffer viable and effective adaptation and mitigation mechanisms.

One of the major institutional challenges in the mitigation and adaptation strategies in LLDCs is the poor coordination of these activities. There is need therefore to strengthen the coordination capacity of institutions and also to ensure that measures of ensuring transparency and accountability in the management and implementation of strategies are in place.

### **What should be included in the post 2015 development agenda?**

This study has demonstrated at length how climate change, land degradation and desertification are negatively impacting the economies of LLDCs. In mapping future development agenda, climate change, desertification and land degradation challenges must be accorded high priority. Thus, drawing from the list of identified priorities (discussed above), the following issues deserve more priority in post 2015 development agenda:







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Appendix A. GDP economic growth rate in LLDCs for the period 1990-2012

Region	LLDC	GDP annual growth (%)											
		1990	1992	1994	1996	1998	2000	2002	2004	2006	2008	2010	2012
Southern Africa	Botswana	6.8	2.9	3.6	5.6	10.6	5.9	9.0	6.0	5.1	3.7	8.1	6.1
	Lesotho	5.6	7.3	5.3	5.2	1.7	5.1	0.5	2.3	4.3	5.7	7.9	4.0
	Malawi	5.7	-7.3	-10.2	7.3	3.9	1.6	1.7	4.9	2.1	8.3	6.5	1.9
	Swaziland	21.0	3.2	2.4	3.8	2.6	1.8	1.8	2.9	3.3	2.4	1.9	-1.5
	Zambia	-0.5	-1.7	-8.6	6.9	-1.9	3.5	3.3	5.4	6.2	6.0	7.6	7.3
	Zimbabwe	7.0	-9.0	9.2	10.4	2.9	-3.1	-8.9	-5.8	-3.5	-17.7	9.6	5.0
	<b>Average</b>												









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