REPUBLIC OF KENYA

# *Kenya Post-Disaster Needs Assessment (PDNA)*

## 2008-2011 Drought

With technical support from the European Union, United Nations, and World Bank

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With financial support from the European Union
In the framework of the ACP-EU Natural Disaster Risk Reduction Program,
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# *Foreword*

We are pleased to present the findings of the Drought Post-Disaster Needs Analysis (PDNA) conducted in Kenya at the request and direction of the Ministry of Finance with technical support from the European Union, United Nations, and World Bank.

The aim of this assessment has been to develop a quantitative estimation of the impact of the drought on the socio-economic development of the country and recommendations of immediate recovery and long-term resilience-building in the country. The findings that have emerged show, in no uncertain terms, Kenya's vulnerability to droughts and devastating impacts arising not only in the last year but prolonged over the last four years where Kenya has experienced drought varying intensities across various areas.

Furthermore, while the PDNA has been an exercise in developing a more pointed assessment of what is needed to make affected communities more resilient, it will also help in putting in place a more systematic process of addressing future droughts in Kenya. The Government of Kenya is fully committed to taking forward the recommendations of the report and building long-term drought resilience across the country.

We would like to acknowledge the technical and financial support received from the European Union, United Nations, and World Bank as well as other partners in completing this exercise. It is a demonstration of how strongly we feel about this area and how much we care about the communities and the people we serve. The work accomplished here will allow us to continue to strengthen Kenya's drought resilience for many years to come.

**Joseph K. Kinyua, CBS**
**PERMANENT SECRETARY/TREASURY**

# Acknowledgements

This Post-Disaster Needs Assessment (PDNA) was prepared under the overall leadership of the Ministry of Finance (Geoffrey Mwau, Economic Secretary) with close technical support from Bernard Rey (European Union), Nathan Belete (World Bank), and Seth Vordzorgbe (United Nations).

Over 85 national and international experts including 42 government staff came together to complete this assessment including the following sector ministries and agencies Agriculture, Education, Energy, Environment and Natural Resources, Forestry and Wildlife, Fisheries, Kenya Forest Service, Kenya National Bureau of Statistics, Lands, Livestock, Public Health and Sanitation, Northern Kenya & Other Arid Lands, State for Special Programmes, Trade, and Water and Irrigation.

The PDNA team wishes to acknowledge the people interviewed for the insights they provided to the team as well as the staff of the many local government offices that provided data and support, without which the team's fieldwork would not have been complete.

Support for the assessment was provided by a team of technical experts from the European Union, United Nations, and World Bank, as well as other partners including the Canadian International Development Agency (CIDA), Food for the Hungry (FHI), Gesellschaft für Internationale Zusammenarbeit (GIZ), Inter-governmental Authority on Development (IGAD), IGAD Climate Prediction and Application Center (ICPAC), Japan International Cooperation Agency (JICA), and Regional Center for Mapping of Resources for Development (RCMRD).

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This assessment was undertaken with technical support and guidance from Bernard Rey (European Union), Nathan Belete (World Bank), and Seth Vordzorgbe (United Nations). The core team for this exercise consisted of Roberto Jovel, Francis Muraya, Rakhi Bhavnani Sharma, Roshin Mathai Joseph (World Bank), Peter Sturesson, Alessandro Liamine, Pascal Ledroit, Nick Maunder, Lammert Zwaagstra, Timothy Baines (European Union). Chalida Chararnsuk, Timothy Mwolo, Ruth Wanga, Debra

Ouma (World Bank) provided logistical support. Sawsan Gad and Keiko Saito provided mapping support and Catherine Njeri produced the design and layout.

The following team members contributed towards the drafting of the sector annexes and provided valuable inputs pertaining to various sectors and cross cutting issues:

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There are many others who contributed to the PDNA who have not been mentioned here. Their contributions are duly acknowledged.

# *List* of acronyms

| | |
|---|---|
| **ADA** | Alcohol and Drug Abuse |
| **ADC** | Agriculture Development Corporation |
| **ALLPRO** | ASAL based livestock and rural livelihoods support project |
| **ASAL** | Arid and Semi Arid Lands |
| **ASCU** | Agricultural Sector Coordination Unit |
| **ASDS** | Agricultural Sector Development Strategy |
| **BCG** | Blue Gum Chalcid |
| **BMUs** | Beach Management Units |
| **DaLA** | Damage and Loss Assessment |
| **DFZ** | Disease Free Zone |
| **DRR** | Disaster Risk Reduction |
| **DWFN** | Distant Water Fishing Nation |
| **EEZ** | Economic Exclusive Zone |
| **ERS** | Economic Recovery Strategy for Wealth Creation and Employment |
| **FAO-UN** | Food and Agriculture Organization of the United Nations |
| **FBO** | Faith Based Organization |
| **FGD** | Focused group discussion |
| **GDP** | Gross Domestic Product |
| **GIZ** | German International Cooperation |
| **GOK** | Government of Kenya |
| **HH** | House Hold |
| **HRNA** | Human Recovery Needs Assessment |
| **IGAD** | Intergovernmental Authority for Development |
| **KAPP** | Kenya agricultural productivity project |
| **KFS** | Kenya Forest Services |
| **KFSSG** | Kenya Food Security Steering Group |
| **KNBS** | Kenya National Bureau of Statistics |
| **KRDP** | Kenya Rural Development Programme |
| **Ksh** | Kenya Shilling |

| | |
|---|---|
| **KTDA** | Kenya Tea Development Agency |
| **KWS** | Kenya Wildlife Services |
| **M Ksh** | Million Kenya Shillings |
| **MCS** | Monitoring Control Surveillance |
| **MEAs** | Multi-lateral Environment Agreements |
| **MMBOA** | Malindi Marine Boats Operators Association |
| **MoA** | Ministry of Agriculture |
| **MT** | Metric Tonnes |
| **MTIP** | Medium Term Investment Plan |
| **NALEP** | National agriculture and extension programme |
| **NCPB** | National Cereals and Produce Board |
| **NGO** | Non Governmental Organization |
| **NWFP** | Non-Wood Forest Products |
| **PATTEC** | Pan African Tsetse and Trypanosomosis eradication |
| **PDNA** | Post Disaster Needs Assessment |
| **PWD** | Persons with disabilities |
| **SDCP** | Smallholder dairy commercialization programme |
| **SGR** | Strategic Grain Reserves |
| **SRA** | Strategy for Revitalization of Agriculture |

# *Executive* summary

## *Overview*

On behalf of the Government of Kenya (GoK), the Ministry of Finance (MoF) sent an official request to international partners in August 2011 for assistance in undertaking an assessment of the prevailing drought in the country. Across the Horn of Africa, countries were responding to the combined impact of drought, loss of crops and livestock, and rising food and deteriorating livestock prices. At the time, 3.7 million people were in immediate need of food, clean water, and basic sanitation in Kenya and urgent short- and long-term interventions were needed to save the lives and livelihoods of millions.

Under the auspices of MoF, a joint assessment team comprised of government line ministry staff, together with the EU, UN, World Bank, and other partners, mobilized to undertake a Post-Disaster Needs Assessment (PDNA). The assessment aimed to develop a quantitative estimation of the impact of the drought on the socio-economic development of the country and recommendations for immediate recovery and long-term resilience-building in the country. Furthermore, in light of frequently recurrent episodes of drought in the country, the exercise aimed to introduce a methodology that could readily be used in the future while strengthening government capacity to do so.

The PDNA combines two methodologies the damage, loss, and needs assessment (DaLA) methodology developed by the United Nations Economic Commission for Latin America and the Caribbean (UN-ECLAC) and further updated and expanded by the World Bank's Global Facility for Disaster Reduction and Recovery (GFDRR), as well as the Human Recovery Needs Assessment (HRNA) methodology developed by the United Nations. Together these methodologies provide the basis for the assessment of the impacts and needs arising from disasters such as drought.

In completing the assessment, over 85 national and international experts including 42 staff from 16 government ministries come together to cover the following themes of drought impact and needs macro-economic analysis, and the effect on social, infrastructure, and productive sectors of the economy as well as cross-cutting themes.

The following sectors and cross-cutting issues were covered as a part of this exercise: agriculture, livestock, fisheries, agro-industry, health, nutrition, education, energy, water & sanitation, tourism, forestry, wildlife, environment, gender, and disaster risk reduction.

For each sector, teams aimed to comprehensively analyze i) damage - the estimated replacement value of physical assets wholly or partly destroyed, built to the same standards as prevailed prior to the disaster; ii) losses – the changes (decrease or increase) in economic flows arising due to the drought; and, iii) needs – the financial requirements to achieve economic recovery and reconstruction after the drought.

With frequently recurring episodes of drought in the country however, the team identified that in order to reduce the exposure to droughts in the future and to truly reduce vulnerability of people and property, there was an imperative need for adding "disaster risk reduction" needs as a part of this analysis. Preliminary DRR needs and indicative costing have been identified by the sector teams which serve as a starting point for the detailed evaluation, dialogue, and prioritization of DRR needs that is required by the government going forward towards building longer term resilience.

## *Key Findings*

### A 2008-2011 Drought

Using data from the Kenya Meteorological Service and the Intergovernmental Authority for Development (IGAD) Climate Prediction and Applications Centre (ICPAC), an analysis of the intensity, duration, and spatial characteristics of the drought provided evidence to show that a drought occurred in Kenya from 2008 to 2011 with varying intensities across geographies and time.

The rainfall deficit that persisted in this period constituted a drought in the following ways i) lower-than-normal precipitation duration and intensities at various times which rendered it as a meteorological drought; ii) an agricultural drought with inadequate soil moisture to meet the needs of various crops in the country; iii) a hydrological drought with deficiencies in the availability of surface and groundwater supplies over periods of time; and, iv) a socio-economic drought with physical water shortages affecting the health, well-being, and quality of life of communities across the country.

Based on these findings, a drought period spanning 2008 to 2011 was considered throughout the exercise and analysis.

### Overall Damage, Losses, and Needs

The overall effects of the 2008-2011 drought in Kenya have been estimated at Ksh 968.6 billion (US$12.1 billion) which includes Ksh 64.4 billion (US$805.6 million) for the destruction of physical and durable assets, and Ksh 904.1 billion (US$11.3 billion) for losses in the flows of the economy across all sectors[1]. Table 1 summarizes the damage, losses, and needs arising from the 2008-2011 drought.

[1] The sum of damage and losses value is provided only as a measure of the total or global amount of the effects of the drought; it is not to be used in combination to avoid possible double accounting.

In terms of currency, the Central Bank of Kenya provided the following average annual exchange rates for the 2008-2011 period 68.82, 77.51, 79.04, and 87.84 Shillings per US Dollar, respectively, and were used throughout the drought assessment unless otherwise specified. In addition, it should be noted that the needs presented, if spanning more than one year, have not been adjusted for inflation.

**Table 1 Summary of damage, losses, and needs**

| Summary of Damage, Losses, and Needs from the 2008 - 2011 Drought | | |
|---|---|---|
| | (Ksh billion) | (US$ billion) |
| **Effects** | | |
| Damage | 64.4 | 0.8 |
| Losses | 904.1 | 11.3 |
| **Total** | 968.6 | 12.1 |
| | | |
| **Needs** | | |
| Recovery | 86.9 | 0.99 |
| Reconstruction | 69.2 | 0.78 |
| **Total** | 156.2 | 1.77 |
| | | |
| Indicative Additional Disaster Risk Reduction Needs | 184.8 | 2.1 |

In terms of needs, three types were identified i) "recovery" needs which include the requirements for immediate reactivation of personal or household income and productive activities, and rehabilitation of basic services; ii) "reconstruction" which include needs for reconstruction of destroyed assets with improved, disaster-resilient standards under a building-back-better strategy; and, iii) "disaster risk reduction" which comprise preliminarily identified activities with indicative costing above and beyond those already covered which are aimed at building longer-term resilience through "systematic efforts to analyze and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events."[2]

Recovery needs are estimated at Ksh 86.9 billion (US$990 million), and reconstruction at Ksh 69.2 billion (US$788 million). Therefore, the total estimated needs for recovery and reconstruction spanning 2012-2016 is Ksh 156.2 billion (US$1.77 billion).

Above this, indicative disaster risk reduction needs identified by sector teams are estimated at Ksh 184.8 billion (US$2.1 billion). Table 2 provides sector-wise break-ups for damage, losses, and needs.

[2] Using the UNISDR definition from http//www.unisdr.org/we/inform/terminology#letter-d

**Table 2 Overall summary of damages, losses, and needs by sector in Ksh million**

| Sectors | Impact | | | Needs | | | Indicative DRR Needs |
|---|---|---|---|---|---|---|---|
| | Damage | Losses | Total | Recovery | Reconstruction | Total | |
| Agriculture | | 121,104.1 | 121,104.1 | 5,048.8 | | 5,048.8 | 13,736.8 |
| Livestock | 56,141.7 | 643,194.5 | 699,336.2 | 50,237 | 56,142 | 106,379 | 85,103.0 |
| Fisheries | 502.6 | 3,661 | 4,163.6 | 406.4 | 753.9 | 1,160.3 | 2,991.2 |
| Agro-industry | | 7,159.6 | 7,159.6 | | | - | |
| Health | | 4,745.7 | 4,745.7 | 5,099 | | 5,099 | |
| Nutrition | | 6,699.4 | 6,699.4 | 225.1 | | 225.1 | 130.9 |
| Education | 41.9 | 3,937.8 | 3,979.7 | 590.1 | 55.7 | 645.8 | 3,592.1 |
| Energy | | 32,392.3 | 32,392.3 | 13,000 | | 13,000 | |
| Water & sanitation | 7,736.1 | 80,466.9 | 88,203 | 4,964.2 | 12,304.1 | 17,268.3 | 78,627.3 |
| Environment, Tourism Forestry, Wildlife | 22.2 | 762.4 | 784.6 | 7,387.9 | | 7,387.9 | 647.5 |
| Total | 64,444.5 | 904,123.7 | 968,568.2 | 86,958.5 | 69,255.7 | 156,214.2 | 184,828.8 |

## *Damage and Losses*

### Sector-wise Breakup

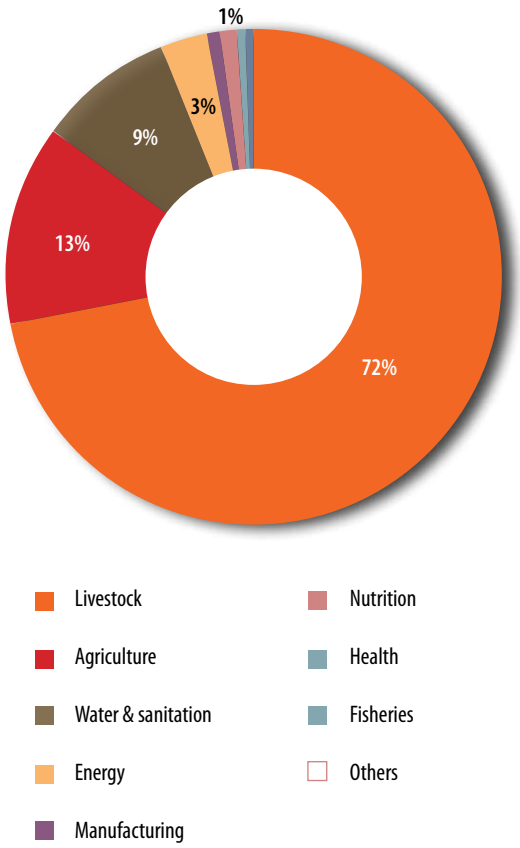
The sectors had varying distribution of damage and losses however, livestock sustained a very significant share. There were substantial deaths of domestic animals of different types to an estimated amount of Ksh 56.1 billion. As well, the subsequent decline in production of meat, milk and other by-products, together with the need to spend significant amounts in providing veterinary attention, water and feed for the animals amounted to approximately Ksh 643.2 billion.

The second most drought affected sector was agriculture where production of food and industrial crops reduced by an amount of Ksh 121.1 billion. The urban water supply and sanitation systems sustained partial damage, faced production losses due to limited water availability as well as higher-than-normal costs of production. In rural areas, individual family systems sustained partial damage due to the lowering of the groundwater table, and rural inhabitants were forced to collect water from far away sources. The electrical sector was unable to provide electricity to meet total customer demand due to insufficient water availability in hydropower dams and was forced to generate electricity using high-cost thermal power plants. The social sectors of education, health and nutrition faced increased costs to provide the required services to the population. Figure 1 provides a graphical breakdown of sectoral damages and losses.

### Ownership-Based Breakup

Ownership of the described damage and losses was heavily concentrated on private sector entities (approximately 92 percent of total damage and losses). This includes individuals, households, or enterprises that owned domestic animals that died, food and industrial crops that failed, damaged fishing equipment and production, food processing losses, and higher costs for water in rural areas.

**Figure 1 Sectoral damages and losses (in percentage)**




The public sector, on the other hand, faced partial destruction of urban water systems, financing of emergency water distribution in urban areas, and the provision of food, nutrition and health assistance with support from development partners - costs that represented approximately 8 percent of the total effects of the drought. [3]

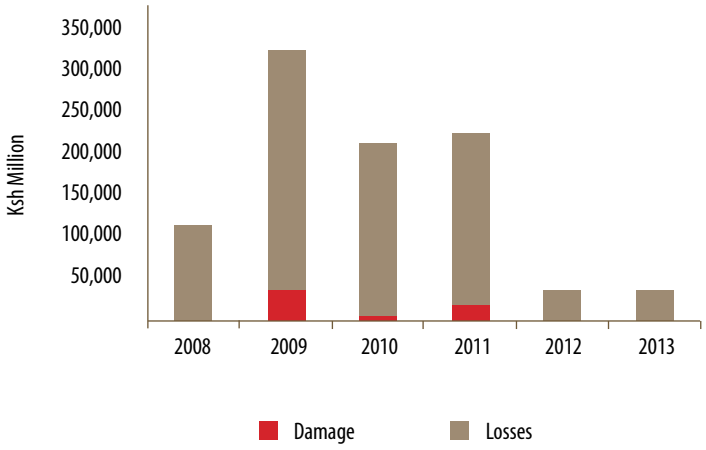
In terms of needs, this asymmetrical distribution in ownership of drought effects may have a bearing on the respective share of post-disaster recovery and resilience-building activities where both public and private sectors will have a corresponding load with the government playing a catalytic promotional role and the private sector assuming the lead in many activities.

## Time-wise Break-up

The current drought spanned four years from 2008-2011 and the distribution of damages and losses along this time period - and beyond – corresponds with the intensity of the rainfall deficits that have occurred.[4]

Between the period of 2008-2011, death of livestock and other damages occurred during each calendar year. However, production losses that occurred during these years will also continue beyond to 2012 and 2013 at least in the livestock sector due to death of animals and until stocks recover naturally in a 3 year period. Higher production costs also occurred in the previous 4 years and are expected to end in 2011. The highest value of damage and losses caused by the drought occurred in 2009 and higher values continued to occur in 2011 and 2010. See Figure 2 below.

**Figure 2 Time variation of damage and losses caused by the 2008-2011 drought in Kenya**




*Source Estimations by Assessment Team on the basis of official information.*

Furthermore, it is noteworthy that the effects of the drought in 2009 were different from those

[3] This concentration of disaster effects on the private sector contrasts with what occurs after earthquakes and floods. In those cases, the extensive destruction of public infrastructure assets usually results in higher participation of the public sector in the ownership of damage and losses.

[4] While recent meteorological forecasts have indicated that normal rainfall rates began after September 2011, there is no guarantee that the drought has ended. In this respect, the figures described herein are to be considered as interim results until future events prove or disprove the termination of the drought.

in 2011. An example from the assessment is that in the livestock sector, Rift Valley province suffered the highest damage in 2009 while in 2011, it was Eastern province that suffered the highest value of damages.

### Province-wise Distribution

The approximate spatial distribution of the effects of the drought were uneven due to the combination of changes in rainfall availability and patterns, and the type and intensity of socio-economic activities prevailing in the country.

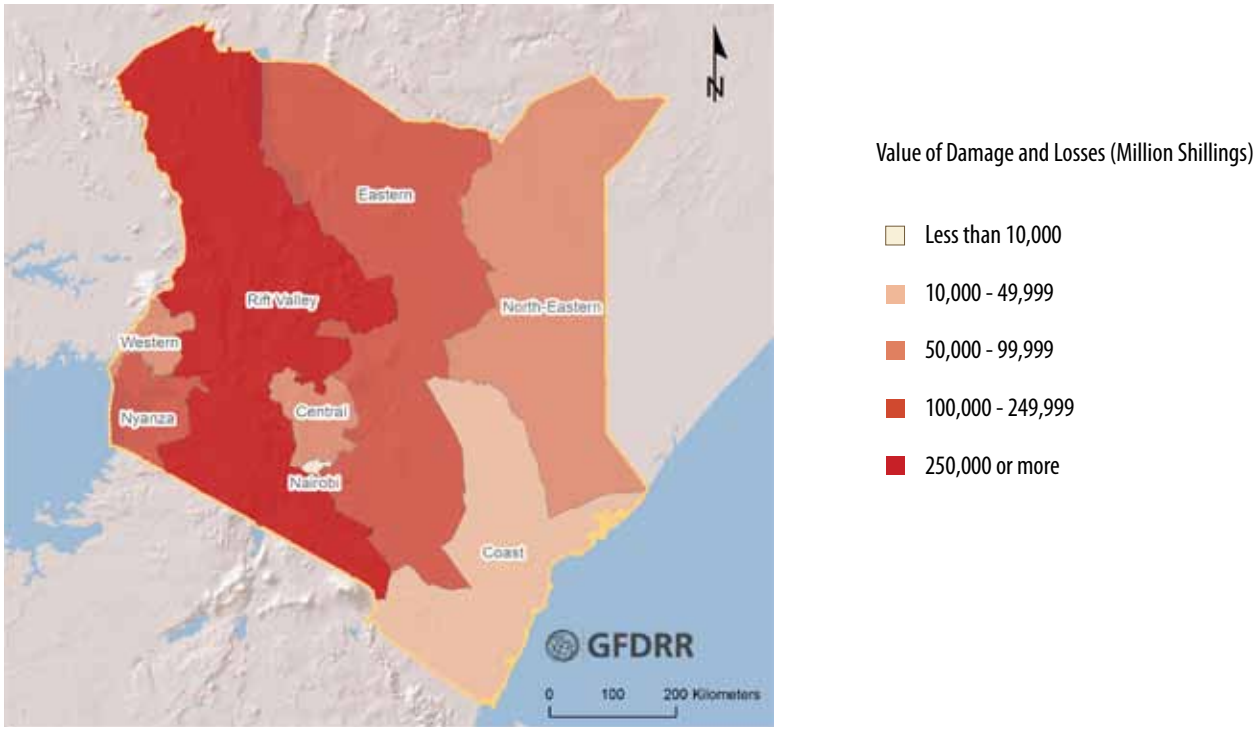
Rift Valley province sustained the highest value of damage and losses totaling Ksh 437.3 billion (or 45 percent of the country total) followed by Eastern and Nyanza Provinces (Ksh 148.1 billion and Ksh 106.1 billion, 15 and 11 percent of the country total, respectively). On a fourth level were the North Eastern, Central, and Western Provinces (8.8, 8.6, and 7 percent of the country total, respectively), while Coast, and Nairobi Provinces sustained a fraction of the previous values. Table 3 details the approximate province-wise distribution while Figure 3 illustrates the spatial distribution of these effects.

**Table 3 Approximated impact of the 2008-2011 drought by province**

| Province | Central | Coast | Eastern | Nairobi | North-Eastern | Nyanza | Rift Valley | Western |
|---|---|---|---|---|---|---|---|---|
| Damage | 3,572 | 1,844 | 15,362 | 327 | 10,784 | 4,331 | 23,428 | 4,797 |
| Losses | 79,086 | 21,686 | 132,748 | 7,543 | 72,890 | 101,768 | 413,858 | 61,737 |
| **Total** | **82,658** | **23,530** | **148,109** | **7,870** | **83,674** | **106,099** | **437,285** | **66,534** |
| % of total | 8.6 | 2.5 | 15.5 | 0.8 | 8.8 | 11.1 | 45.8 | 7.0 |

*Source Estimations by Assessment Team on the basis of official information.*

**Figure 3 Map showing the spatial distribution of damage and losses per province.**



### Per capita drought effects

Information on the spatial variation of population density together with damage and losses per capita provides a view of the effects of drought at the personal or household level. Table 4 shows the approximate estimated per capita damage and losses causes by the 2008-2011 drought in Kenya by province.

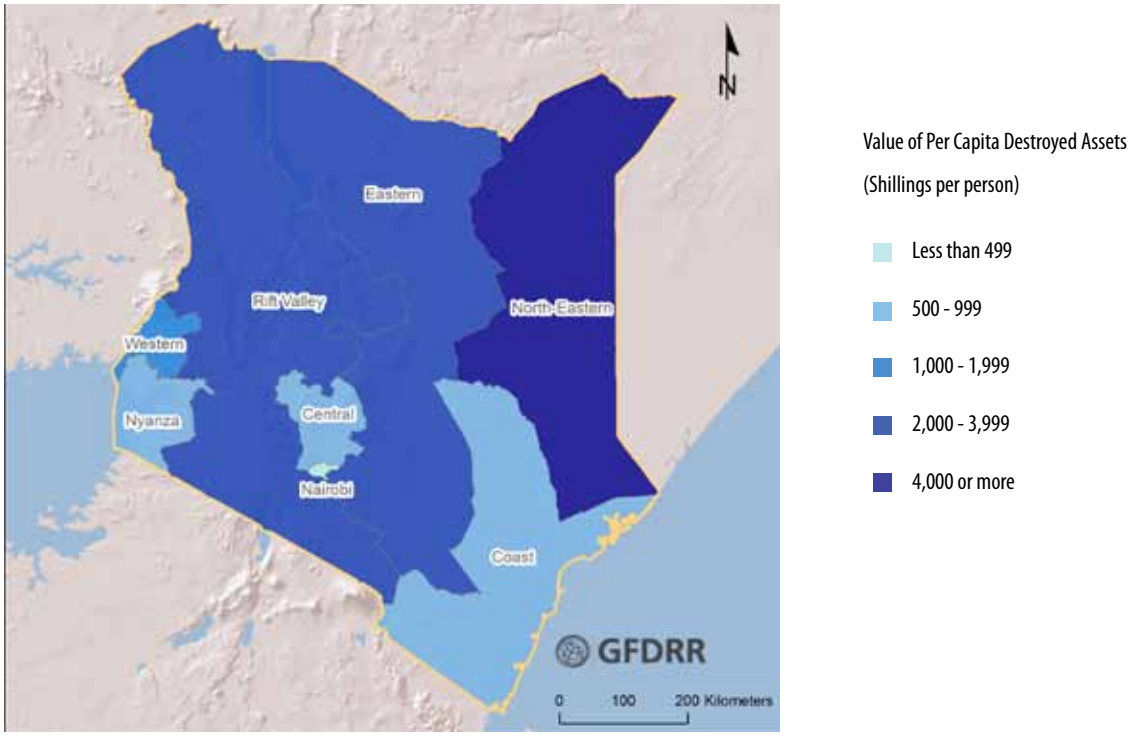
The value of per capita damage is a direct reflection of the resulting decline or decimation of domestic animal stock. The highest value of per capita damage occurred in the North Eastern province, at an average value of Ksh 4,667 per person. The second most affected were those in Eastern and Rift valley provinces (Ksh 2,710 and Ksh 2,341 per person), with Western province placing as a distant third (Ksh 1,107 per person). Figure 4 shows the spatial variation of per capita damage caused by the 2008-2011 drought in the country.

**Table 4 Per capita damage and losses caused by the 2008-2011 drought in Kenya by province**

| | Ksh per person | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Province** | **Central** | **Coast** | **Eastern** | **Nairobi** | **North-Eastern** | **Nyanza** | **Rift Valley** | **Western** |
| Damage | 815 | 555 | 2,710 | 104 | 4,667 | 796 | 2,341 | 1,107 |
| Damage and losses | 18,856 | 7,076 | 26,130 | 2,508 | 36,211 | 19,494 | 43,699 | 15,351 |

*Source Estimations by Assessment Team on the basis of official information.*

**Figure 4 Spatial variation of per capita damage caused by the 2008-2011 drought in Kenya**



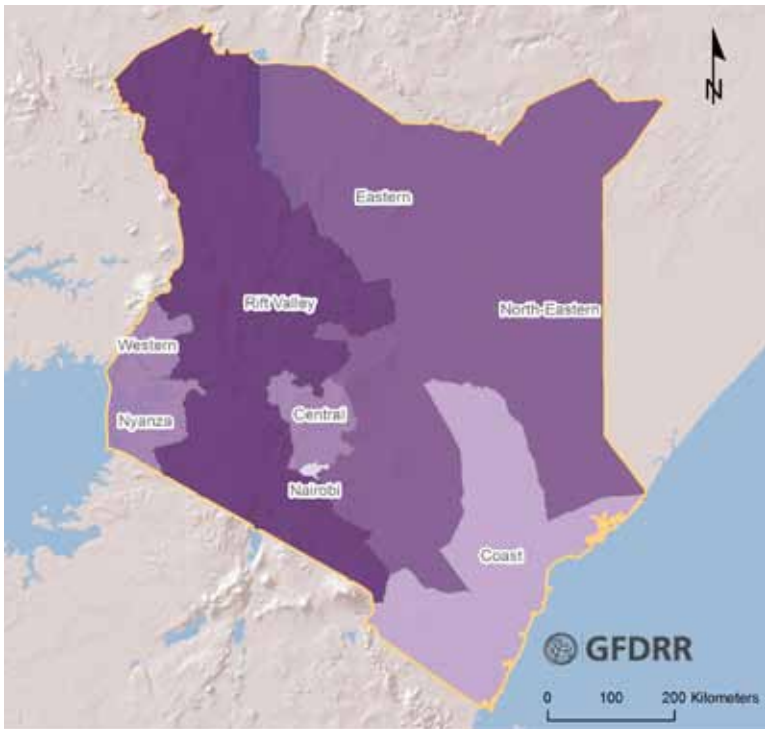
Considering the combination of damage and losses, people living in Rift Valley sustained the highest per capita impact at Ksh 43,699 per person. Inhabitants of North Eastern and Eastern provinces were the second most affected showing average values of Ksh 36,211 and Ksh 26,130 per person respectively. Nyanza, Central and Western provinces follow in a third level of affectation (refer to Figure 5).

As expected, the figure illustrates the correlation between semi-arid and arid lands of the country and the higher values of per capita drought effects.

### Drought Effects and Human Development

When the values of per capita damage and losses are compared with the most recent values of the Human Development Index (HDI) developed by UNDP in cooperation with the Government of Kenya, the highest values of per capita damage and losses occurred in provinces where the HDI is lowest.[5] That is to say, individuals with the lowest human development in the country – and the most vulnerable against disasters – have sustained the highest socio-economic impact caused by the drought. Worse is that since this meteorological event lasted more than four consecutive calendar years, poverty in the most affected locations would have increased in both qualitative and quantitative terms, and the country will now have to significantly increase its efforts to reduce poverty in the medium- to long-term. Figure 5 shows the spatial variation in per capita damage and losses caused by the 2008-2011 drought in Kenya.

**Figure 5 Value of per capita damage and losses due to the 2008-2011 drought in Kenya by province**



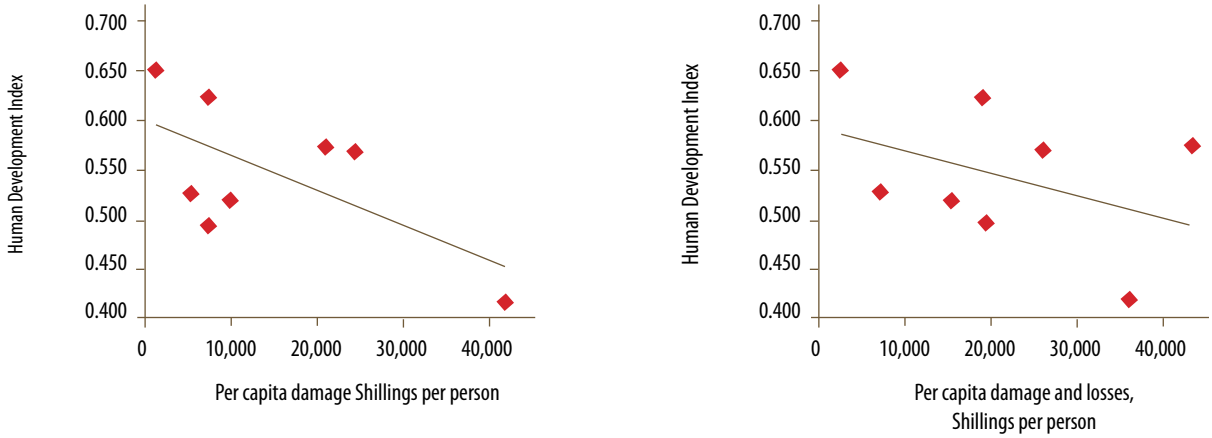

[5] See Kenya National Human Development Report 2009, United Nations Development Program (UNDP), Nairobi, June 2010.

**Table 5 Drought-induced damage and damage and losses versus human development index in Kenya Provinces**

| Province | Central | Coast | Eastern | Nairobi | North Eastern | Nyanza | Rift Valley | Western |
|---|---|---|---|---|---|---|---|---|
| Damage, Ksh/person | 815 | 555 | 2,710 | 104 | 4,667 | 796 | 2,341 | 1,107 |
| Damage and losses, Ksh/person | 18,856 | 7,076 | 26,130 | 2,508 | 36,211 | 19,494 | 43,699 | 15,351 |
| HDI (2009) | 0.624 | 0.527 | 0.568 | 0.653 | 0.417 | 0.497 | 0.574 | 0.52 |

*Source Estimations by Assessment Team on the basis of official information.*

**Figure 6 Value of damage caused by drought in Kenya Provinces versus Human Development Index**




*Source Estimations by Assessment Team on the basis of official information.*

The above conclusion suggests that poverty may have been aggravated by the drought, especially in those provinces and districts that were most affected. Further analyses are required in order to deepen this conclusion.

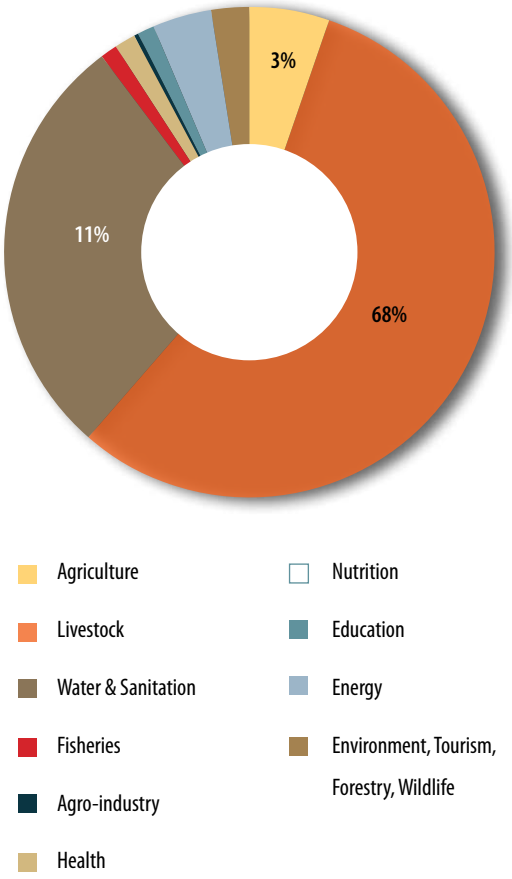
## *Needs Analysis*

Based on the damage and loss analysis, the disaster's impact was assessed to develop recovery and reconstruction needs, and disaster risk reduction needs in the country from the period 2012-2016.

Corresponding to damage and losses, Figure 7 below shows that the major share of recovery and reconstruction needs is also concentrated in livestock (68 percent), water and sanitation (11 percent), and agriculture (3 percent), followed by the other sectors. The total recovery and reconstruction needs are estimated at Ksh 156.2 billion.

It is important to note that higher needs for sectors do not necessarily mean that needs in those sectors have the highest priority. Each sector has critical needs which should be addressed in parallel or in a prioritised manner that does not neglect one sector at the expense of another. Similarly, the "type of need" – recovery, reconstruction, and DRR – are all equally critical and need to be addressed in a comprehensive manner without which, the adequate foundation for resilience to future droughts cannot be strengthened in Kenya.

**Figure 7 Sector needs in proportion to total needs arising from the 2008-2011 drought.**




## *Recovery*

Recovery needs are broadly short- to medium-term interventions designed to reactivate the economic activities and living conditions, as soon as possible.. The recovery needs as defined here stem from the losses identified in the impact analysis. The total recovery needs identified for the drought amount to Ksh 86.9 billion.

The period of "recovery" was calculated differently for each sector depending on sector-specific needs and priorities. Most recovery activities are concentrated in 2012 (87 percent) and 2013 (6 percent). Examples in the livestock sector include activities such as establishing and maintaining strategic livestock feed reserves in the ASALs, and rehabilitation of the resource-base in rangelands through reseeding and water development. For agriculture, recovery needs include the provision of seeds for drought tolerant crops, fertilizer subidies, water harvesting, and the construction of water pans, among other things.

Table 6 identifies the recovery and reconstruction needs as well as the indicative additional DRR needs approximated by year.[6]

**Table 6 Recovery, reconstruction, and DRR needs arising from the drought, by year**

| Year | Recovery | Reconstruction | Total | DRR |
|---|---|---|---|---|
| 2012 | 74,808.1 | 51,729.0 | 126,537.1 | 59,009.3 |
| 2013 | 5,086.5 | 15,009.1 | 20,095.6 | 54,641.6 |
| 2014 | 2,729.9 | 2,460.8 | 5,190.7 | 41,668.7 |
| 2015 | 2,674.5 | - | 2,674.5 | 14,053.0 |
| 2016 | 1,069.0 | - | 1,069.0 | 11,862.7 |
| Total | 86,368.0 | 69,198.9 | 155,566.9 | 181,235.3 |

[6] This is an estimate as not all sector needs have been disaggregated by year.

Recovery needs are concentrated heavily in livestock (58 percent) which is commensurate with the losses sustained in this sector (72 percent of total losses) and essential for shortening and mitigating the drought's impact in the country.

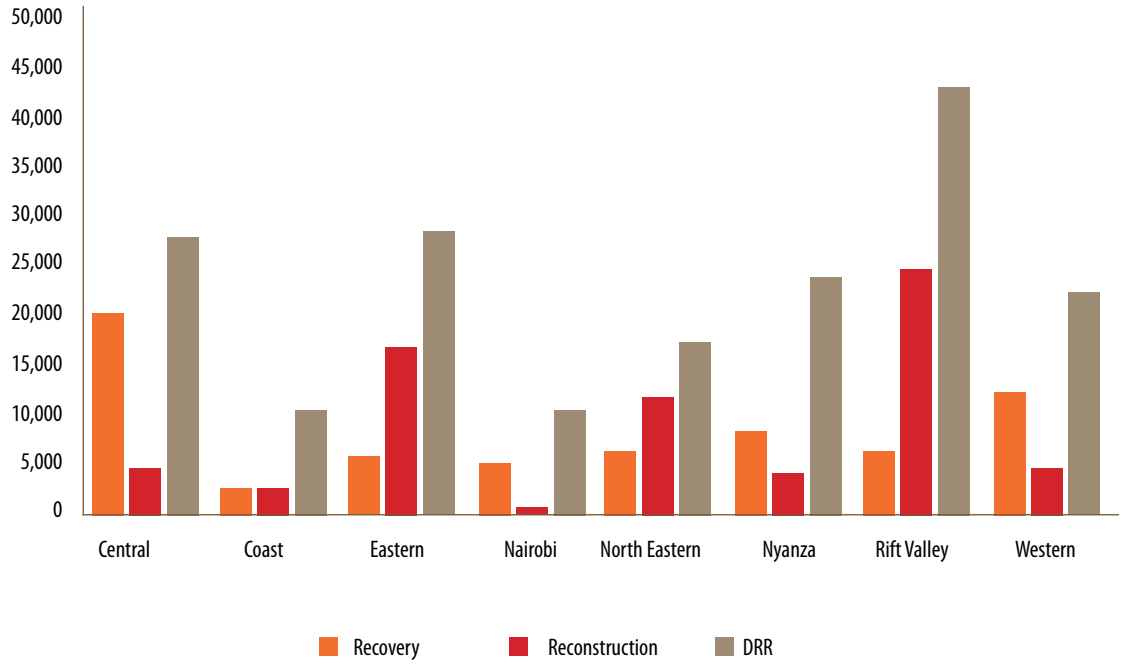
## *Reconstruction*

Reconstruction needs, as defined in the assessment, stem from the damages identified in the assessment. The total reconstruction needs identified for the drought amount to Ksh 69.2 billion.

Beyond rebuilding destroyed assets, reconstruction needs incorporate a "build-back-better" factor to ensure resilience of the intervention. For example, the water and sanitation sector identified undertaking the repair of dams and pans dried as a result of the drought and in doing so, also identified at the same time, the need to deepen them to reduce the effect of evaporation and where possible, to introduce linings to reduce seepage. Another example is the protection of water pans by fencing and constructing water points and animal watering troughs away from the structures will prevent further damage to these facilities.

Commensurate with damage value, reconstruction needs are mainly concentrated in the livestock sector (81 percent of total) that includes restoring the animal stock, and water and sanitation (18 percent), both of which sustained the brunt of damages. Reconstruction needs are highest in Rift Valley, followed by Eastern Province, and North Eastern.

**Figure 8 Reconstruction, recovery, and DRR needs arising from the 2008-2011 by province**



## *Breaking the Cycle of Drought The Role of Disaster Risk Reduction*

In light of frequently recurrent episodes of drought in the country, it has become imperative that Kenya, like other countries, concomitantly implement resilience-building measures to reduce vulnerability. Needs for mitigating and shortening the impact of the drought were addressed in recovery and for rebuilding destroyed assets (with a build-back-better approach) in reconstruction.

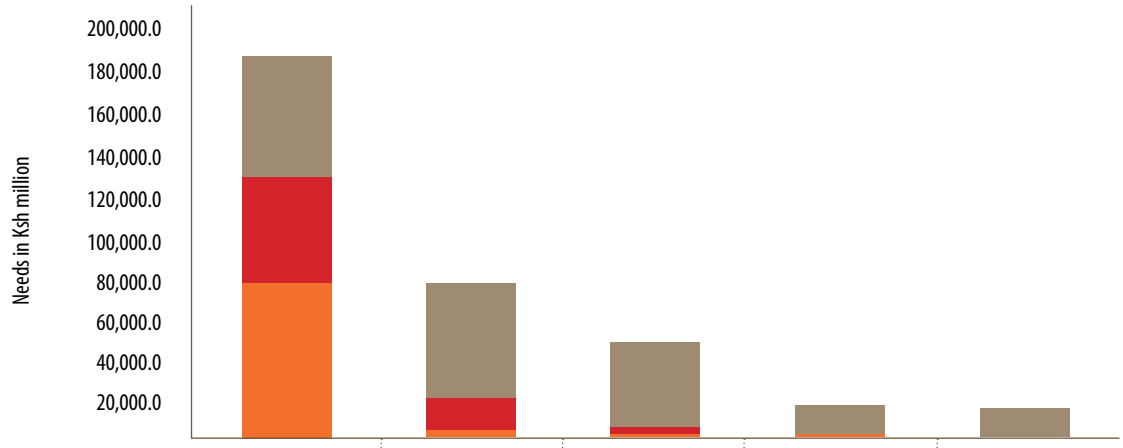
While all sectors include disaster risk reduction, there are interventions above these which sectors identified as critical needs and have been grouped together in disaster risk reduction. In this exercise, PDNA teams have undertaken the first step in analyzing DRR needs in respective sectors though the identification of key projects and programs with indicative costing. This is neither intended to be exhaustive nor final however, these could form the basis of dialogue, evaluation, and prioritization in Kenya going forward.

The total DRR needs have been estimated at Ksh 184.8 billion spread out from 2012-2016 as shown in Figure 9.

DRR interventions cover a broad range of activities across sectors. In agriculture, for example, DRR interventions are aimed at building the resilience of farmers to ensure food security through increasing areas under irrigation, warehouse receipts, improving value additions, and improving extension service coverage in development programmes.

Corresponding with the impact analysis, the DRR need for the livestock sector constitutes the largest share (46 percent), followed by water and sanitation (43 percent), and agriculture (7 percent). All provinces have identified DRR needs with Rift Valley, Eastern, and Central indicating the largest share of identified DRR needs.

**Figure 9 Reconstruction, Recovery, and DRR Needs by Year**




| | 2012 | 2015 | 2014 | 2015 | 2016 |
|---|---|---|---|---|---|
| DRR | 59,009.3 | 54,641.6 | 41,668.7 | 14,053.0 | 11,862.7 |
| Reconstruction | 51,729.0 | 15,009.1 | 2,460.8 | – | – |
| Recovery | 74,808.1 | 5,086.5 | 2,729.9 | 2,674.5 | 1,069.0 |

In terms of cost per year, the DRR needs identified average to approximately Ksh 36.2 billion compared with the average cost of impact being Ksh 242.1 billion per year. Therefore, proactively investing in DRR interventions may not only reduce the long-term vulnerability to droughts but may also minimize the need for emergency humanitarian spending as well as the magnitude of recovery and reconstruction costs outlined. If analyzed at the individual level, the drought impact was approximately Ksh 25,086 per capita which is far greater than the cost of disaster risk reduction at Ksh 8833 per capita.[7] This is an illustrative example since a full and detailed evaluation of projects and programs with costing is yet to be completed. This however provides some indication of the potential benefits of investing in disaster risk reduction.

In addition, this is not to say that only investing in DRR needs will offset the entire costs borne from future droughts. It only demonstrate that the magnitude of DRR investment needs identified in this preliminary review are far less than the costs that arise from droughts in the country. For DRR interventions to be successful, they cannot be viewed in isolation and need to be paired together with the recovery and reconstruction needs identified, without which, communities will not be able to fully recover from the effects of the 2008-2011 drought.

Finally, many interventions identified by teams are based on existing sector priorities and programming. Therefore, a thorough review of these and other needs against current programming as well as prioritization is essential going forward.

[7] Population of 38,610,097 was taken from the Kenya 2009 Census.

# *7 Key* Messages

1. **A drought occurred from 2008 to 2011 in Kenya with varying durations and intensities across different regions.** From 2008-2011, Kenya experienced a meteorological drought with lower-than-normal precipitation duration and intensities at various times; an agricultural drought with inadequate soil moisture to meet the needs of various crops in the country; a hydrological drought with deficiencies in the availability of surface and groundwater supplies over periods of time; and a socio-economic drought with physical water shortages affecting the health, well-being, and quality of life of communities across the country.

2. **The overall impact of the 2008-2011 drought in Kenya is estimated at Ksh 968.6 billion (US$12.1 billion).** This includes Ksh 64.4 billion (US$805.6 million) for the destruction of physical and durable assets, and Ksh 904.1 billion (US$11.3 billion) for losses in the flows of the economy. The most affected sector was livestock (Ksh 699.3 billion), followed by agriculture (Ksh 121.1 billion). The highest values of per capita damage and losses occurred in provinces where the HDI is lowest. The economic impact of the drought is estimated to have slowed down the growth of the country´s economy by an average of 2.8 percent per year.

3. **The total needs for recovery and reconstruction amount to Ksh 156.2 billion (US$1.7 billion). Towards greater resilience building, an additional Ksh 184.8 billion (US$2.1 billion) has been identified as disaster risk reduction needs.** The assessment has identified recovery needs at Ksh 86.9 billion (US$990 million), and reconstruction at Ksh 69.2 billion (US$788.4 million). The major share of needs are consistent with impacts and concentrated in livestock, water and sanitation, and agriculture. All needs identified are based on existing sector priorities with some perhaps already planned or ongoing as part of programming. Therefore, a thorough review of these and other needs against current budgeting is essential in taking forward these recommendations.

4. **Integration with Kenya Vision 2030.** The PDNA findings echo those of Kenya Vision 2030. The need going forward is for fully integrating them, evaluating how existing programming can be scaled and new programs fast-tracked, while exploring innovative approaches for implementation and service delivery.

5. **Key role of institutions**. The recently gazetted National Drought Management Authority (NDMA) and the National Drought Contingency Fund (NDCF) have a central role in policy and programme implementation. Establishing and supporting the NDMA and NDCF are key elements of institutionalizing improved drought management which needs to be prioritized.

6. **Institutionalization of the PDNA** With this PDNA, a methodology has been put in place for assessing the effects and impacts of droughts and other disasters. Going forward, the PDNA methodology and process should be institutionalized through its integration with existing assessment processes (e.g. long and short rains assessments). For this, it is essential that the capacity that has been built through this exercise be sustained and enhanced going forward.

## 7. The Way Forward

**Use of the PDNA as process for partner engagement towards strengthening drought resilience in Kenya**. The implementation of the PDNA recommendations must not be a separate, parallel process but an integral part of all ongoing and future responses to droughts and other disasters.

**Development of a robust process for taking forward the recommendations of the PDNA** including identification of the institutions that will lead this process, appointment of a steering committee, processes to evaluate the needs presented, and monitoring and evaluation

**With recurrent droughts in Kenya, institutionalizing a process for assessing the impacts of droughts** based on this PDNA as well as taking forward the recommendations that come out of them

**Evaluating disaster risk reduction programming needs based on the first identification of programs presented in the PDNA** including budgetary and programming reviews, consultations, and the development and implementation of a comprehensive recovery and drought risk management framework

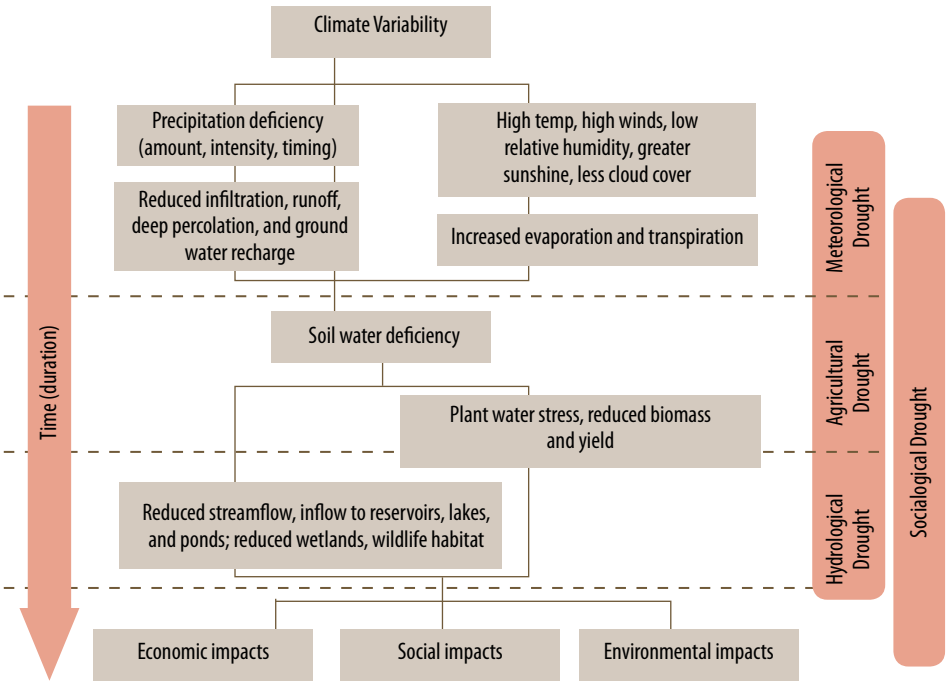
# *The 2008-2011* drought

## *Overview*

There is no universally accepted single definition for a drought. The most commonly used drought definitions are based on meteorological, agricultural, hydrological and socioeconomic considerations.

A meteorological drought refers to a period of time when lower-than-normal precipitation duration and/or intensity occurs. An agricultural drought occurs when there is inadequate soil moisture to meet the needs of crops, livestock and other dry-land agricultural operations. A hydrological drought refers to deficiencies in the availability of surface and groundwater supplies. A socio-economic drought, occurs when physical water shortages start to affect the health, well-being, and quality of life of the people, or when the drought starts to affect the supply and demand of the production of goods and services. These stages of drought are lagged and sequenced as shown in Figure 10.

**Figure 10 Stages of Drought**




*Source UNISDR 2009*

## *Rainfall Analysis*

Kenya has twelve distinct rainfall zones, each of which has different amounts and characteristics of rainfall regimes (See Figure 11). Relevant information for representative stations that measure rainfall on a daily basis and which have consistent, reliable information for at least 50 years, was made available by the Kenya Meteorological Service and by ICPAC.

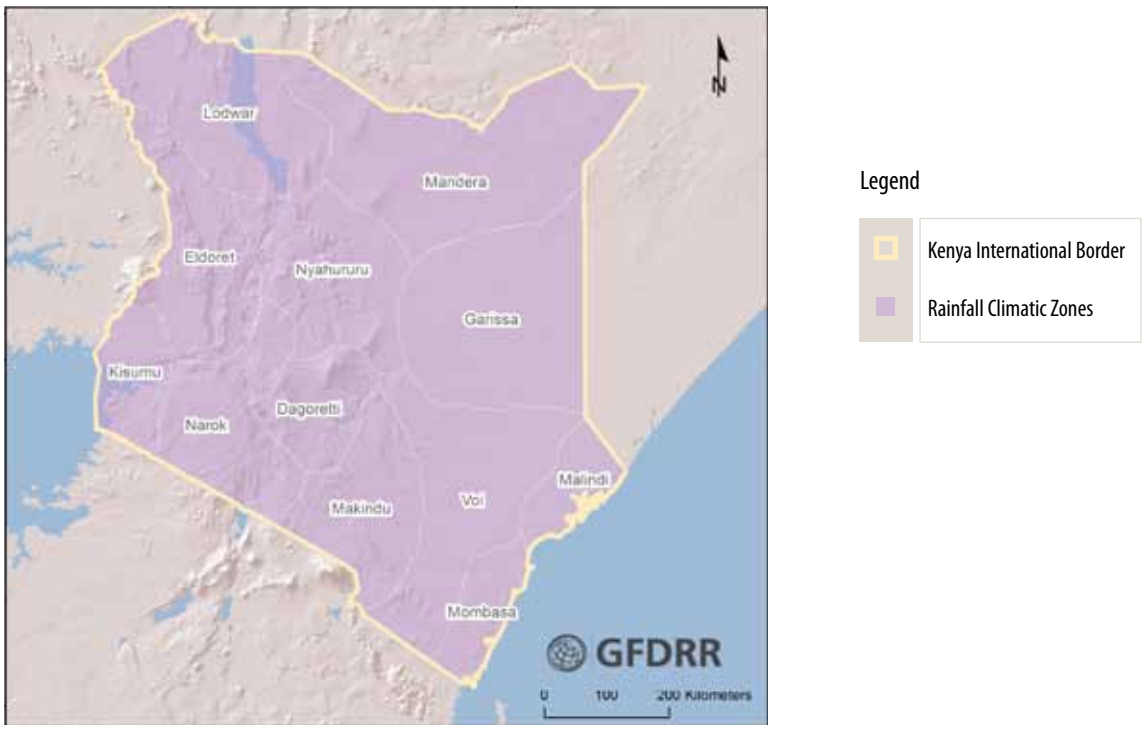
### Annual rainfall

An analysis of annual rainfall values for the above-mentioned different rainfall zones shows that annual rainfall was below the long-term average during 2008, 2009 and 2010, as well as in the first half of 2011. The degree of rainfall deficits that occurred in those years varied among the different rainfall zones, as well as from one year to another.

To illustrate such variation, Figure 12 shows information for the rainfall station located in Makindu covering the 50-year period between 1960 and 2010. It is observed that at this location, the long-term average rainfall is 1,070 millimeters per year, and that in the years from 2008 to 2010 there was a deficit in the availability of rainfall similar to what has occurred in the past (i.e. 1974-77, 1991-94, and 2004-06). Furthermore, the long-term trend in the occurrence of successive dry years may be observed in Figure 13 showing the cumulative departure of annual rainfall from its long-term average value.

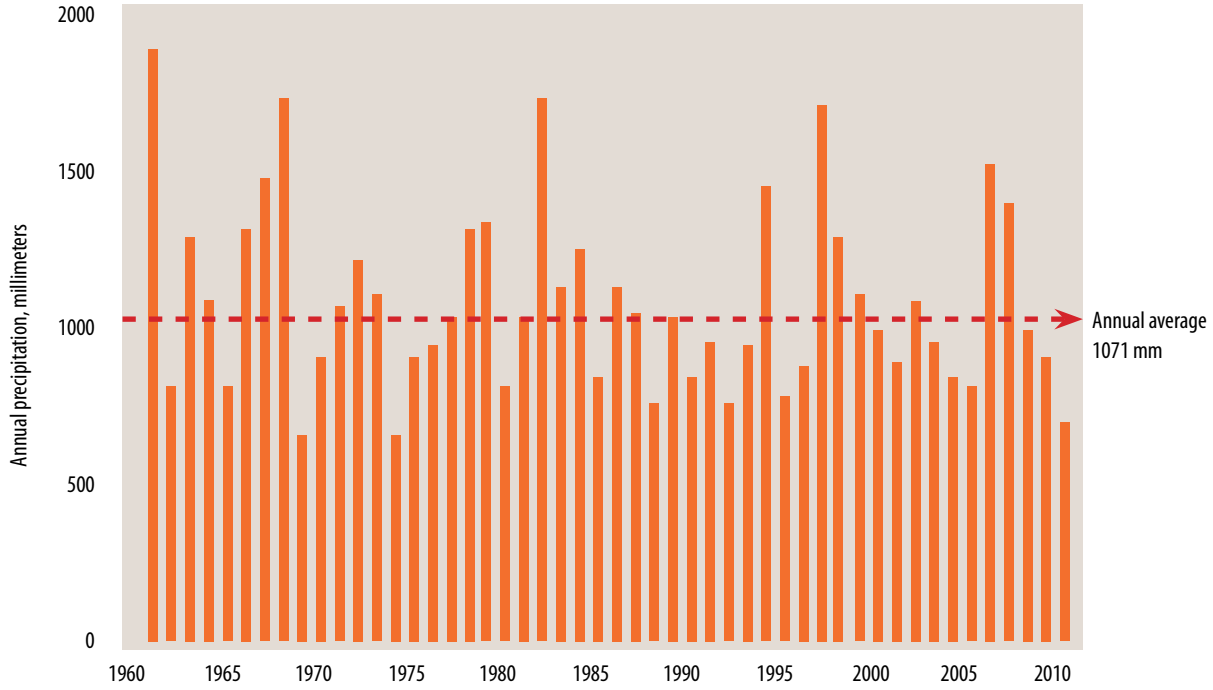
This analysis clearly shows a downward rainfall trend, or occurrence of successive dry years during different periods.

**Figure 11 Map showing rainfall climatic zones of Kenya**



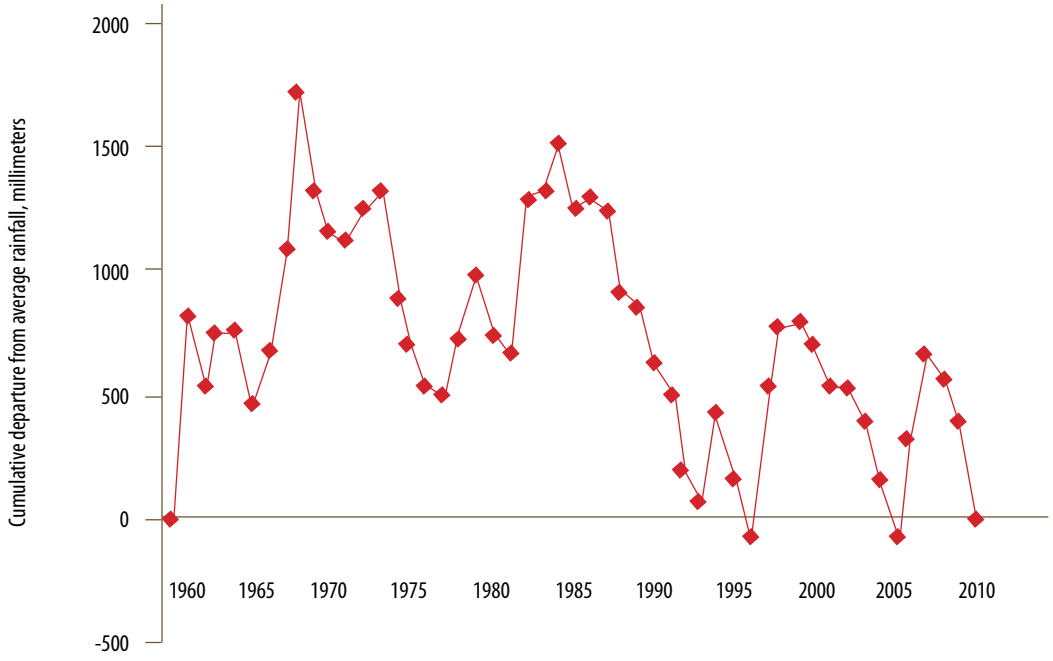

*Source Information provided by Kenya Meteorological Service and ICPAC*

**Figure 12 Variation of annual rainfall at Makindu in comparison to long-term annual average**




*Source Estimations of Assessment Team using official rainfall information*

**Figure 13 Long-term trends in occurrence of successive wet and dry years at Makindu**




*Source Estimations of Assessment Team using official rainfall information*

A full analysis was conducted for representative stations in the twelve rainfall zones of the country to define how severe the rainfall deficits had been in the years 2008, 2009 and 2010. Results of this analysis are summarized in the following table that shows the extent of the rainfall deficit per rainfall zone expressed as percentage of the observed actual annual rainfall versus the long-term annual average.

Based on this analysis, the following can be concluded

- The Mombasa rainfall zone received less than 75 per cent of normal annual rainfall from 2008 to 2010
- The coastal zone of Malindi received decreased annual rainfall in each of the calendar years, ending at 65 per cent in 2010
- The Makindu rainfall zone was affected in the entire three-year period, receiving annual rainfall values below 60 percent in 2008 and 2009, and recovering slightly in 2010
- Rainfall zones Dagoretti and Narok received less than 80 per cent of annual rainfall in 2008 and 2009, and received more than the annual average in 2010;



**Table 7 Annual rainfall deficit in rainfall zones of Kenya 2008 to 2010**

| Rainfall Zone | Per cent of average annual rainfall | | |
|---|---|---|---|
| | 2008 | 2009 | 2010 |
| Lodwar | 60.4 | 84.5 | 116.6 |
| Mandera | 72.7 | 92.5 | 137.5 |
| Garissa | 76.0 | 78.8 | 109.6 |
| Voi | 75.4 | 102.6 | 77.2 |
| Malindi | 91.8 | 83.6 | 64.1 |
| Mombasa | 73.0 | 65.2 | 68.8 |
| Makindu | 65.0 | 53.8 | 87.6 |
| Dagoretti | 76.2 | 76.2 | 124.6 |
| Nakuru | 84.9 | 76.3 | 146.0 |
| Eldoret | 90.8 | 79.9 | 121.5 |
| Narok | 79.5 | 74.2 | 101.6 |
| Kisumu | 87.0 | 100.9 | 72.5 |

*Source Estimations of Assessment Team using official rainfall information*

- Nyahururu zone faced 85 per cent of normal rain in 2008, about 75 per cent in 2009, and above-average rain in 2010
- Rainfall zones located in the agro-pastoral areas of Garissa faced rainfall just below 80 per cent of average in 2008 and 2009, and recovered fully in 2010
- Mandera zone received less than 75 per cent of normal rainfall in 2008, almost normal in 2009 and above normal in 2010;
- Lodwar faced a significant annual deficit in 2008, a slightly improved situation in 2009 and above-than-normal rain in 2010;
- Voi zone received annual rainfall of about 75 per cent in both 2008 and 2010, and normal rainfall in 2009.

Figures 14-16 show the variation of the rainfall deficit in each calendar year from 2008 to 2010, to illustrate more clearly the geographical coverage of the drought

**Figure 14 Map showing the rainfall deficit versus average annual rainfall in Kenya rainfall zones in 2008**

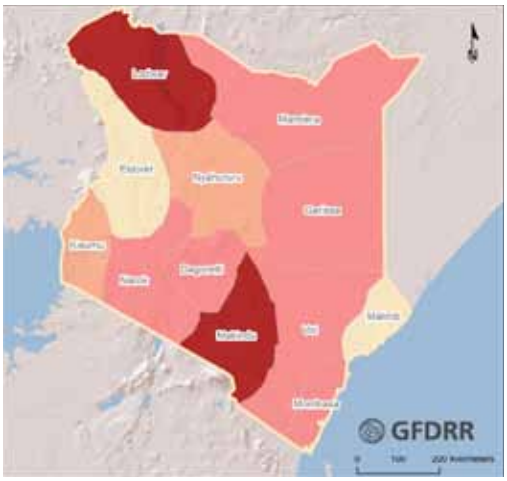
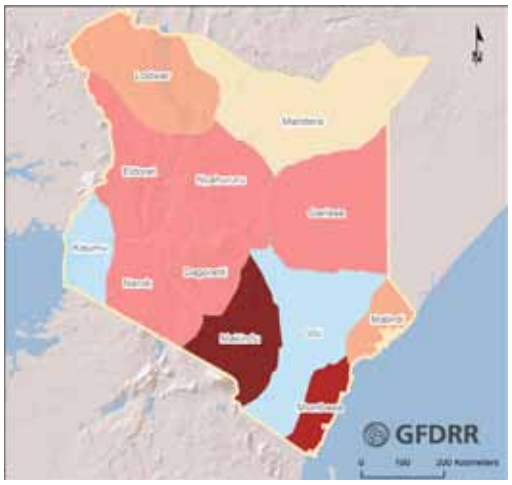
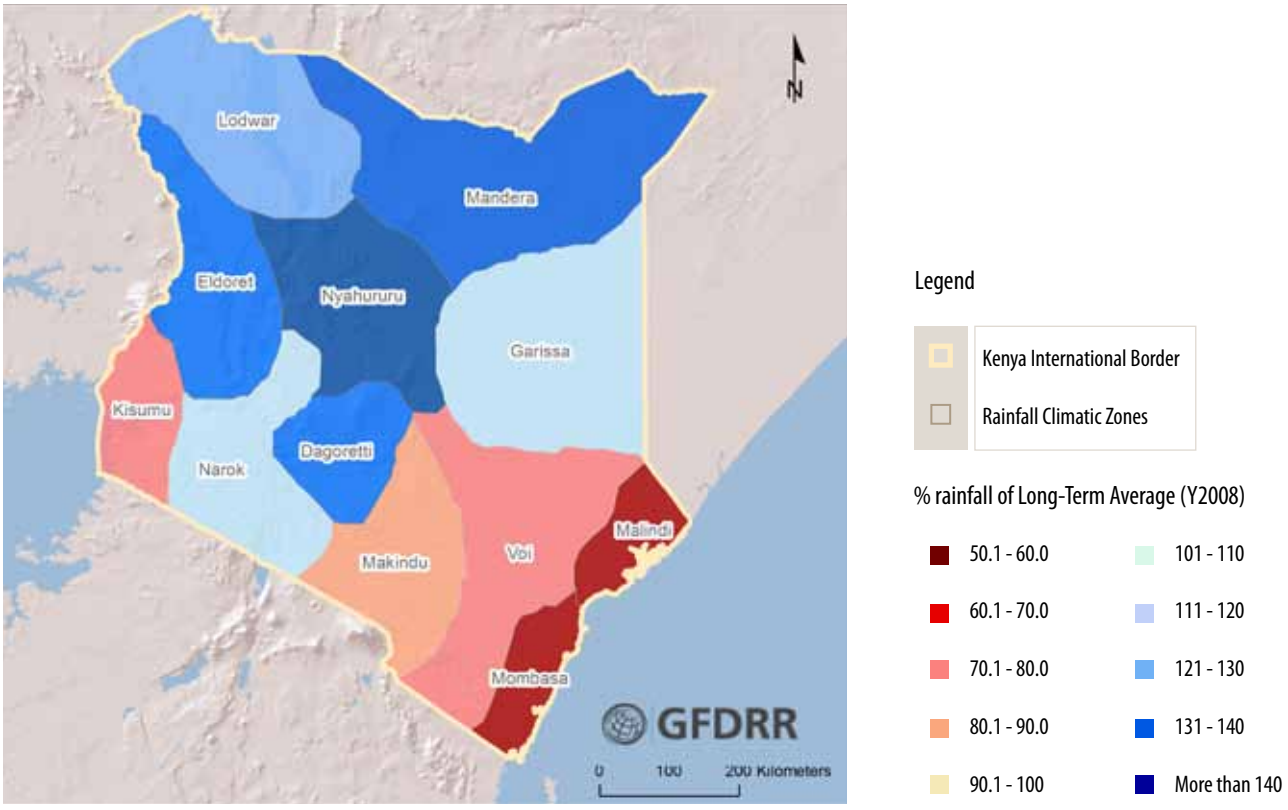



**Figure 15 Map showing the rainfall deficit versus average annual rainfall in Kenya rainfall zones in 2009**




*Source Estimations of Assessment Team using official rainfall information*

**Figure 16 Map showing the rainfall deficit versus average annual rainfall in Kenya rainfall zones in 2010**




*Source Estimations of Assessment Team using official rainfall information*

### Monthly rainfall

Since the annual values and distribution of rainfall are not sufficient to properly define the times when rainfall deficits occurred that would affect availability of water to satisfy individual water demands by consumer-sectors, a further qualitative analysis of monthly rainfall availability was also undertaken. For this, monthly rainfall data for 2008, 2009, and 2010 and for the first half of 2011 was obtained and compared with the 50-year average obtained from the Meteorological Service and from ICPAC.

Actual monthly values of rainfall for each rainfall zone in the country were compared to the 50-year monthly average values, and periods of either surplus or deficit of rainfall were determined for the entire January 2008 to July 2011 period of analysis. Table 8 shows the results of this analysis, indicating the number of months per calendar year when monthly rainfall was below the long-term monthly average values, and provides a more clear idea of the time frame for the drought in the country.



On that basis, the following can be concluded

- For the entire country, rainfall fell below the monthly average in 8 months out of 12, or 67 percent of the time in 2008;
- In 2009, the number of months showing less rainfall than the long-term monthly average increased to 9 or 75 per cent of the time
- In 2010, the number of rainfall deficit months decreased to 7.5 months (62 percent of the time); and,
- In the first half of 2011, the number of months rose significantly to 5 out of 7 months (72 percent of the time)

This is indicative of the duration of the time in each calendar year in which rainfall availability was insufficient when compared to the long-term average conditions.

**Table 8 Number of months when rainfall was below the long-term average in Kenya rainfall zones**

| Rainfall zone | Number of months with rainfall deficit in year | | | |
|---|---|---|---|---|
| | 2008 | 2009 | 2010 | 2011[8] |
| Lodwar | 8 | 8 | 8 | 6 |
| Mandera | 8 | 9 | 9 | 6 |
| Garissa | 8 | 9 | 7 | 6 |
| Voi | 9 | 8 | 8 | |
| Malindi | 7 | 10 | 10 | 6 |
| Mombasa | 9 | 10 | 8 | 6 |
| Makindu | 10 | 10 | 10 | 5 |
| Dagoretti | 8 | 9 | 5 | 4 |
| Nakuru | 8 | 9 | 8 | 4 |
| Eldoret | 7 | 9 | 6 | 4 |
| Narok | 6 | 8 | 6 | 4 |
| Kisumu | 9 | 8 | 5 | 5 |

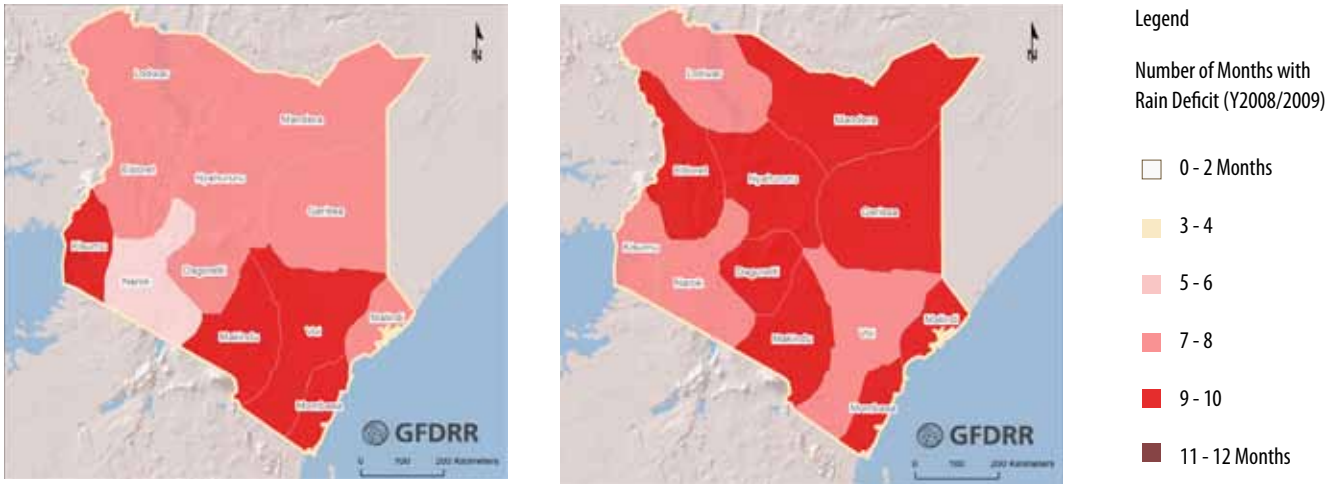
*Source Estimations of Assessment Team using official rainfall information*

[8] Covers from January to July 2011 only, for which there is available information.

The following Figures show the distribution of monthly rainfall deficits over the period from 2008 to July 2011 in the country.

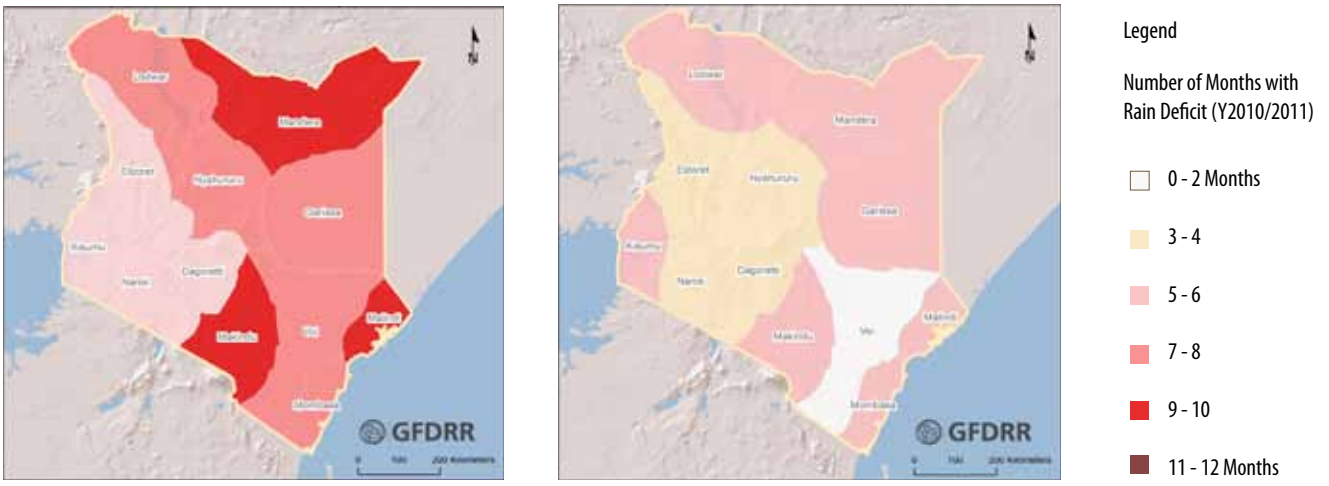
A further quantitative analysis was carried out in each of the rainfall zones of Kenya by estimating the difference between actual monthly rainfall values observed in the period between 2008 and July of 2011 and the estimated long-term average of monthly rainfall at each location. This enabled the identification of periods where actual rainfall deficits occurred in each specific rainfall zone that could be compared to the estimated water demands from each consumer-sector. Results of this analysis are shown in Figures 17 and 18 with data for the twelve different rainfall zones of Kenya.

**Figure 17 Map showing the number of months with rainfall deficit in Kenya rainfall zones in 2008 and 2009**



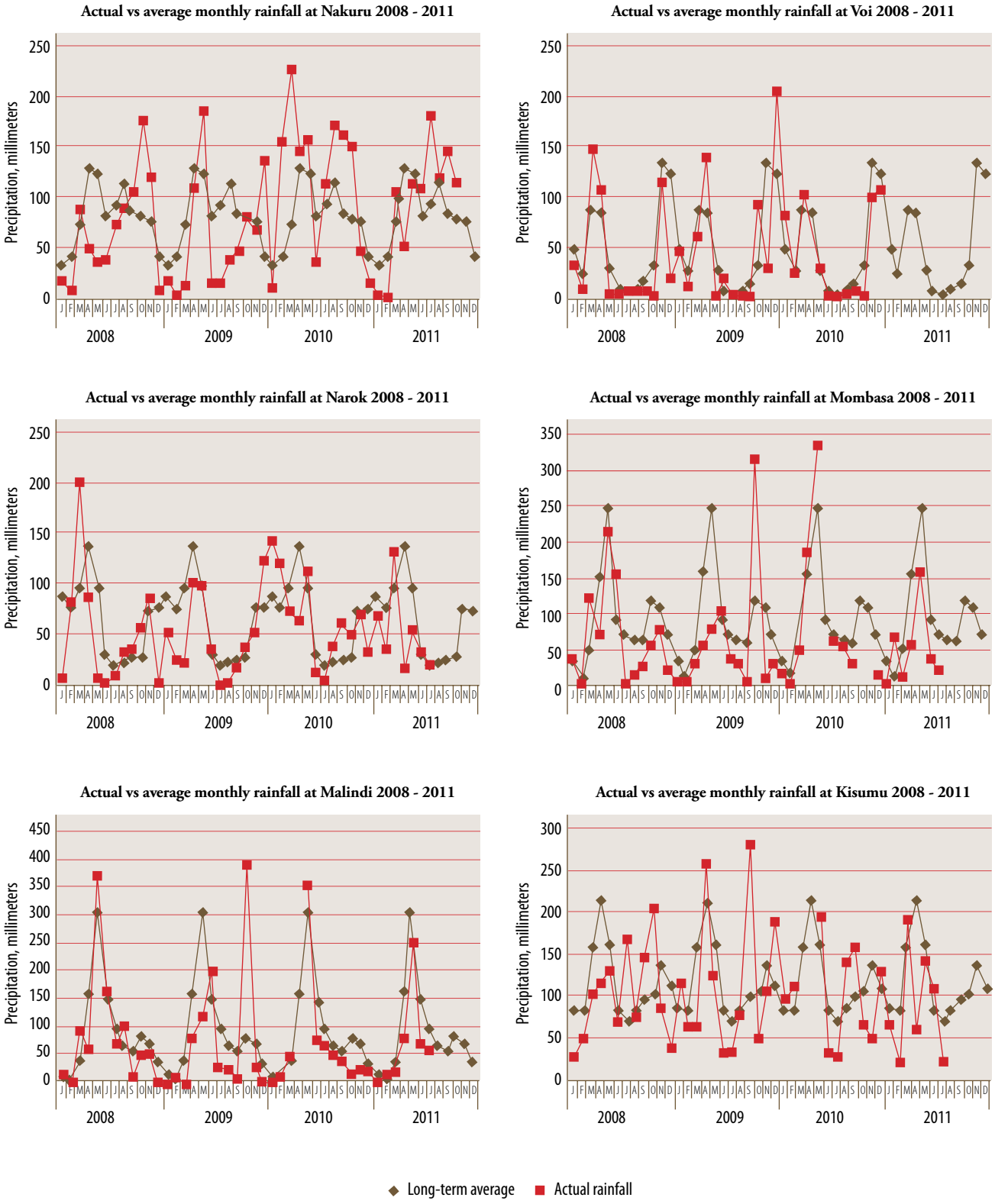

*Source Estimations of Assessment Team using official rainfall information*

**Figure 18 Map showing the number of months with rainfall deficit in Kenya rainfall zones in 2010 and 2011**



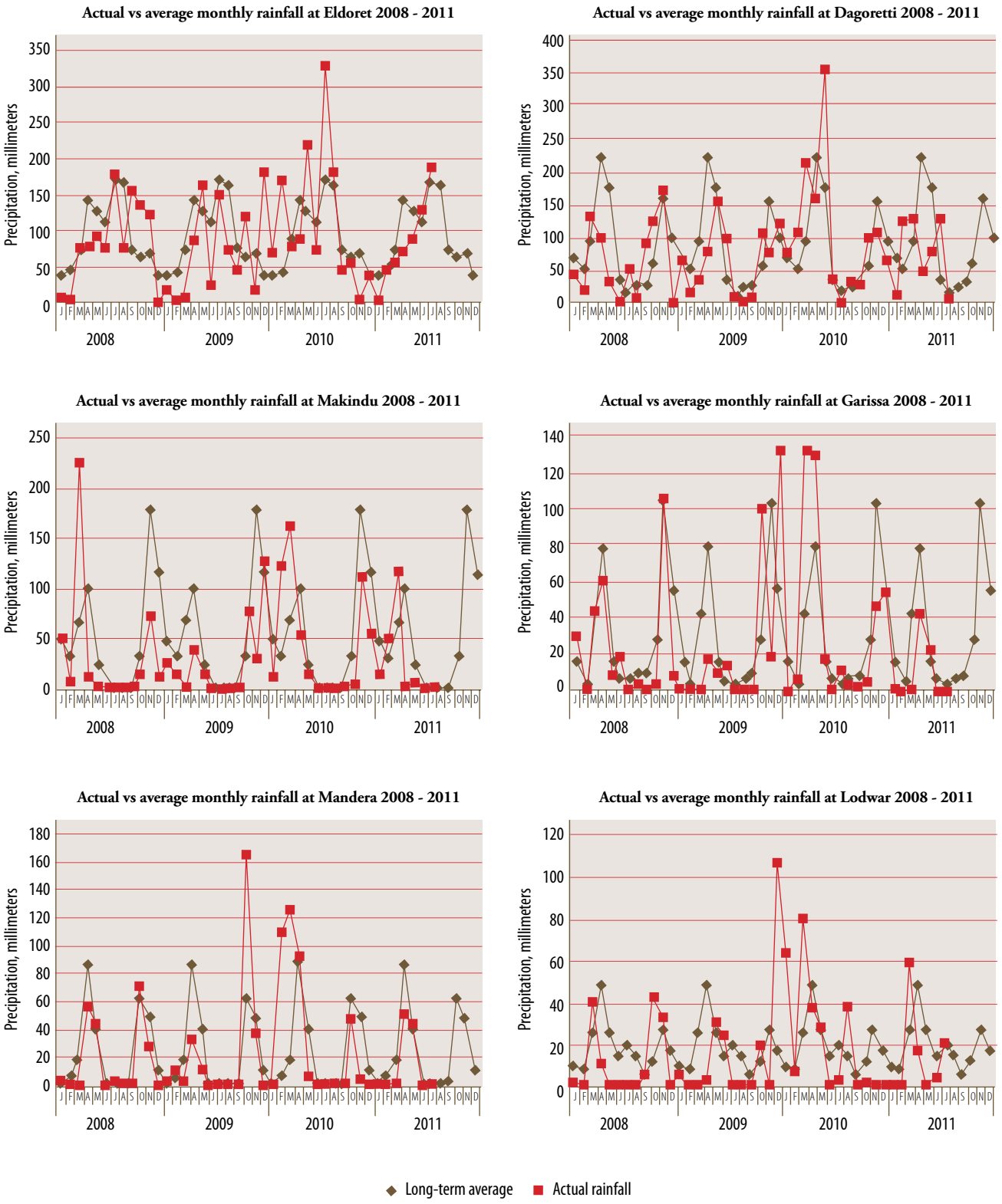

*Source Estimations of Assessment Team using official rainfall information*

**Figure 19 Composite chart showing actual periods of monthly rainfall availability deficits in Nakuru, Voi, Narok, Mombasa, Malindi and Kisimu in 2008 to 2011**




*Source Estimations of Assessment Team using official rainfall information*

**Figure 20 Composite chart showing actual periods of monthly rainfall availability deficits in Eldoretti, Dagoretti, Makindu, Garissa, Mandera and Lodwar in 2008 to 2011**




*Source Estimations of Assessment Team using official rainfall information*

Based on the above, it can be concluded that a meteorological drought occurred in Kenya, with varying intensities depending on the specific rainfall zones of the country, and lasted since 2008 and apparently ended in mid-2011. Any socio-economic impact analysis of this meteorological event should therefore cover the aforementioned time period of nearly four calendar years.

## *Water balance for selected sectors of economic activity*

After the determination of the time over which rainfall fell below the long-term average, preliminary estimations of the water balance for selected sectors of economic activity were carried to determine whether actual shortages occurred that would prevent sectors to meet water demands of the country.

### Agriculture and crops

To determine whether an agricultural drought occurred, a comparison was made between crop water requirements for growth and the availability of effective rainfall over the entire 2008 to 2011 time period.[9]

Estimations were made of crop water requirements on the basis of the normal calendar of agricultural activities for the country for two seasons the "long rains" season that goes from March to June and the "short rains" season from October to December. Potential evapotranspiration was estimated using standard procedures on the basis of existing air temperature and solar radiation information. Specific water requirements for the typical crops planted in each rainfall zone of the country were estimated on the basis of their stage of growth, and were linked to the potential evapotranspiration rates previously estimated.

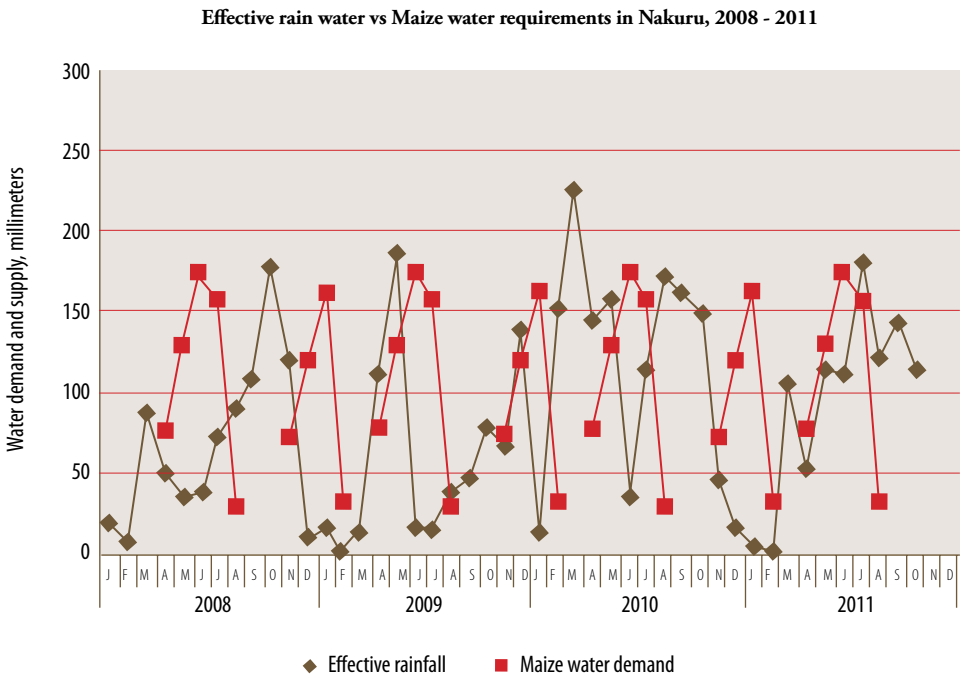
The estimated crop water demands were superimposed on the available effective rainfall for the 2008 to 2011 period, as described in the preceding section, and it was found that many seasonal crops and permanent plantations faced significant water deficits over several months in each calendar year, which caused stress on plants and resulted in productivity and production decline.

Figure 21 shows the balance between monthly rainfall and maize water requirements for 2008 to 2011 in one of the rainfall zones of Kenya. It is observed that the crop (maize) sustained water deficits in several cases in 2008, during both the long rains and short rains seasons; in 2009, during the long rains season and only partially during the short rains season; in 2010, during part of the long rains season and in the short rains season; and in 2011, partially in the long rains season only. During those periods, the maize crop did not have sufficient rain to meet its water demand for growth, which resulted in lower productivity and production, as proven by the quantities and value of the crop in each year.

Similar results were obtained when extending the analysis to other rainfall zones and to other crops, whether seasonal or permanent. Therefore, agricultural drought covered all different rainfall zones of the country beginning in 2008 and lasting through mid-2011, with different intensities.

[9] Effective rainfall was assumed as 80 percent of observed monthly rainfall, after deducting runoff and evaporation.

**Figure 21 Monthly maize water requirements versus monthly rainfall at Nakuru, 2008 to 2011**




*Source Estimations by Assessment Team on basis of official information*

## Hydropower for electricity generation

Electricity generation in Kenya relies heavily on hydropower production, supported by geothermal energy sources and several thermal power units that use either steam or diesel. In addition, there exist some wind power units, and small imports of electricity from neighboring Uganda. The breakdown of electricity production by source is shown in Table 9 below.

**Table 9 Electricity generation by source in Kenya 2005 to 2010.**

| | Year[10] | | | | | |
|---|---|---|---|---|---|---|
| Energy source | 2005/06 | 2006/07 | 2007/08 | 2008/09 | 2009/10 | 2010/11 |
| Hydropower | 3,025 | 3,277 | 3,488 | 2,849 | 2,170 | 3,427 |
| Geothermal | 1,003 | 1,012 | 1,020 | 1,179 | 1,339 | 1,453 |
| Thermal | 1,638 | 1,850 | 1,832 | 2,413 | 3,109 | 2,374 |
| Other sources | 31 | 30 | 45 | 48 | 74 | 49 |
| Total | 5,697 | 6,169 | 6,385 | 6,489 | 6,692 | 7,303 |

*Source Assessment Team estimations based on official Government information*

[10] The year used here refers to the Kenyan fiscal year from July 1 of the first calendar year to June 31 of the second calendar year.

The major hydropower plants are located on the Tana river and utilize water stored mainly in Masinga dam. When annual rainfall began its decline in 2008, water levels at this dam began declining as well until it was not feasible to continue producing electricity at normal rates. Thus, in 2008 and 2009 hydropower production was limited in quantity, and only started recovering to near normal levels in mid-2010 and then began declining again following the rainfall pattern, as may be observed in Figure 22.

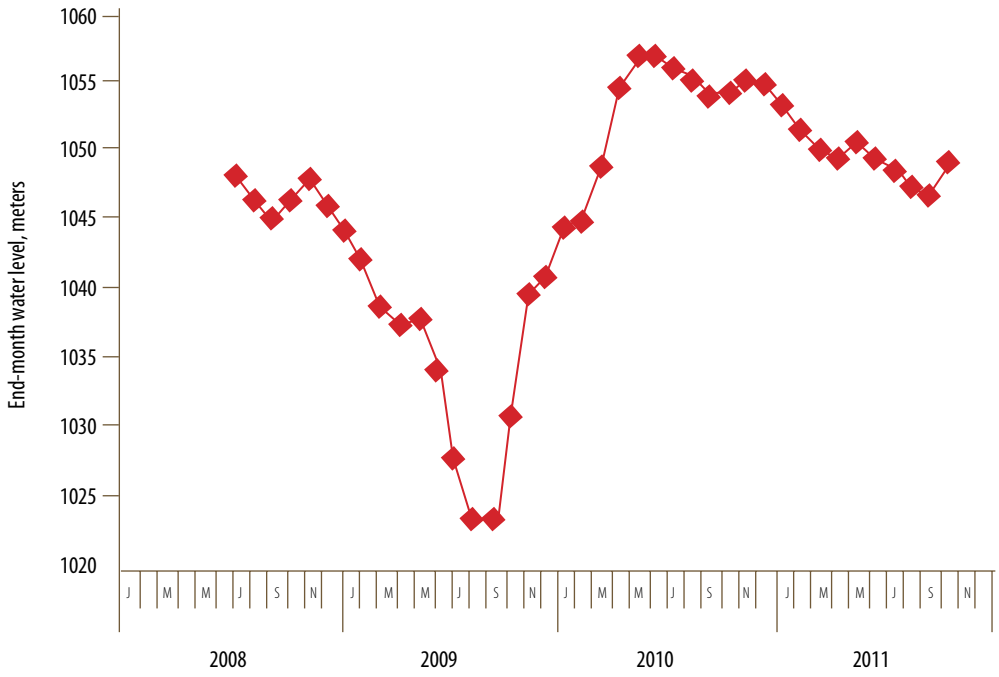
When the drought caused water levels and hydropower production decline, electricity generation in thermal power plants had to be increased in order to try and meet consumer demands (further discussed in the energy sector annex). Despite this increase in thermal power generation, some electricity rationing and load shedding was imposed which had a negative impact on industrial and other sector production. The growth in thermal power generation resulted in an increase in the average cost of power generation for the entire system including an impact on the balance of payments due to the need to import diesel fuel.

As a result, there is no doubt that the rainfall deficits that happened in Kenya in 2008 to 2011 caused negative effects and that a hydrological drought occurred in the country.

### Effects on other sectors

In different sectors of economic activity between 2008 and 2011, a clear correlation has been found between rainfall variations and deficits as compared with quantity and value of production of goods and services. This leads to the conclusion that a socio-economic drought occurred during that period. Details of these relationships will be described in the report section dealing with damage and losses caused by the drought.

**Figure 22 Impact of drought on water levels at Masinga Dam, 2008 to 2011**



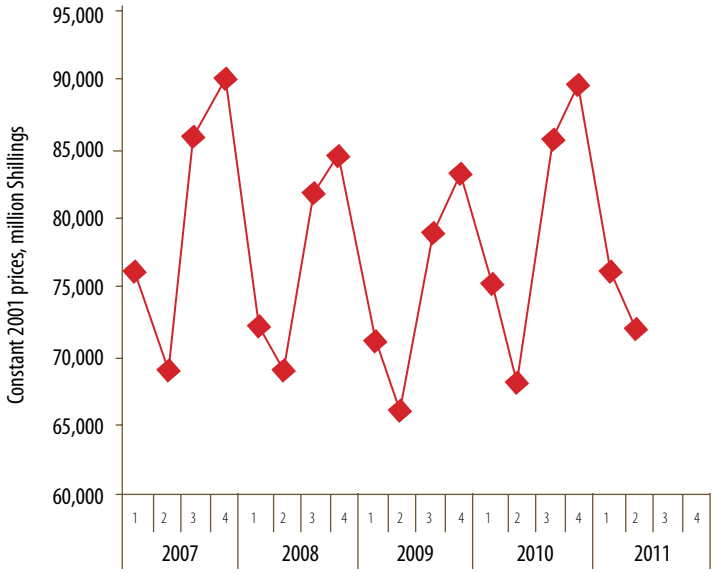

*Source Estimations by Assessment Team on basis of official information*

### Production of agriculture crops

The primary production of food and industrial crops declined in clear response to rainfall deficits caused by the drought in the entire period between 2008 and 2011. Figure 23 plots the quarterly value of such production expressed in constant 2001 prices (to eliminate unit price variations from the analysis).

As expected from this analysis, there is a seasonal variation in the value of crop production. Nevertheless, it is clearly observed that the peak and bottom quarterly values achieved in 2007 – which is the baseline year – decline in 2008 and 2009, and recover in 2010. This provides evidence that there is a direct impact between rainfall decline induced by the drought and crop production decline, which will result in a corresponding fall in agricultural producers' income.

**Figure 23 Variation of quarterly value of crop production in Kenya, 2007 to 2011**

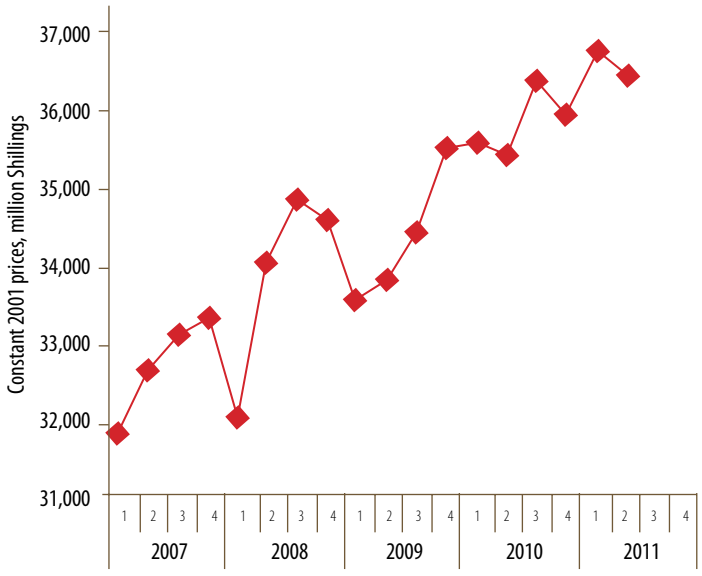



*Source Estimations of Assessment Team using official rainfall information*

### Food-processing industry

A similar analysis as described above was conducted for the value of quarterly production in the food-processing industry subsector. The data in Figure 24 shows that there is a decline in the quarterly production of the sub-sector beginning in early 2008, and similar although less pronounced declines in the subsequent years, which are clearly associated with the primary loss in production of food and industrial crops caused by the drought. Instead of following an increasing trend of production, these declines in food processing output occur right after the harvests of long rains crops. More details of the analysis will of course be provided in the section on damage and losses for the sector, but the information available here shows that the decline in rainfall due to the drought caused at least indirectly, a decline in the processing of food product activities, and a corresponding drop in personal income for the people that work in this sub-sector.

**Figure 24 Variation of quarterly value of food processing in Kenya, 2007 to 2011**

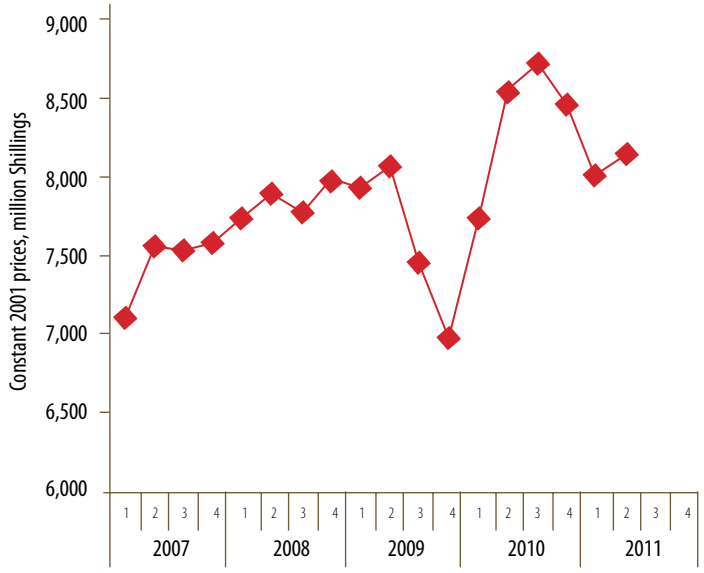



*Source Estimations of Assessment Team using official rainfall information*

**Electricity and water supply sectors**

A similar analysis was conducted with quarterly value of electricity and water supply production. Using constant 2001 prices to eliminate the effect of inflation, Figure 25 shows the variation in the value of services production for the sector in the period between 2007 and 2011. In the case of these service sectors, the impact of the drought may be observed to have had a delay in its manifestation, partially caused by the dampening effect of water storage in Masinga Dam which is only evident in the third and fourth quarters of 2009 as well as in the same quarters for 2010 with a recovery period in between caused by the improved rainfall rates of mid-2010.

**Figure 25 Variation of quarterly value of electricity and water service production in Kenya, 2007 to 2011**




*Source Estimations of Assessment Team using official rainfall information*

While the larger weight of the value of the production in this service sector corresponds to that of electricity production, since water service has a limited economic weight, the above analysis shows that – despite the already-mentioned delay in the negative effects which is due to the storage factor in Masinga Dam – the drought did induce a negative effect and impact on the availability of essential services to the inhabitants of the entire country, thus giving arguments to the statement that there was a socio-economic drought in Kenya during the period of analysis.

This conclusion is fully supported in the subsequent sections of this report where quantitative estimations are made on the negative effects and impacts of the drought on the overall economy and living conditions of the country.

## *Human Impacts*

The various early warning and assessment reports highlight a number of contributory causes of the humanitarian crisis that unfurled between 2008 and 2011. While drought was the immediate trigger for the crisis, this was compounded by a number of other shocks. The consequences of the post-election violence following the 2008 elections were evident through 2008 and part of 2009. Abnormally high food and fuel prices – heavily influenced by global market trends – significantly reduced purchasing power over much of the period. These impacts were felt countrywide but perhaps most keenly in urban areas. Recurrent livestock disease outbreaks (PPR, RVF) occurred, along with a major aflotoxin infestation of maize in 2010. Security remained problematic – particularly in the pastoral districts –partly driven by competition over declining grazing and water resources, and also the spillover effects of long-term instability in Somalia.

In addition, the areas most keenly affected by the drought – the Arid and Semi Arid Lands (ASALs) - are characterized by under development and high vulnerability. The ASALs have the lowest human development indicators and the highest incidence of poverty in Kenya. More than 60 percent of the population lives below the poverty line. Pastoral production systems depend on mobile herding which

are increasingly constrained through changes in land tenure systems and demographic pressures. There are limited options for livelihood diversification, inadequate social and physical infrastructure, poor marketing systems, and low levels of investment. In consequence, the extended 2008-2011 drought quickly progressed to a major humanitarian emergency, characterized by acute malnutrition rates far in excess of accepted international emergency thresholds.

The progressive evolution of the needs arising from the crisis is summarized in Figure 26. This shows the number of pastoralist, agro-pastorlists and marginal agriculturalists assessed as requiring emergency assistance by the GoK led assessments.[11] Drought related emergency needs rose through 2008 and initially peaked in mid 2009 at 3.8 million. After an incomplete recovery in 2010, assessed needs rose again rapidly in 2011 to 3.5 million food insecure.

## *Immediate Responses*

The immediate response addressed multiple aspects of this complex and multi-layered disaster. Consequently, it is difficult to isolate the 'drought' response. The overall scale of the response – and form of assistance - tracked the progression of the crisis over time.

### Government Response

The Government was responsible for coordinating the overall response to the crisis through structures at both the national and district levels. This coordination promoted the effective integration of Government and partner resources to the crisis.

Using available budget resources, the Government directly responded to needs in a range of sectors. Responses were tailored to the stage of the drought cycle and included early mitigation, emergency response and early recovery actions, and included the main sectors and activities as follows

- Water - Water trucking, fuel subsidy to boreholes, repair of equipment, water quality
- Livestock - Livestock offtake, animal health, fodder supply

**Figure 26 Number of pastoralists, agro-pastoralists and marginal agriculturalists assessed as requiring emergency assistance (Source Long and Short Rains Assessments)**


*Source Estimations by Assessment Team on basis of official information*

[11] The needs assessments also identified othe groups as requiring emergency assistance – for example significant urban populations mostly affected by global food and fuel and price rises, rather than drought.

- Health and nutrition - Increased surveillance, screening, supplementary and therapeutic feeding
- Agriculture - Agricultural inputs supply
- Food Aid - General food distributions, home grown school feeding

Funds of KSh 9.4 billion (US$160m) – drawn from national contingency funds and budget reallocations – were allocated by the Ministry of Finance in July 2011 to support drought response by line ministries. Other interventions were designed to improve access to staple foods for rural and urban groups – especially those impacted by the abnormally high prices. In December 2008, an agreement was made with millers to limit retail maize prices – especially in highly food insecure locations – in return for subsidized wholesale supplies. However, this arrangement proved unsustainable. As an alternative policy response the maize import tariff was waived between May and December 2011.

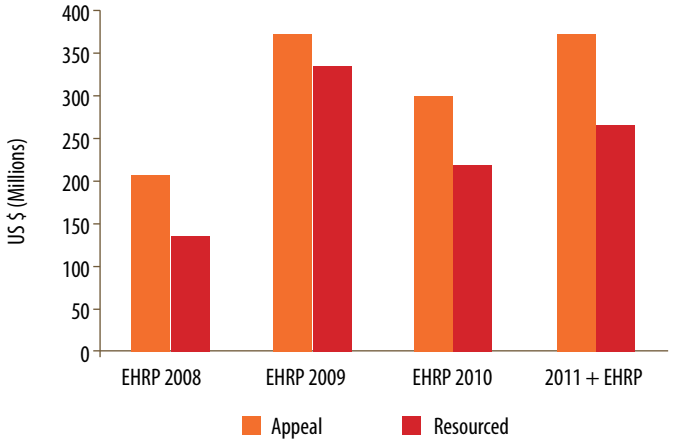
Direct food aid was funded over this period under the Ministry of Special Programmes. This targeted variable proportions of chronically and acutely, food insecure caseloads. The food pipeline was organized through the National Cereals and Produce Board (NCPB). As the scale of the crisis escalated this was supplemented by a parallel pipeline was also operated by WFP supported with both GoK and international humanitarian resources.

It can be added that the contingency fund of the Arid Lands Resource Management Project (ALRMP) also provided an important source of flexible finance for early mitigation activities.[12] This funding was used to support implementation by sectoral ministries and leverage line ministry budgets. The majority of this support was used to maintain water sources, with significant support to livestock, coordination, and livelihood based food security interventions. ALRMP district level funding ceased in early 2010 with the suspension of the contingency fund.

### Response by Partners

Given the scale of the disaster, the Government requested the international community to provide large-scale humanitarian assistance. The majority of this funding was presented in the form of Consolidated Annual Appeals (CAP). The CAP appeals include both emergency response and early recovery projects. The total amounts requested, and the level of response, are given in Figure 27.

**Figure 27 Response to UN Kenya Emergency Humanitarian Response Programme (EHRP) Consolidated Appeals (CAP)**




[12] This does not include food aid.

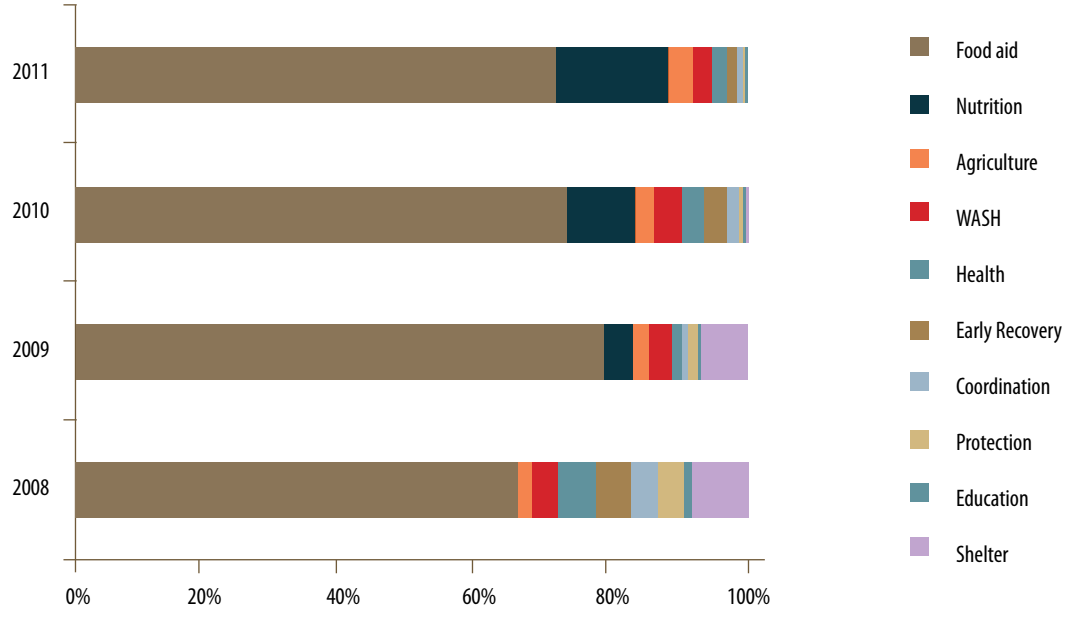
In total, over the four years approximately US$1.26 billion was requested in humanitarian aid for drought response and donors responded with recorded contributions of US$960 million. This figure is an underestimate of the actual amount as considerable amounts were either contributed outside of the appeal framework, such as direct Government to Government support – or not reported to the United Nations Office for the Coordination of Humanitarian Affairs. (UN-OCHA).

The top donors over this period were the United States (29 percent), European Commission (12 percent), Germany (5 percent), Japan (5 percent) and UK (4 percent). In addition, 5 percent of the support came from the Central Emergency Response Fund (CERF) and 17.5 percent was reported as carry-over funding with no donor specified. Increasing levels of contributions are coming from non-traditional donors but are generally not well represented in current statistics.

These funds supported projects in a range of sectors. However, the clear emphasis continues to be on food aid in terms of both the total amounts requested and the responsiveness of the donors (see Figure 28). Over the four years food aid accounted for 60 to 80 percent of the total response. Food dominated both the appeal and a higher proportion of the food related appeal was funded by the donors. However, according to the context, food assistance was used both to support immediate consumption needs (e.g. as general food distributions) or to support livelihoods (e.g. as payment for community works such as food for assets).

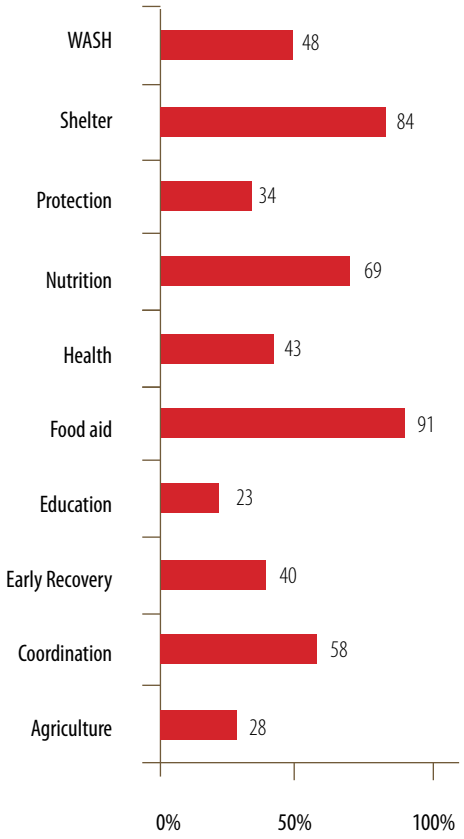
The main observable trend in humanitarian funding over this period has been the increased funding of nutrition interventions.

**Figure 28 Funding by Sector of the Kenya EHRP**
**(a) Percentage of Total funding provided by year**




*Source Estimations by Assessment Team on basis of official information*

**(b) Percentage of amount appealed for**




## Citizens' response

Under the national initiative "Kenyans for Kenya" citizens and residents as well as those in the diaspora contributed about US$4 million through personal and institutional donations to support the humanitarian and long-term food security and livelihood recovery efforts of government and partners.

# *Undertaking* the PDNA

This assessment employed the Post-Disaster Needs Assessment (PDNA) methodology. This methodology combines two distinct and complementary strands of assessing disaster effects, impacts, and needs the time-proven damage, loss and needs assessment (DaLA) methodology – originally developed by the United Nations Economic Commission for Latin America and the Caribbean (UN-ECLAC) in the 1970s and further updated and expanded by the World Bank's Global Facility for Disaster Reduction and Recovery (GFDRR) – and the Human Recovery Needs Assessment (HRNA) methodology that has been developed by the United Nations.

## *Damage and Losses*

Under the DaLA methodology conceptual framework, the following disaster effects are measured during the assessment

- Damage is the value of physical, durable assets that may be destroyed due to the action of the natural hazard that caused the disaster, expressed in terms of the replacement value of the assets assuming the same characteristics that they had prior to the disaster; and,

- Losses or changes in the normal flows of the economy that may arise in all sectors of economic and social activity due to the external shocks brought about by the disaster, until full economic recovery and reconstruction has been achieved, and are expressed in current values.

The following disaster impacts are also estimated as part of the assessment

- Possible macro-economic growth decline due to losses inflicted by the disaster, including possible slowdown of gross domestic production, deterioration of the balance of payments and of fiscal sector position, as well as increase in inflation;

- Decline in personal or household living conditions, livelihoods and income, possible increase in costs of living, as well as poverty aggravation arising from the resulting losses caused by the disaster

## *Needs*

- Recovery needs are estimated on the basis of the financial resources required for immediate reactivation of personal or household income, rehabilitation of basic services, and reactivation of productive activities;
- Reconstruction needs are estimated as the requirements for financing that will make it possible to repair, reconstruct or replace the physical assets that were destroyed or damaged by the disaster. These figures include a build back better factor to consider quality improvements

The estimate of financial needs for recovery and reconstruction therefore uses quantitative information from the systematic estimate of the value of destroyed assets (damages) and of changes in economic flows (losses) of this assessment.

### Disaster risk reduction

Disaster risk reduction needs are additional needs identified above and beyond the ones in recovery and reconstruction aimed at building longer-term resilience through systematic efforts to "analyze and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events."[13]

PDNA teams have undertaken the first step in this process – identification of key projects and programs required for risk reduction in their respective sectors. The result is a preliminary list with indicative costing which has been included in the assessment. This is neither intended to be exhaustive nor finalized however, this could form the basis of dialogue, evaluation, and prioritization which is necessary to ascertain the suitability of the interventions.




[13] Using the UNISDR definition from http//www.unisdr.org/we/inform/terminology#letter-d

**Human Recovery Needs Assessment (HRNA)**

The HRNA methodology enables the following

- Estimation of the decline in human development, expressed by the quantification of the human development index (HDI), arising from the disaster effects and impact;
- Estimation of possible setbacks in the achievement of the Millennium Development Goals (MDGs) for the affected country that may arise due to the disaster; and,
- Estimation of needs to achieve early human recovery at the personal and community levels

It should be noted that these methodologies complement each other and provide a complete view of the human and economic needs to achieve recovery and reconstruction.

The fact that the Horn of Africa drought is a slow-onset disaster does not necessitate any modification to existing methodological tools. Rather, application of the general concepts and definitions of each to the typical conditions of a drought is the only requirement for the tool's correct application.

In drought assessments, sectors of economic and social activity that are included in the system of national accounts of the affected country, which may sustain either destruction of physical, durable assets and/or modifications to the normal flows of the economy caused by the absence of sufficient rainfall, are analyzed. In many of the sectors, the drought may cause changes in economic flows without necessarily causing destruction of assets. In fact, under drought conditions, the sector that typically sustains assets destruction is livestock while the rest of sectors may not face any substantial damage.

## *Assessment Process*

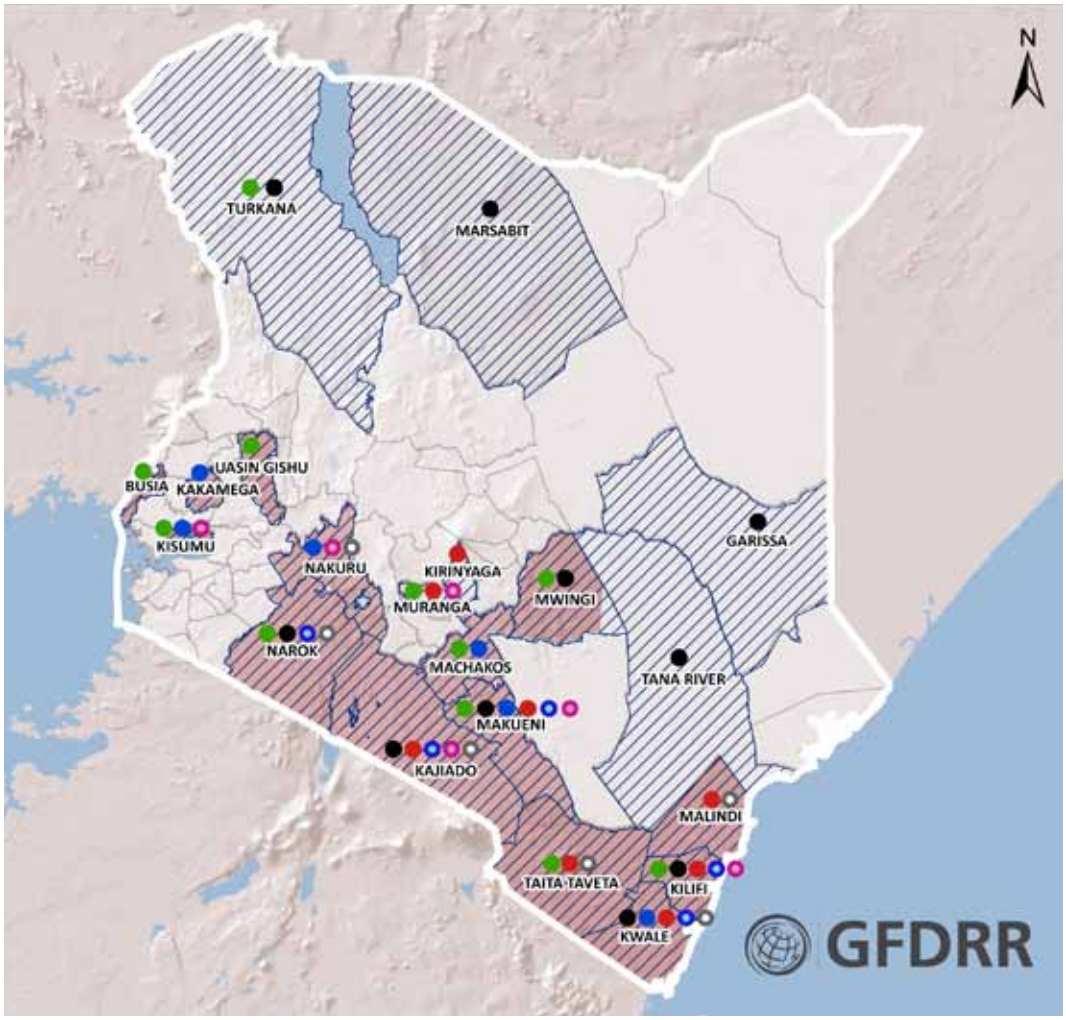
As a first step, available data on the production accounts of the country for the period between 2007 and 2011 was examined to identify possible effects and impacts of the drought on economic development. Such data is available with geographical disaggregation down to the province and district levels in most sectors of social and economic activity.

In view of limitations in time and resources, it was not feasible to do a detailed drought impact analysis for all affected districts in the country. Instead, a number of representative districts were identified where a full analysis could be conducted that would later enable to extrapolation of results to cover the entire country on the basis of existing quantitative baseline information on production and other variables. These districts were identified to be visited for the collection of quantitative information relating to damage and losses, ensuring that they represented a set with varying degrees of impact.

Field visits were then carried out by a team of approximately 50 experts for the purpose of quantitative data collection in District Offices as well as of interviews with strategic informants. Figure 29 lists all districts that were included in the sample covering both specific field visits by sector teams as well as data gathering by local district authorities using standard forms in areas that could not be visited due to security limitations.

After completing the detailed analyses in the selected sample districts, the relative weights of each district within each province were determined. These ratios were then used – after determining their geographical or spatial trends in the entire country – to extrapolate results from the sample districts to the entire drought-affected areas of the country.

**Figure 29 Districts used as samples for detailed assessment of drought effects and impacts in each sector of economic and social activity.**




KENYA: Location of Districts Used as Sample for Assessment (November 2011)

Legend

- International Border
- Admin-1 Districts
- Districts where Full Drought Assessment were conducted
- Data collected in non-visited Districts

Sector Assessment

- Agriculture
- Livestock
- Fisheries
- Education
- Water
- Health
- Other

*Sources: ESRI Basemap, World Bank Country Borders, OCHA COD Registry (2009), World Bank PDNA Team.*

# *Macroeconomic* and human recovery analysis

## *Overview*

The damage and loss assessment methodology (DaLA) was used to determine the impact of the drought on the macro-economic performance of the country.[14]

Disasters tend to generate impacts at the macro-economic level when the event covers a very large geographical area of the affected country, and/or whenever the event has a direct bearing on strategic sectors of economic and social activities. Otherwise, the disaster may show a sizeable impact at the personal or household level only, in the most affected areas of the country – but only a negligible impact at the macro level.

In the case of the 2008-2011 drought in Kenya, it has been possible to isolate the effects and impacts of the disaster with relative ease and sufficient degree of accuracy. This was possible due to the relatively long-term duration of the shock, as well as the extensive drought coverage of the country by the meteorological event.

The methodology used is a counter-factual analysis, estimating the performance of the Kenyan economy in the absence of drought. This draws on available detailed reports on the macro-economic performance of the country from 2007 to date, and on the estimated annual economic losses for 2008 to 2011– including production losses and higher expenditures – which were estimated as part of the PDNA sectoral assessments. The outcome of the analysis is an estimation of the performance of the country´s gross domestic product (GDP), and of the external sector , if the drought had not occurred.

[14] Please note that the impact on the fiscal sector and the estimated impact at the personal and household level have not been assessed as a part of this assessment due to insufficiency of data.

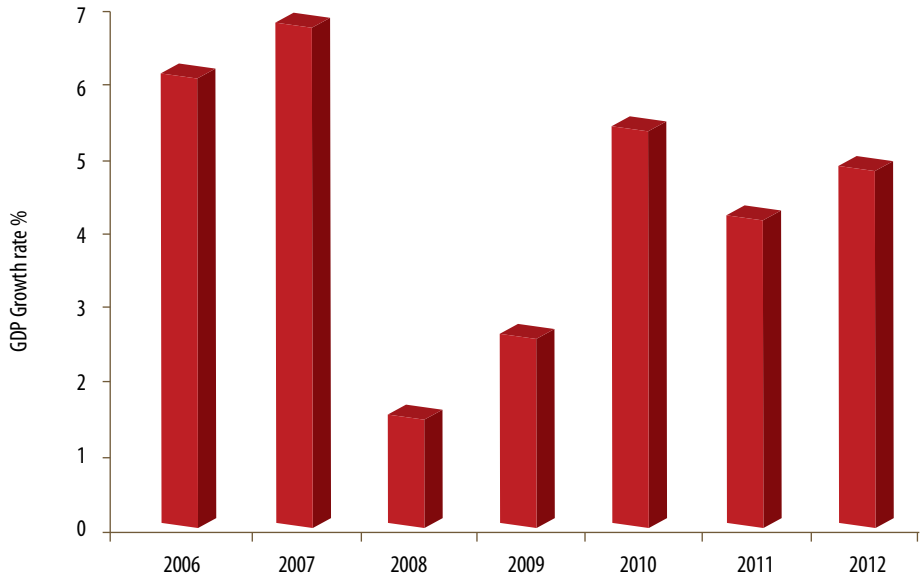
## *Impact on GDP*

Before the start of the 2008 to 2011 drought, the Kenyan economy had been growing at relatively high annual rates ranging from 6 to 7 percent (See Figure 30), and the government was foreseeing continuous similar growth in subsequent years. However, in 2008, Kenya faced several internal and external shocks including an increase in international crude oil prices, the global financial crisis, significant post-electoral civil disruptions and continued political bickering, as well as the start of the drought and increasing food and fuel prices. Collectively, this resulted in the annual growth rate falling to 1.5 percent in 2008. Despite significant growth in the construction sector, tourism and agriculture faced very high declines (-36 and -5 percent, respectively), and inflation rose to an unprecedented annual rate of 26.2 percent. [15]

In 2009, the government carried out measures designed to stimulate growth which involved restoring investor confidence, an expansionary fiscal policy through a stimulus package as well as focusing monetary policy to maintain price stability within a single digit rate. Overall GDP grew by 2.6 per cent, helped by the resurgence of tourism and the growth of the construction sector.

These gains were offset by drought related losses, the global economic recession and a sluggish internal and external demand. The agriculture sector contracted by 2.7 percent, in view of the drought, high costs of inputs and a depressed demand for some of the country´s exports. Furthermore, electricity generation in hydropower plants declined by 35 per cent due to reduced water levels in the key dams.[16]

**Figure 30 Observed and Expected Annual Growth of Gross Domestic Product in Kenya**




*Source Estimations by Assessment Team using official information*

[15] Only in 1994 had Kenya sustained a higher inflation rate of 28.8 per cent.
[16] See Economic Survey 2010, Kenya National Bureau of Statistics, Nairobi, 2010

In 2010, the drought´s intensity declined and government´s efforts at macro-economic stability continued with increased credit to the private sector, and lower inflationary pressures. The country also benefitted from improved international prices of its main exports and from higher remittances from abroad due to the improved global economic position. Consequently, the Kenya economy grew at 5.6 percent.[17] Some of the individual sector rebounds in growth stem from a post drought recovery such as those of the electricity and agriculture sectors.

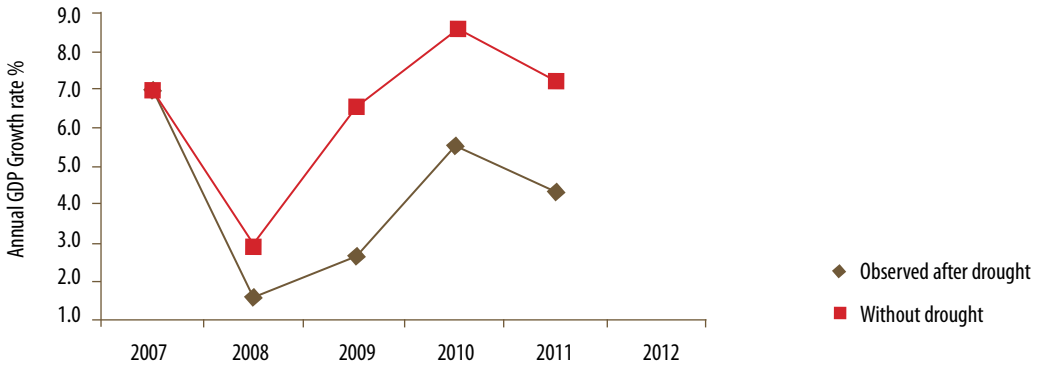
In 2011, the economy is expected to grow at a rate of 4.3 percent, a full one point below its long-term growth rate and below the growth projected for Sub-Saharan Africa. This is driven by strong performance of the financial sector, construction and tourism.[18] The effect of the drought on agriculture, which was relatively intense in the first five months of the year, is expected to be moderate on account of the good rains that occurred in the second half of the year.

Kenya´s economy is threatened by the combination of four factors high fuel prices, high food prices, the drought in the Horn of Africa and the recent Euro crisis. The population is facing a high annual rate of inflation caused by escalating food and fuel prices, which tend to disproportionally hurt the poor.

Kenya´s economy has been out of balance for some time but the 2011 external shocks – added to the residual drought impacts – have exposed the country´s unsustainable external position. The Shilling has depreciated to an all-time low; the current account deficit reached a record high, so that by mid-year Kenya´s four top exports became insufficient to pay for oil imports. The Central Bank has initiated decisive actions to restore macro-economic stability.

To estimate the impact of the drought on economic growth, the estimated drought induced production losses and higher costs of production across sectors (as estimated in the assessment) were superimposed on the values of observed GDP for 2008 to 2011. Current values of these losses were first deflated to convert them into constant 2001 values, and intermediate consumption was also eliminated from the original values to ensure no double accounting, before comparing with the observed annual values of GDP. Growth rates were subsequently obtained and compared to those observed in the past four calendar years, as indicated in Figure 31.

**Figure 31 GDP Growth in Kenya, with and without drought**




*Source Estimations by Assessment Team on basis of official information*

[17] See Economic Survey 2011, Kenya National Bureau of Statistics, Nairobi.
[18] See Kenya Economic Update, The World Bank, Nairobi, 2011.

The chart shows the observed annual rates of growth of gross domestic product (connected by a green line), as produced by the Kenya National Bureau of Statistics, versus the growth rates of GDP growth that would have occurred without the four-year drought (connected by the red line), and provides a measure of the impact of the drought on the overall growth of the national economy. The growth gap is significant – an average of 2.8 percent per annum – more than what analysts had probably expected in the absence of detailed information about the actual effects of the disaster. Had the drought not occurred, Kenya´s GDP would have grown at an average annual rate of 6.3 percent, instead of the achieved 3.5 percent average.

This figure provides a measure of the possible positive impact obtainable through introduction of future drought risk reduction measures. Furthermore, the estimated value of the losses sustained is an indication of the upper threshold of the value of investments that may be economically feasible to undertake as part of the future drought risk reduction programs.

## *Impact on Balance of Payments*

In 2008, the first year of the drought, the balance of payments went into a deficit of Ksh 32.6 billion after the previous year´s surplus of Ksh 63.3 billion. This deficit was due to the combination of decreased inflows of foreign direct investment and of a widened merchandise trade deficit of Ksh 425.7 billion. The current account balance deteriorated to a deficit of Ksh 136.9 billion from Ksh 69.5 billion in the preceding year. The capital and financial account reached a surplus of Ksh 104 billion following a surplus of Ksh 132.7 billion in 2007.[19]

In 2008, the drought caused lower production and exports of coffee and tea, as well as higher-than-normal food and nutrition item imports to compensate for domestic food production losses, and significant fuel imports to generate electricity in thermal power plants due to the lack of adequate rainfall. The combined impact on international merchandise trade due to the drought was estimated at Ksh 10.25 billion. This is equivalent to about one third of the resulting

**Table 10 Balance of Payments in Kenya 2007-2011**

| | Million Shillings | | | |
|---|---|---|---|---|
| | 2007 | 2008 | 2009 | 2010 |
| Imports (cif) | 605,112 | 770,651 | 788,097 | 947,382 |
| Exports (fob) | 261,685 | 322,660 | 323,571 | 385,666 |
| Trade balance | -343,427 | -447,991 | -464,528 | -561,716 |
| Net Services | 217,030 | 253,637 | 254,621 | 300,172 |
| Current account balance | -69,476 | -136,598 | -129,239 | -199,232 |
| Net capital, financial account | 132,726 | 103,985 | 204,419 | 211,456 |
| Overall balance of payment | 63,250 | -32,613 | 75,180 | 12,224 |

*Source Ministry of Finance*

[19] See Statistical Annex for the Budget Speech for the Fiscal year 2011/2012, Office of the Prime Minister and Ministry of Finance, Nairobi, 2011.

overall balance of payments of the country in 2008.

In 2009 – which corresponded to the peak of the impact of the drought – the overall balance of payments achieved a surplus of Ksh 75.2 billion after a deficit of Ksh 32.6 billion in the preceding year. This improved position was caused by an increase in the net capital inflows and a slightly lower current account deficit of Ksh 129.2 billion (vis à vis Ksh 136.6 billion in the previous year as indicated in Table 10). During this year, the drought had a smaller impact on coffee and tea exports than in the previous year but food and nutrition items -as well as fuel imports- increased significantly. Overall this caused a combined negative impact of Ksh 23.86 billion in the trade deficit.

During 2010, the overall balance of payment deteriorated to a surplus of Ksh 12.2 billion down from a surplus of Ksh 75.2 billion in 2009. This was caused again by the combination of a decrease in net capital inflows and a deterioration of the current account balance to a deficit of Ksh 199.2 billion. The capital and financial account recorded a surplus of Ksh 187.4 billion.[20] In this year, the drought impact was lower than in 2009, to the tune of nearly Ksh 12 billion and was concentrated on imports of diesel fuel for power generation, food assistance and nutrition materials and relative lower exports of coffee and tea.

For 2011, the World Bank expects that the pressure on overall balance of payments will continue due to the record low levels of the current account, induced by the declining international demand for some of the traditional exports of Kenya and the negative impact of the drought on agriculture production.[21] However, the highest impact of the drought will be from the higher imports of food and nutrition materials required, rather than by decreased exports.

## *Implications for Human Recovery*

The assessment findings underscore the human impact of drought all damages and losses are human-centred; they relate to human needs. For example 92% of combined effects impact private sector operators. The impact

**Table 11 Estimated drought impacts on merchandise imports and exports, 2008 to 2011**

| | Million Shillings | | | |
|---|---|---|---|---|
| | 2008 | 2009 | 2010 | 2011 |
| **Lower exports** | **757.89** | **74.53** | **86.56** | **93.71** |
| Agro-industry processing losses | 757.89 | 74.53 | 86.56 | 93.71 |
| **Higher imports** | **9,494.61** | **23,781.85** | **12,964.88** | **11,714.87** |
| Food assistance | 1,423.89 | 8,216.06 | 4,923.40 | 10,739.32 |
| Diesel fuel for power generation | 6,980.74 | 14,891.19 | 7,910.46 | - |
| Nutrition materials | 1,089.99 | 674.60 | 131.02 | 975.56 |

*Source Estimations by Assessment Team using official information*

[20] See again Economic Survey 2011, Kenya National Bureau of Statistics, Nairobi, 2011.
[21] See again Kenya Economic Update, The World Bank, Nairobi, 2011.

on livestock formed approximately 71 percent of both losses as well as overall impacts. Also, agriculture effects were the second highest both are the major means of livelihoods for communities in most drought-prone areas.

### Livestock sector community impacts

The following dimensions of human impacts of the drought through transmission mechanisms in the livestock sector in Garissa and Tana River counties exemplify the extent of implications for human and community welfare in the ASALs

- Losses due to mortality of significant portions of the livestock resulting in reduced income levels
- Reduced milk yields and livestock productivity resulting in high prices of milk and other livestock products that contributed to hunger and reduced household incomes
- Competition of pastures and water by livestock contributing to land degradation and overgrazing
- Migration to other areas to look for pastures and water which caused displacement of people, thereby affecting school enrolment.
- Increased vulnerability to food insecurity, with heightened malnutrition mostly in children

### Agriculture-sector effects

Aside from direct economic losses, the drought also imposed social costs by undermining the social standing of agro-pastoral households whose status is determined by the size of livestock herds and food stocks. The drought disrupted local power relationships and damaged social safety networks especially those built around lending and borrowing of cereals thus promoting inequality between communities. Drought also increased household vulnerability to climatic shocks and food insecurity. In some cases, poor farmers in marginal areas were pushed out of their production systems forcing them to move to urban centers where food distribution, health, sanitation and water supply were available. Within the ASALs, there is predominantly an informal seed system which relies on utilization of "recycled" seed. This system was most affected by the drought in 2008 because households consumed the seeds that they had reserved for subsequent planting. In all the surveyed districts, it was observed that culturally, commercial crops were controlled by men while women controlled low value subsistence crops. During the drought, men lost their source of income leaving women to shoulder the burden of feeding their families on their limited supplies. In the mechanized cereal production systems, wheat farmers experienced the greatest loss and some dropped out from the business altogether after they depleted their capital and became highly indebted. There were reported incidents of bankruptcies and farmers who committed suicide.

Drought also reduced the availability of pasture for domestic animals and wildlife which increased human wildlife conflicts as large herbivores depleted vegetation in their traditional grazing range and encroached into human settlements in search of water and pastures.

### Nutrition

The nutrition status of communities deteriorated time trend 2007-11 data on prevalence of acute malnutrition cases in areas most affected by the drought (including Makueni, Kilifi, Turkana, Marsabit, Wajir, Mandera and Garissa) showed worsening malnutrition in years of severe drought in 2009 and 2011.

The following are some socio-economic impacts of the drought

- Increased defaulter rates in health care programs – Supplementary Feeding Programmes (SFP) and Anti-Retroviral Therapy (ART);

- Increased defaulting from exclusive breastfeeding (by mothers facing hunger). This was particularly reported in areas where there was no SFP in place;
- Increased length of stay and high relapses in Nutrition Programs. Higher numbers of malnourished individuals spent more time in SFP programmes or were readmitted, increasing the cost of management of the programmes;
- Poor nutrition programme support delivery coverage in remote areas due to poor communication network and inadequate resources;
- Lack of water in health facilities to run programmes, compromising sanitation in the facilities; and,
- Delay in implementation of nutrition programmes due to delayed funding of needs

**Education**

The following are some of the major effects of the drought on communities and families with respect to the education sector

- Brief disruption of the school calendar in some areas of the country
- Temporary dropouts and irregular attendance in schools had also increased due to pressure on children to contribute to the survival of the families through domestic chores
- Enrolment declined in some schools but, conversely, increased enrolments in some areas strained existing school resources (education materials, furniture and equipment)
- Children were without access to sufficient nutrition at home and hence were not able to concentrate in class or retain information
- Reduced school feeding food rations as a result of increased enrolment in primary and ECD centres
- Scarcity of water in schools
- Psychosocial trauma leading to an attention deficient (difficulties and a lack of focus in the classroom)
- The need to raise money to alleviate the scarcity of food, leads parents to marry off their daughters, a common practice during drought period, which often denies these girls an opportunity to realize their future dreams.
- A combined effect of high food prices and lack of fees payment in some secondary schools

**Gender**

Women and children are disproportionately affected by droughts. Some of the effects discerned from the field and documented evidence include the following

- Significant increase in the socio-economic burden on women and girls drought induced mobility and loss of livelihoods is impacting existing gender-roles increasing the vulnerability and socio-economic burden on women;
- Often men migrate with livestock searching for pastures while leaving behind women and children with weak animals and small stock. One Maasai woman complained that in times of drought, women and children had very little to eat and no cows to milk. In other instances within the marginal agricultural areas, unemployed men migrated to towns and urban centers looking for wage employment leaving women and children at home without food.

- Increased risk of physical insecurity for women and girls increased incidence of resource based conflict due to drought further is heightening the vulnerability and safety and security of communities, in particular women and girls;
- The drought had further adverse social impact by separating spouses for long periods and in some cases leading to divorce;
- Women and girls are being forced to seek negative coping mechanisms limited livelihood options, high levels of illiteracy, women's historically low status in society, and limited role in decision making mean that alternative livelihoods options are limited for women;
- Increase risk of Gender Based Violence (GBV) including sexual exploitation and abuse (SEA) and early marriage in drought affected areas. For example in some cases where government and other organizations provided relief, some women were also reported to have exchanged sexual favors with men who were charged with food distribution in return for food.
- Often boys who accompanied their fathers also ended up dropping out of school and thus compromising their long term career prospects.
- While women's income was used within the family, men's income was lost especially where they turned to alcohol to relieve stress thereby placing greater strain on family welfare

### Conflict

In some regions (particularly Turkana and Pokot) the drought has contributed to an increase in resource-based conflicts, boundary disputes, cattle rustling and conflict induced displacements due to the ongoing shortage of water and pasture. In June 2011, 76 deaths were reported linked to resource based conflicts.[22]

[22] FEWSNET. Kenya Dekadal Food Security Monitoring, August 3 & 11, 2011.

# *The way* forward and framework for recovery

## *Overview*

Drought and other disasters such floods and landslides are perennial issues facing the country, bringing significant devastation, hindering economic performance, and depriving communities of their assets, livelihoods, and labour force - all too often locking them into endemic poverty cycles. As seen from the analysis above, the country has been plagued with the same disaster impacting thousands of people, and destroying the lives and livelihoods year after year.

In Kenya, the most affected areas coincide with those that have suffered from entrenched poverty over many decades and while the current drought has intensified the number of people affected, it is clear that an adequate response to droughts must not only meet urgent humanitarian needs but also as urgently, address underlying vulnerabilities.

The real challenge in Kenya is to achieve institutional paradigm shifts towards drought risk management and resilience-building rather than one-time initiatives focusing on small groups of people, or led through short-term project approaches. There is an urgent need for long-term transformations on how risk is managed in the country to ensure that the normal stay of development interventions are not put in jeopardy through reallocations when emergency needs become overwhelming.

Kenya has worked to develop the resilience of communities in drought-affected areas. Among many others things, these experience hold important lessons on how to plan recovery as well as shape disaster risk reduction programming.

Going forward, for long-term resilience building in Kenya, there is a need for a comprehensive framework for recovery to guide not only recovery from the current drought however, also build towards disaster risk reduction for the future.

The following is a compilation of considerations imbibed in the sector analyses for the identification of needs. These principles are in line with global good practices and should be the basis of the development of a robust framework for recovery to be developed by the government.

## *Guiding Principles*

**Addressing long-term vulnerability and risks** In order to be able to create lasting impact for drought-affected communities, it is imperative that all recovery actors work in concert to put in place and successfully execute interventions that are geared toward building long-term resilience.

**Building on lessons of past experiences in drought resilience building** Planning and prioritization for drought recovery should be based on sound lessons of experience and practices in Kenya while leveraging good practices in the region and worldwide.

**Alignment with Kenya Vision 2030.** There is a need for alignment and integration of recommendations with Kenya Vision 2030. Disaster preparedness (in all disaster-prone areas) and capacity development for adaptation to global climate change have been identified within this.

**Further strengthen institutions and their ability to manage risks** Recovery in the country should strive to strengthen existing institutional gaps and build long-term capacity to manage disasters, particularly droughts and food crises.

**Comprehensive, sustainable, country-wide approaches** While it is important to focus on the most affected areas, there is a clear need to provide support that can leverage catalytic changes for the country as a whole.

Recognize that unlike other disasters, droughts do not have a sharp end. There is a critical need to **sustain the momentum for recovery** with constant monitoring particularly as floods follow droughts and may exacerbate the current disaster.

**Implementation**

**Prioritizing immediate service delivery support to local governments in drought-affected areas directly in the short-term** and a program of capacity building over the long-term. Even prior to the onset of the drought, affected counties had weak capacity to implement development programs. The disaster has only impacted this further and there is a need to assess and prioritize capacity development in these areas.

**Maintaining realistic recovery programming while exploring innovative and ambitious approaches for implementation** Planning conservatively to ensure that there is sufficient capacity to undertake recovery tasks while developing innovative efficiency mechanisms.

**Institutionalizing urgency** Assessing current institutional arrangements including processes and procedures for recovery interventions and if necessary, streamlining them or developing special dispensation for key recovery processes.

## *Supporting Principles Fiduciary governance and oversight*

**Developing a strong monitoring and evaluation (M&E) system to ensure that the course of recovery, reconstruction, and DRR activities get completed in a timely way** An M&E mechanism must be used as a tool that brings together all the recovery, reconstruction, and disaster risk reduction initiatives that have been envisaged towards delivering results as a coherent whole. The users and target audience of the performance management tools should be the managers of these programs and the projects that make up the recovery programs going forward.

**Employing a dedicated body within the Government of Kenya to own and implement**

the results agenda for drought recovery, reconstruction, and disaster risk reduction with adequate resources for its successful functioning.

**Leveraging existing capacities** The capacity of existing M&E systems must be first assessed and any existing capacities and resources must be leveraged. Further, the capacities and resources of development partners' M&E must be assessed in order to ensure a harmonized M&E framework for recovery and to leverage synergies.

**Channeling funds into the hands of those with the strongest incentive to use them for the intended purposes** This includes direct transfers to recipients and community-driven implementation and oversight.

**Maximize credibility through independent oversight mechanisms, third party monitoring and community-based grievance redressal mechanisms.**

**Utilize real-time financial reporting/fiduciary arrangements to ensure transparency, accountability and maintain credibility for beneficiaries and donors.**

### Coordination

**Donor coordination** Going forward towards drought recovery programming, it will be important to ensure harmonization between agencies involved in needs planning and execution and the government, coordinating and prioritizing fund flows. There is a critical need to **bridge efforts from relief, recovery, reconstruction, and disaster risk reduction and the organizations working in this area.**

**Developing and enforcing quality standards** to ensure that the underlying vulnerability of drought affected communities diminishes with recovery.

## *Next steps in follow-up to the PDNA*

| Activity | Next steps |
|---|---|
| Post-PDNA Steering Committee | ■ Appointment of a Steering Committee to take forward the recommendations of the assessment |
| Programming Review | ■ Undertake a comprehensive review of existing and envisioned sector budget allocations, projects, and programs for drought response and risk reduction<br>■ Harmonization of sectoral recommendations from the report |
| Recovery Framework | ■ Development of a comprehensive framework for recovery, in line with the guiding principles of this PDNA, with clear budgets and timelines for drought recovery activities |
| DRR recommendations | ■ Review, evaluation, prioritization, and potential programming of DRR needs<br>■ Integration into ongoing and envisioned DRR programming |
| Institutional Arrangements | ■ Undertake an analysis of the current institutional arrangements for drought recovery and resilience building |
| Monitoring and Evaluation System | ■ Development of a monitoring and evaluation system to track the progress of implementation of the recommendations of the report and recovery with regular reporting |
| Institutionalizing the PDNA process | ■ Develop a system for maintaining PDNA experts for future droughts<br>■ Develop a plan for integrating the PDNA methodology into existing ministries undertaking drought and other disaster assessments |















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# *Sector* annexes

The following section details the proposed sector-specific drought impact and needs analyses. Each sector profile provides a brief overview followed by the damage and loss quantification, socio-economic impact, existing sectoral policies and priorities and major programs, challenges, objectives of recovery and resilience building in the sector, needs estimation, sector priorities, and methodologies and limitations.

The following sectors and cross-cutting issues have been covered Agriculture, Agro-Industry, Livestock, Water & Sanitation, Health, Nutrition, Energy, Fisheries, Tourism, Forestry, Wildlife, and Environment, Education, Gender, and Disaster Risk Reduction.

# *Agriculture*

## *Executive Summary*

This report shows the estimated agricultural losses as a result of the 2008 to 2011 drought in Kenya. It shows that maize, tea and coffee were the crops that had the highest losses in the country. The data was computed by sampling 10 districts in six provinces representing the main crop producing areas. Table 12 is a summary of the crop losses that were estimated using the PDNA approach.

**Table 12 Summary table (all figures in Ksh million)**

| Province | Damages | | Losses | | Total | Recovery | DRR Needs | Total |
|---|---|---|---|---|---|---|---|---|
| | Public | Private | Public | Private | | | | |
| Central | 0 | 0 | 0 | 18,446.6 | 18,446.6 | 183.7 | 1,231.2 | 1,414.9 |
| Coast | 0 | 0 | 0 | 1,887.3 | 1,887.3 | 716.6 | 1,477.5 | 2,194.1 |
| Eastern | 0 | 0 | 0 | 17,902.2 | 17,902.2 | 1,387.6 | 3,938.3 | 5,325.9 |
| Nyanza | 0 | 0 | 0 | 15,174.9 | 15,174.9 | 1,224.0 | 2,953.5 | 4,177.5 |
| Rift Valley | 0 | 0 | 0 | 56,231.4 | 56,231.4 | 1,389.1 | 3,077.6 | 4,466.7 |
| Western | 0 | 0 | 0 | 11,028.4 | 11,028.4 | 147.8 | 1,058.7 | 1,206.5 |
| Total | 0 | 0 | 0 | | 120,670.8 | 5,048.8 | 13,736.8 | 18,785.6 |

| Year | Damages | | | Losses | | | Recovery Needs | DRR Needs |
|---|---|---|---|---|---|---|---|---|
| | Public | Private | Total | Public | Private | Total | | |
| 2008 | 0 | 0 | **0** | | 35,223 | **35,223** | | |
| 2009 | 0 | 0 | **0** | | 48,992 | **48,992** | | |
| 2010 | 0 | 0 | **0** | | 16,444 | **16,444** | | |
| 2011 | 0 | 0 | **0** | | 20,445 | **20,445** | | |
| 2012 | | | | | | | 5,048.8 | 4,578.8 |
| 2013 | | | | | | | | 4,578.8 |
| 2014 | | | | | | | | 4,578.8 |
| **Total** | | | | | | **121,104** | **5,048.8** | **13,736.55** |

*Source Estimations by Assessment Team on the basis of official information.*

## *Background*

Agriculture is the backbone of the Kenyan economy, contributing 24 percent directly to Gross Domestic Product (GDP) and 65 percent of export earnings. The sector generates almost all of the country's food requirements and provides a significant proportion of raw materials for agro-based industries. There are more than 3.5 million small scale farmers who own land that on average is 2.5 acres. Overall, the smallholder sub-sector contributes about 75 percent of the country's total value of agricultural output, 55 percent of the marketed agricultural output and just over 85 percent of total employment within agricultural sector. For this reason, it has a major role in the economy and consequently on the design of poverty eradication programmes.

In Kenya, economic growth is highly correlated to growth and development in agriculture. In the first two decades after independence, the agricultural sector, and in turn the national economy, recorded the most impressive growth in sub-Saharan Africa at average rates of 6 percent per annum for agriculture and 7 per cent for the national economy.

## *Damage and Loss Quantification*

### Damages

There are no reported damages that were incurred on agricultural infrastructure from the 2008-2011 drought.

### Losses

The greatest impact of the drought in the agriculture sector has been on crop production losses arising from reduced yields. Crop losses, beginning in 2008, have continued in 2009 and up to 2011 for a number of reasons. First, farmers who were indebted in 2008 became even more so in subsequent years and therefore reduced the scale of production and use of farm inputs. Furthermore, poor farmers who relied on the sale of surplus crop to acquire inputs for the following season were unable to do so.

The highest crop losses were evident in the Coast province at 44.5 percent followed by Eastern province at 36.5 percent. Crop losses were generally low in Central and Western provinces at an average of 4.5 percent. Rift Valley and Nyanza provinces experienced average crop losses of 19.75 percent and 17.5 percent respectively during the same period. Table 13 shows the estimated percentage crop losses by province.

The period 2009 saw the highest crop losses amounting to approximately Ksh 49 billion followed by 2008 at approximately Ksh 35.2 billion. The overall crop losses in 2010 were Ksh 16.4 billion. The total losses in maize were highest in 2008 and 2009 while tea registered the highest losses in 2010. In 2008, the losses in maize was Ksh 19.6 billion followed by tea, wheat, and beans at Ksh 6.5, Ksh 3.2 and Ksh 1.6 billion, respectively. The same trend was observed in 2009 with maize leading in losses of Ksh 19.1 billion, followed by tea, wheat, and sorghum at Ksh 15.7, Ksh 5.3 and Ksh 2.2 billion, respectively. However, the highest losses in 2010 were in tea at Ksh 4.9 billion, followed by coffee, maize and cowpeas at Ksh 3.3, Ksh 2.6, and Ksh 1.7 billion, respectively.

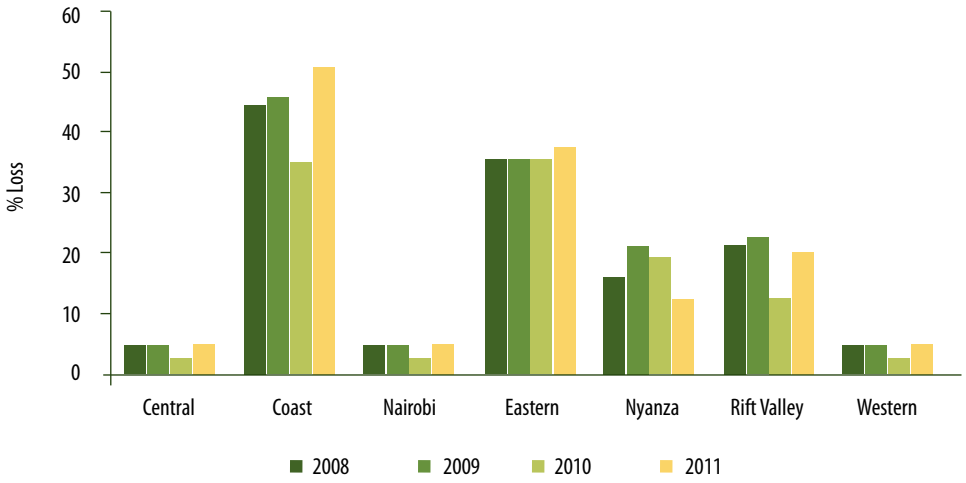
**Table 13 Percentage Crop Losses**

| Province | 2008 | 2009 | 2010 | 2011 | Average |
|---|---|---|---|---|---|
| Central | 5% | 5% | 3% | 5% | 4.50% |
| Coast | 45% | 46% | 36% | 51% | 44.50% |
| North Eastern | 60% | 60% | 40% | 60% | 55.00% |
| Nairobi | 5% | 5% | 3% | 5% | 4.50% |
| Eastern | 36% | 36% | 36% | 38% | 36.50% |
| Nyanza | 16% | 21% | 20% | 13% | 17.50% |
| Rift Valley | 22% | 23% | 13% | 21% | 19.75% |
| Western | 5% | 5% | 3% | 5% | 4.50% |
| National | 24% | 25% | 19% | 25% | 23.25% |

*Source Estimations by Assessment Team on the basis of official information.*[23]

[23] The agriculture team excluded North Eastern Province from the crop loss analysis with livelihoods being predominantly pastoral and Nairobi being an urban area.

**Figure 32 Average crop losses by region**[24]




*Source Estimations by Assessment Team on the basis of official information.*

**Table 14 Summary of value of crop losses by year**

| Losses in Million Ksh | | | | |
|---|---|---|---|---|
| | **2008** | **2009** | **2010** | **2011** |
| **Food crops** | **27,109** | **32,439** | **6,808** | **3,060** |
| Maize | 19,563 | 19,131 | 2,590 | |
| Wheat | 3,183 | 5,286 | 944 | 3,000 |
| Beans | 1,641 | | | |
| Sorghum | 412 | 2,212 | | |
| Millet | 349 | 1,972 | 1,560 | 60 |
| Rice | 731 | 1,097 | | |
| Cowpeas | 688 | 1,073 | 1,714 | |
| Green Grams | 542 | 363 | | |
| Sweet potato | | 1,305 | | |
| **Cash crops** | **8,113** | **16,553** | **9,636** | **17,385** |
| Tea | 6,502 | 15,707 | 4,891 | 13,769 |
| Coffee | 1,612 | | 3,270 | 2,096 |
| Sugarcane | | 846 | 1,475 | 1,520 |
| Total | 35,223 | 48,992 | 16,444 | 20,445 |

*Source Estimations by Assessment Team on the basis of official information.*

[23] The agriculture team excluded North Eastern Province from the crop loss analysis with livelihoods being predominantly pastoral and Nairobi being an urban area.

**Table 15 Estimation of production losses of crops, 2008-2011**

| Crops | 2008 | | | 2009 | | | 2010 | | | 2011 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Production loss (tons) | Price (sh/ton) | Losses, million (Sh) | Production loss (tons) | Price (sh/ton) | Losses, million (Sh) | Production loss (tons) | Price (sh/ton) | Losses, million (Sh) | Production loss (tons) | Price (sh/ton) | Losses, million (Sh) |
| **Food crops** | **1,034,210** | | **27,109** | **1,186,633** | | **32,439** | **240,634** | | **6,808** | **101,157** | | **3,060** |
| Maize | 800,000 | 24,454 | 19,563 | 800,000 | 23,913 | 19,131 | 150,482 | 17,214 | 2,590 | | | |
| Wheat | 100,000 | 31,832 | 3,183 | 180,000 | 29,368 | 5,286 | 32,152 | 29,368 | 944 | 100,000 | 30,000 | 3,000 |
| Beans | 41,025 | 40,000 | 1,641 | 10,186 | | | | 40,000 | | | | |
| Sorghum | 32,000 | 12,890 | 412 | 60,000 | 36,860 | 2,212 | | 28,040 | | | 30,000 | |
| Millet | 11,185 | 31,200 | 349 | 38,000 | 51,900 | 1,972 | 30,000 | 52,000 | 1,560 | 1,157 | 52,000 | 60 |
| Rice | 20,000 | 36,533 | 731 | 18,919 | 57,970 | 1,097 | | | | | | |
| Cowpeas | 20,000 | 34,400 | 688 | 17,537 | 61,200 | 1,073 | 28,000 | 61,200 | 1,714 | | | |
| Green Grams | 10,000 | 54,200 | 542 | 6,701 | 54,200 | 363 | | | | | | |
| Sweet potato | | 16,400 | | 55,290 | 23,600 | 1,305 | | | | | | |
| Cassava | | 7,100 | | | 7,100 | | | 7,100 | | | | |
| **Cash crops** | **49,691** | | **8,113** | **382,825** | | **16,553** | **507,262** | | **9,636** | **541,434** | | **17,385** |
| Tea | 40,597 | 160,152 | 6,502 | 73,867 | 212,640 | 15,707 | 22,188 | 220,448 | 4,891 | 61,194 | 225,000 | 13,769 |
| Coffee | 9,094 | 177,220 | 1,612 | | 195,444 | | 8,240 | 396,794 | 3,270 | 5,240 | 400,000 | 2,096 |
| Sugarcane | | 2,404 | | 308,958 | 2,739 | 846 | 476,834 | 3,094 | 1,475 | 475,000 | 3,200 | 1,520 |
| **Total** | **1,083,901** | | **35,223** | **1,569,458** | | **48,992** | **747,896** | | **16,444** | **642,591** | | **20,445** |

*Source Estimations by Assessment Team.*

## *Socio-Economic Impact*

The impact of drought in the agricultural sector is closely linked to other sectors. For instance, as the drought escalated, women had to travel longer distances and spent more time fetching water which reduced the time they had to tend their crops. In 2008, the drought eroded the recovery capacity of communities especially in the ASAL districts thereby increasing the economic and social cost of the drought. For instance, some farmers lost their draught oxen and therefore reduced the cropped area in 2009.

Apart from the direct economic losses, the drought also imposed social costs by undermining the social standing of agro-pastoral households whose status is determined by the size of livestock herds and food stocks. The drought disrupted local power relationships and damaged social safety networks especially those built around lending and borrowing of cereals. Poor farmers in marginal agricultural areas were pushed out of their production systems forcing them to move to urban centers where food distribution, health, sanitation and water supply, and casual wage labour were available.

Within the ASALs, there is predominantly an informal seed system which relies on utilization of "recycled" seed. This system was most affected by the drought in 2008 because households consumed the seeds that they had reserved for subsequent planting.

In all the surveyed districts, it was observed that culturally, commercial crops were controlled by men while women controlled low value subsistence crops. During the drought, men lost their source of income and left for urban centers to look for casual labor leaving women to shoulder the burden of feeding their families on their limited supplies.

In the mechanized cereal production systems, wheat farmers experienced the greatest loss and some dropped out from the business altogether after they depleted their capital and became highly indebted.

Women and children are disproportionately affected by droughts. Often men migrate with livestock searching for pastures while leaving behind women and children with weak animals and small stock. One Maasai woman complained that in times of drought, women and children had very little to eat and no cows to milk. In addition, even where government and other organizations provided relief, some women were also reported to have exchanged sexual favors with men who were charged with food distribution in return for food. The drought had further adverse social impact by separating spouses for long periods and in some cases leading to divorce. Often boys who accompanied their fathers also ended up dropping out of school and thus compromising their long term career prospects.

As a coping strategy, men with limited income sources in the ASALs and marginal agricultural areas resorted to sand harvesting in the river beds and charcoal burning to earn some income outside agriculture. This exposed the delicate eco-systems to soil erosion and environmental degradation which, in turn, reduced the capacity of the existing natural resource base to meet current and future societal needs. Women on the other hand resorted to harvesting sisal and stripping it for twine which they sold. Some women with traditional handicraft skills added value by making strings, ropes, baskets, mats and bead jewelry which were later sold to traders. Increased cases of theft of farm produce both stored and at the farm are reported at the peak of the droughts.

## *Existing Sectoral Policies and Priorities, and Major Programs*

There are many policies and strategies governing the agricultural sector. The overall policy document for the sector is the Agricultural Sector Development Strategy (ASDS) and its Medium Term Investment Plan (MTIP). In the framework of that document, there are several other and more specific policies and strategies developed or still in the process of development that are relevant for increasing drought resilience of the Kenyan population. Those include sector-wide policies like the Food and Nutrition Security Policy, the National Agricultural Research Systems Policy, the National Agricultural Sector Extension Policy and the Agricultural Insurance Policy. There are also specific policies like the National Roots and Tuber Crops Policy, National Horticulture Policy, and National Seed Policy. Other relevant policies include the National Irrigation Policy, Water Harvesting and Storage Policy, Land Use Policy and Spatial Plan, and the National Agribusiness Strategy. Broader plans and strategies that also touch on agriculture are the Vision 2030 MTIP for Northern Kenya and Other Arid Lands, Climate Change Response Strategy and the Country Programme Paper "Ending Drought Emergencies in Kenya A commitment to sustainable solutions."

According to the ASDS, the main sector priorities are increasing productivity, commercialization and competitiveness of agricultural commodities and enterprises and developing and managing key factors of production.

## *Challenges*

Poor economic performance Kenyan economy has performed poorly until recent years. The population that lives below the poverty line bears the most shock of a poorly performing

economy due to low resilience. Furthermore, production for 2008 dropped significantly due to post-election violence that disrupted cultivation and also caused food destruction among things.

More frequent droughts and floods Drought cycles have shortened to every 2-3 years instead of 5-7 years in the past and the effect of climate change and global warming is posing great danger to agricultural productivity. This has been aggravated by population pressures in high potential areas pushing human settlement to water catchment areas and also cultivation of the fragile ASALs.[25]

Other Challenges to food security include

- Continued over-reliance on rain-fed agriculture
- Limited agro-processing/value addition
- Inefficient marketing systems
- Losses due to pests and diseases, and poor handling
- High costs of production due to high cost of inputs fertilizer, seeds, and fuel
- Poor rural infrastructure such as roads, railway, energy, market sheds
- Limited access to affordable credit facilities
- Under funding and investment in the agriculture sector

## *Key Objectives of Recovery and Resilience Building in the Agriculture Sector*

The following are the key objectives of recovery and resilience building in the agriculture sector

Strengthen Seed Systems The existing seed system in the marginal agricultural areas of Kenya is predominantly an informal seed system that relies on utilization of "recycled" seeds. These areas were the most affected by the 2008 drought which escalated in 2009 because farmers consumed their seeds that they reserve for planting. The main intervention should be capacity building in seed production in order to strengthen informal seed structures, build resilience, and improve production.

Crop Diversification The second group of interventions revolves around crop diversification in particular, promotion of root and tubers crops especially sweet potatoes and cassava as well as cereals such as millets, sorghums, and drought tolerant maize varieties.

Strengthen post harvest handling and storage practices The third group of interventions is to enhance post harvest management and storage practices so as to minimize losses of agricultural produce. Deterioration in quality caused by improper drying cannot be eliminated until improved drying systems based on mechanical dryers have been adopted.

Rehabilitation, construction and expansion of irrigation infrastructure The long-term intervention towards building resilience of communities involves rehabilitating, constructing, and expanding small-scale irrigation infrastructure schemes and supporting water harvesting (including roof catchments and road water harvesting). Within the arid and semi-arid areas, the recovery interventions should support construction of sub-surface dams, water pans, and dams. This could be done through food-for-work, cash-for-assets or cash-for-work programs depending on the targeted groups.

Promote Soil and Water Conservation To ensure long-term agricultural productivity and build

[25] Nyariki, D.M., Kinyua P.I.D. & Wasonga, V. (2007). A comparative study of commercial consumptive and non-consumptive utilization options for wildlife conservation strategies in Kenya, IFAW.

resilience of the communities to drought, promotion of soil and water conservation in all agro-ecological zones will be critical.

Reduce Human-Wildlife Conflict Where relocation is not possible, create barriers such as electric fences. This would significantly reduce loss of life and property especially in areas that are in close proximity to wildlife reserves and conservancies especially during droughts.

Strengthen the risk bearing capacity of farming communities to adopt good agricultural practices Aside from drought, a combination of poor agricultural practices is the second most important cause of low agricultural productivity and is therefore a risk in marginal agricultural areas. These practices include late land preparation, use of inappropriate seeds and other farm inputs and late planting. In the high potential areas where there is commercial production, poor machine operations, inappropriate soil and water conservation structures, late farm operations and poor pest and disease control all contribute to increased vulnerability of the farming community.

Other interventions to increase risk bearing capacity of the farming communities in the event of drought is to increase their access to credit and to strengthen linkages to financial service providers including access to insurance.

Reconfigure agricultural institutions Finally, it is important to reconfigure some of the agricultural institutions to strengthen research-extension linkages to accelerate the speed at which new technologies are adopted. In addition, there is need to develop gender disaggregated extension service delivery mechanisms because currently, men are the ones who attend training in the rural areas whereas women are the ones who are involved in agricultural production activities. By reconfiguring agricultural institutions so that they make agriculture more attractive to youth and women, it would unleash the energy and innovation that is necessary to build resilience of communities.

## *Needs Estimation*

Kenya's agriculture is predominantly small-scale where production is carried out on farms averaging 0.2–3 ha. This small-scale production accounts for 75 per cent of the total agricultural output and 70 percent of marketed agricultural produce. The majority of these farmers are resource poor and when drought hits, most of them are unable to replant using the appropriate farm inputs. In estimation of needs, it is therefore important to consider provision of these inputs to the vulnerable farmers for at least two seasons to bring them back to production.

To build on their resilience and ensure food security at all times, water harvesting for irrigation purposes should be enhanced through the construction of water pans at the village level. For sustained crop production, it is paramount to conserve the country's water towers and also increase the tree cover at the household level by providing tree seedlings. Other interventions for a resilient community include increasing the area under irrigation, warehouse receipts, improving value additions, and improving extension service coverage in development programmes.



**Table 16 Estimates of Recovery and DRR Needs for the Agriculture Sector**

| Province | | Recovery Needs Ksh. (Millions) | | DRR Needs Ksh. (Millions) | |
|---|---|---|---|---|---|
| | | 2012 | 2012 | 2013 | 2014 |
| Central | Provision of assorted seeds of drought tolerant crops | 95.5 | | | |
| | Fertilizer subsidy (DAP/NPK, CAN) | 88.2 | | | |
| | Water harvesting (construction of water pans) | | 410.0 | 410.0 | 410.0 |
| | Promotion of agro-forestry (Establishment of agro forestry and fruit tree nurseries) | | 0.4 | 0.4 | 0.4 |
| | **Subtotal 1** | **183.7** | **410.4** | **410.4** | **410.4** |
| | | | | | **1,414.9** |
| Coast | Provision of assorted seeds of drought tolerant crops | 409.5 | | | |
| | Fertilizer subsidy (DAP/NPK, CAN) | 307.1 | | | |
| | Water harvesting (construction of water pans) | | 492 | 492 | 492 |
| | Promotion of agro-forestry (Establishment of agro forestry and fruit tree nurseries) | | 0.5 | 0.5 | 0.5 |
| | **Subtotal 2** | **716.6** | **492.5** | **492.5** | **492.5** |
| | | | | | **2,193.1** |
| Eastern | Provision of assorted seeds of drought tolerant crops | 832.6 | | | |
| | Fertilizer subsidy (DAP/NPK, CAN) | 555.1 | | | |
| | Water harvesting (construction of water pans) | | 1,312.0 | 1,312.0 | 1,312.0 |
| | Promotion of agro-forestry (Establishment of agro forestry and fruit tree nurseries) | | 0.8 | 0.8 | 0.8 |
| | **Subtotal 3** | **1,387.6** | **1,312.8** | **1,312.8** | **1,312.8** |
| | | | | | **5,325.9** |
| Nyanza | Provision of assorted seeds of drought tolerant crops | 938.8 | | | |
| | Fertilizer subsidy (DAP/NPK, CAN) | 285.2 | | | |
| | Water harvesting (construction of water pans) | | 984.0 | 984.0 | 984.0 |
| | Promotion of agro-forestry (Establishment of agro forestry and fruit tree nurseries) | | 0.5 | 0.5 | 0.5 |
| | **Subtotal 4** | **1,224.0** | **984.5** | **984.5** | **984.5** |
| | | | | | **4,177.5** |
| Rift Valley | Provision of assorted seeds of drought tolerant crops | 722.4 | | | |
| | Fertilizer subsidy (DAP/NPK, CAN) | 666.8 | | | |
| | Water harvesting (construction of water pans) | | 1,025.0 | 1,025.0 | 1,025.0 |
| | Promotion of agro-forestry (Establishment of agro forestry and fruit tree nurseries) | | 0.9 | 0.9 | 0.9 |
| | **Subtotal 5** | **1,389.1** | **1,025.9** | **1,025.9** | **1,025.9** |
| | | | | | **4,466.8** |
| Western | Provision of assorted seeds of drought torelant crops | 115.3 | | | |
| | Fertilizer subsidy (DAP/NPK, CAN) | 32.6 | | | |
| | Water harvesting (construction of water pans) | | 352.6 | 352.6 | 352.6 |
| | Promotion of agro-forestry (Establishment of agro forestry and fruit tree nurseries) | | 0.3 | 0.3 | 0.3 |
| | **Sub-Total-6** | **147.8** | **352.9** | **352.9** | **352.9** |
| | | | | | **1,206.4** |
| **Grand Total** | | | | | **18,785.6** |

*Source: Estimations by Assessment Team.*

## *Strategic initiatives*

Kenya has a comprehensive policy environment and a large number of different programmes, projects, and initiatives in the agricultural sector. Every intervention recommended in this assessment needs to be aligned to broader development objectives in order to avoid duplication and ensure integrated approaches to build resilience among the affected population. At the time of the drought, there were already some recovery activities ongoing and it is important that going forward, these are built upon.

Needs estimation for the agricultural sector includes focussing on immediate recovery needs as well as building resilience. However, due to the wide-range of ongoing programmes and projects in the agricultural sector contributing to resilience building, one key issue is to identify gaps and to address them. Apart from the identified recovery needs as presented in Table 3, and the resilience needs of constructing water pans, promoting agro-forestry or improving post-harvest handling, there are many other needs of the population to build resilience to drought. Some of them are not immediate recovery needs, rather long-term initiatives to build resilience. Those activities range from training in sustainable agricultural practices (conservation agriculture), improvement of seed systems, post-harvest handling, processing, and value addition to irrigation structures and market access.

Most of these areas are already addressed in the Agricultural Sector Development Strategy (ASDS), its Medium Term Investment Plan (MTIP) and other sub-sector policies. Many of the existing programmes and projects in the sector address these issues however, there are still gaps and overlaps both thematically and geographically. There are several initiatives currently in the sector on enhanced coordination and cooperation, two important ones being mapping of food security activities and so-called alignment process, where all programmes and projects in the agricultural sector are assessed according to their contribution to the MTIP. Once this exercise is finalized in early 2012, it should be used as a basis to plan further interventions addressing the gap and reallocate resources.

Due to these circumstances, the recommendation of this sector is to use the ongoing analysis of existing programmes to build long-term interventions particularly in the area of sustainable agricultural practices, post-harvest handling, processing, value addition as well as water harvesting and irrigation.

The main recommendation is to develop a comprehensive an integrated approach or programme in line with the Horn of Africa initiative and the Country Paper on "Ending Drought Emergencies in Kenya." One of the major issues will be the coordination and streamlining of activities and initiatives. Existing coordination structures such as the Agricultural Sector Coordination Unit (ASCU) should get a clear mandate and be strengthened in their work. That way, successful projects can be scaled up and synergies achieved. With the high number of existing and probable new initiatives in the sector, coordination and collaboration are very important to ensure an efficient and effective approach to building resilience of the affected population.

## *Sector Priorities*

Prioritization of initiatives was done as follows 1) urgency/deadline of the initiative to begin to be successful; and, 2) preparation time and long-term perspective. Interviews with farmers and officers from the District Agricultural Offices are the foundation for this prioritisation.

For the immediate recovery needs of seed distribution and fertilizer subsidies, it is important that the purchase and distribution activities start before the next planting season in order to be successful and enable the farmers to plant in time.

## *Methodology*

To undertake this assessment, the agricultural team collected quantitative and qualitative data from both secondary and primary sources. Three factors guided the choice of methodology First, the team looked at the intensity, geographical coverage and duration of rainfall based on meteorological records availability to meet water demands as well as the drought and its impact on crop production. Based on the assessment, the following districts were selected to represent the impact of drought in the agricultural sector namely Narok, Machakos, Mwingi, Muranga, Makueni, Taita Taveta, Uasin Gishu, Kisumu West, Busia, and Kilifi.

The assessment team also looked at factors that ameliorated or worsened the impact of drought in the agricultural sector such as gender roles, support services, local traditions, infrastructure, proximity to game parks and reserves, social conditions, and relationship between stakeholders. In addition, they included other disasters that impacted the agricultural sector such as floods, pests and diseases and human conflict. In this assessment, the team used a participatory approach in which the client and partners will be involved at all stages of the evaluation through regular briefings and consultations.

Finally, to conduct this assessment, qualitative and quantitative data was collected from both primary and secondary sources. A mix of techniques was used to collect the data that included reviewing secondary data, key informant interviews, and focus group discussions and observations. The following is a summary of the study tools that the team used in the assessment.



Secondary Data The study team collected secondary data namely literature review and other records.

Literature Review and Other Records The team reviewed available documents including monthly, quarterly and annual progress reports, field reports, detailed lists of beneficiaries, stakeholder workshop reports, evaluations and strategic plans, and relevant government documents on development. In addition, the team also reviewed other relevant multimedia records such as photographs and videos where available.

Primary Data To supplement the secondary data, the study team collected primary data from individuals that had been affected by drought using the following methods and tools

Sampling Method In every district, each team identified three representative sites the whole range of drought experiences in that district through discussions with the district agricultural staff.

Data Analysis and Interpretation The study team analyzed the crop data before and after the drought in each district, which included crop acreage, yields, of beneficiaries; prices as per the PDNA guidelines. The team then used their expertise of the Kenyan agricultural sector to weigh the contribution of drought and other factors in the crop losses from 2008 through to 2011. Such factors included the post election violence of early 2008, delayed planting, choice of inappropriate seed and poor crop husbandry practices. Using agro-ecological map of Kenya, the team then identified the patterns of crop losses each year across the country. Using the provincial the team then calculated the average crop losses per province based on the districts in each province and their ecological zones.

Limitations of the methodology Estimating the drought related losses depend on the quality of the information available to the assessment team and how well versed the team is with the local agricultural sector for a number of years. For this reason, the assessment of agricultural losses was the best estimate under the circumstances presented.

Finally, the assessment relied on a very diverse team which was only available for some aspects of the exercise and not the full exercise. The exercise would have benefited if there was more time and if the institutions had an idea of the amount of time involved so that they could release their staff full time and assign the most suitable candidates.



# *Agro*-industry

In this sector are included many privately-owned food processing industries that were indirectly affected by the drought in Kenya during the four-year period 2008 to 2011. While their industrial facilities and capacities were unaffected by the disaster, the quantity of goods processed was lower than normal due to the primary production losses that occurred in different food and industrial crops, as was described earlier in the agriculture crops sector. Under this heading are included grains mills as well as tea and coffee processing industries. Losses of the sugar milling industry are included together with the sugarcane losses in the agriculture sector.

## *Estimated Value of Damage and Losses*

Following the standard procedures of the damage and loss assessment methodology, estimations were made of the loss in value added in the food processing industries that arise due to the lower quantities of food and industrial crops caused by the drought in the entire 2008-to-2011 period.

In the case of grain milling, primary production losses due to the drought as estimated in the agriculture sector were used as the loss of raw materials for the millers, after deducting the normal retention of farmers for their own consumption. The loss in raw material was later on combined with the price differential between unit prices paid at farm-gate and ex-factory levels, thus obtaining the loss in value added at processing.

In the case of coffee and tea processing, a similar process was followed, taking the quantities of primary production losses by Estates and individual producers and multiplying them by the unit price differential between producer, ex-factory and export levels.

In that manner, the value of production losses in these industries was estimated as 7.2 billion Shillings over the entire 2008-to-2011 period. Most affected was the grain milling enterprises, while tea and coffee processors lost considerably lower amounts. (See Table 17) that describes the breakdown of losses by type of industry and over time).

## *Ownership of Losses*

Since the enterprises that operate in this sector are mainly owned by private sector entities, the bulk of the production losses are attributed to the private sector. Nevertheless, there would occur losses in tax revenues to the government for the non-sale of these processed goods.

## *Impact on balance of payments*

The processed goods are destined to both domestic and international markets. In the case of grain mills, their output goes directly to domestic markets, while the processed production of coffee and tea are destined for export to international markets. Thus, the estimated production losses will have a bearing on the country´s balance of payment, to an amount of 1,012.7 million Shillings (or 14.14 million US Dollars) that was not exported in the drought period 2008 to 2011.

## *Recovery Disaster risk Reduction Needs*

In view of the fact that the estimated losses in processing for this sector are a small fraction of the normal value of activity, and that no destruction of physical assets occurred due to the drought, the financial requirements for recovery are not significant.

However, the financial needs for drought-proofing of the primary production of the processed goods are already addressed under the agriculture sector, and are not repeated here to avoid double accounting.

**Table 17 Estimated value of production losses in food-processing industry due to drought in Kenya**

| Agro-industry | Million Shillings | | | | |
|---|---|---|---|---|---|
| | 2008 | 2009 | 2010 | 2011 | Total |
| Coffee processing | 735.4 | - | 71.9 | 52.4 | 859.7 |
| Tea processing | 22.6 | 74.5 | 14.6 | 41.3 | 153.0 |
| Grain milling | 2,399.6 | 2,940.1 | 504.4 | 303.0 | 6,147.0 |
| **Total** | **3,157.5** | **3,014.6** | **590.9** | **396.7** | **7,159.6** |

*Source Estimations by Assessment Team on basis of official information*



# *Livestock*

## *Executive Summary*

Livestock was the sector that was most affected by the drought. The assessment for the period 2008-2011 indicates that the livestock sector sustained negative effects of approximately Ksh 699,336 million with Ksh 56,142 million in damages and Ksh 643,201 in losses as indicated in the summary table below. The damages value represents the death of animals due to the drought while losses were incurred from increased costs from veterinary care, water and feeds, as well as production losses due to disease and death of animals. Rift Valley was the most affected province and 2009 was the year with the highest impact. The various recovery, reconstruction and DRR initiatives envisaged are estimated to cost Ksh 50,237 million, Ksh 56,142 million and Ksh 85,103 million respectively.

**Table 18 Damages, Losses and Needs in the Livestock sector (Ksh Million)**

| Province | Damages | | Losses | | | Needs | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Public | Private | Public | Private | Total | Recovery | Reconstruction | DRR | Total |
| Coast | - | 927 | 8,766 | 974 | 9,740 | 518 | 927 | 1,156 | 2,601 |
| Eastern | - | 12,628 | 79,184 | 8,798 | 87,982 | 2,685 | 12,628 | 12,250 | 27,562 |
| Nyanza | - | 4,088 | 63,050 | 7,006 | 70,056 | 5,657 | 4,088 | 7,796 | 17,542 |
| Central | - | 3,003 | 40,463 | 4,496 | 44,959 | 18,665 | 3,003 | 17,334 | 39,003 |
| Western | - | 4,585 | 38,263 | 4,251 | 42,514 | 10,312 | 4,585 | 11,918 | 26,815 |
| Nairobi | - | 270 | 2,310 | 257 | 2,567 | 4,520 | 270 | 3,832 | 8,622 |
| North Eastern | - | 9,751 | 57,075 | 6,342 | 63,417 | 5,608 | 9,751 | 12,287 | 27,647 |
| Rift Valley | - | 20,889 | 289,769 | 32,197 | 321,966 | 2,272 | 20,889 | 18,529 | 41,691 |
| Total | | 56,142 | 578,881 | 64,320 | 643,201 | 50,237 | 56,142 | 85,103 | 191,482 |

**Table 19 Summary of the livestock effects of the drought in Kenya from 2008-2013**

| Province | Damage | | | | | Losses | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2008 | 2009 | 2010 | 2011 | Sub Total | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | Sub Total | Total |
| Coast | - | 851 | - | 76 | 927 | 494 | 3,229 | 2,637 | 3,026 | 177 | 177 | 9,740 | 10,667 |
| Eastern | 1,291 | 3,495 | 1,893 | 5,948 | 12,628 | 1,810 | 11,906 | 11,991 | 29,319 | 16,478 | 16,478 | 87,982 | 100,610 |
| Nyanza | - | 3,554 | - | 535 | 4,088 | 6,927 | 26,804 | 19,878 | 13,753 | 1,347 | 1,347 | 70,056 | 74,144 |
| Central | - | 2,265 | 397 | 341 | 3,003 | 4,576 | 16,707 | 12,881 | 9,043 | 876 | 876 | 44,959 | 47,962 |
| Western | - | 2,082 | 2,193 | 310 | 4,585 | 4,169 | 16,427 | 12,012 | 8,280 | 813 | 813 | 42,514 | 47,099 |
| Nairobi | - | 122 | 129 | 18 | 269 | 245 | 1,021 | 660 | 555 | 43 | 43 | 2,567 | 2,836 |
| North Eastern | - | 4,608 | - | 5,143 | 9,751 | 2,133 | 11,333 | 10,654 | 20,761 | 9,268 | 9,268 | 63,417 | 73,168 |
| Rift Valley | - | 18,100 | - | 2,789 | 20,889 | 34,979 | 117,948 | 92,226 | 64,667 | 6,073 | 6,073 | 321,966 | 342,855 |
| Total | 1,291 | 35,077 | 4,612 | 15,160 | 56,140 | 55,333 | 205,375 | 162,939 | 149,404 | 35,075 | 35,075 | 643,201 | 699,341 |

## *Background*

The livestock sector contributes approximately 13 percent of Kenya's Gross Domestic Product (GDP), 40 percent to agricultural GDP and employs 50 percent of the agricultural labor force.[26] Kenya's livestock products annual output is valued at Ksh 302,900 million. Approximately 60 percent of the country's livestock is found in the ASALs which constitute about 80 percent of the country's land mass and home of 30 percent of the country's population.

[26] Intergovernmental Authority for Development (IGAD), and the Government of Kenya.

Within the ASALs, it is estimated that 10 million Kenyans – mainly pastoralists and small-scale mixed farmers - derive their livelihood largely from livestock however, extreme weather and climate events greatly impact their livelihoods with these regions being characterized by high evapo-transpiration rates, low organic matter, and poor infrastructure.[27] Food insecurity has been highest among the pastoralists and small-scale mixed farmers found within these regions.

For the last two decades, drought has been a cyclical phenomenon impacting these populations. The years 2005-2006 and 2009 received below normal and poorly distributed rainfall. The country experienced depressed rainfall in five consecutive rainfall seasons leading to the drought of 2009 which saw the depletion of pastures and water especially in the ASALs and deterioration of livestock body condition and reduced immunity. Successive rain failures caused loss of seed banks and poor regeneration of the pasture.

## *Damage and Loss Quantification*

### Damages

The total damages associated with livestock deaths due to rainfall deficits amount to Ksh. 56,140 million. The highest damages were incurred in 2009 amounting to Ksh. 35,078 million with the highest damage in Rift Valley province amounting to Ksh. 20,889 million and minimal damage reported in Nairobi and Coast Provinces (Figure 33).

**Figure 33 Spatial damages from drought in Kenya 2008-2011**

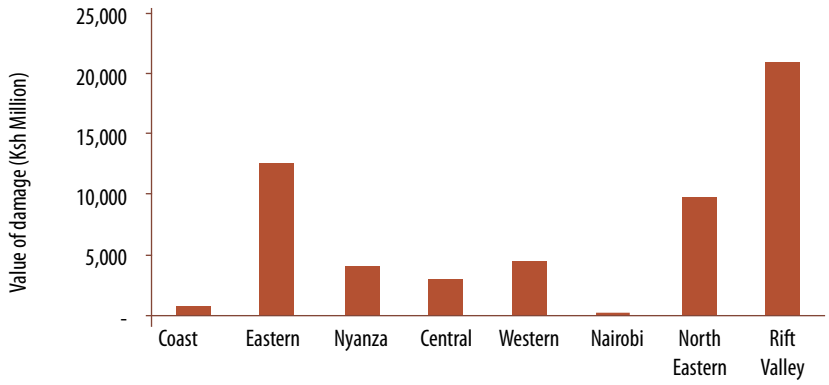



**Table 20 Summary of Estimated losses by type 2008-2011 (Ksh. millions)**

| | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | Total |
|---|---|---|---|---|---|---|---|
| Production losses | 36,219.5 | 176,944.0 | 140,150.5 | 130,503.8 | 35,074.8 | 35,074.8 | 553,967.4 |
| Higher costs of production | 19,114.0 | 28,431.1 | 22,782.5 | 18,899.5 | | | 89,227.1 |
| **Total** | **55,333.5** | **205,371.1** | **162,932.9** | **149,403.3** | **35,074.8** | **35,074.8** | **643,194.4** |

[27] Behnke, R. et al. 2011.

**Losses**

Total losses in the livestock sector were estimated at Ksh 643.2 billion. They include production losses of Ksh 554.0 billion and higher costs of veterinarian attention, and water and feed costs of Ksh 42.5 billion.

The information in table 1 reveals that the highest losses occurred in 2009 (Ksh 205.4 billion) followed closely by 2010 (Ksh 162.9 billion) and 2011 (Ksh 149.4 billion). Geographically, Rift Valley Province sustained the highest losses amounting to Ksh. 322,000 million as opposed to Nairobi Province that sustained only Ksh 2500 million.

Combined Damages and Losses The overall value of damage and losses for the livestock sector was highest in Rift Valley province (Ksh. 322 billion) - several times the level of effects of all other provinces which may be attributed to the high population of livestock in the province and the intensity of the drought. The rest were less but still significantly affected as follows in order of decreasing importance Eastern (Ksh 88 billion), Nyanza (Ksh 70 billion), North Eastern (Ksh 63.4 billion), Central (Ksh 45 billion), and Western (Ksh 42.5 billion). Other provinces sustained much lower values of damage and losses.

## *Socio-Economic Impacts of the Drought*

The drought has led to depletion of pastures and water especially in the ASAL areas resulting in deterioration of livestock body condition and reduced immunity. This has triggered massive migration of livestock from one region to another including national parks, high altitude areas of Mount Kenya, and permanent water sources. Congregation of migrating herds has resulted in increased and widespread disease outbreaks in most parts of the country. Some of the major outbreaks include Foot and Mouth disease in Kwale-Kinango, Makueni-Kathonzweni, Makueni-Mukaa, and Kajiado-

**Figure 34 Spatial Distribution of losses from drought in Kenya since 2008**

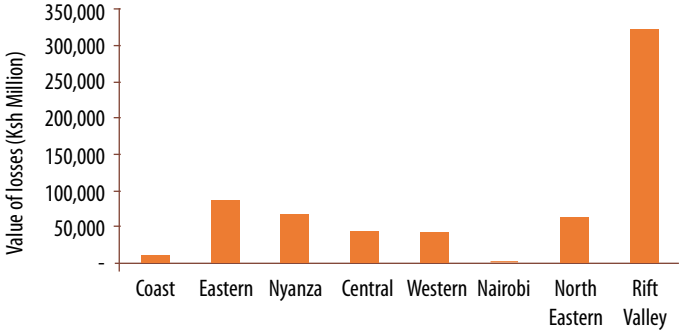



**Figure 35 Spatial distribution of Damage and Losses**

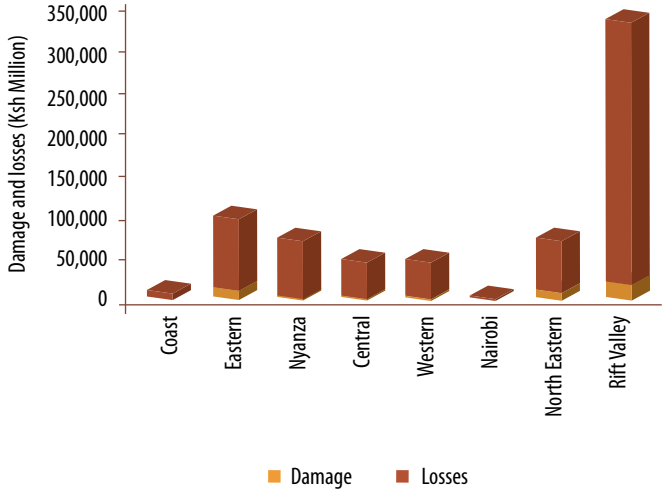
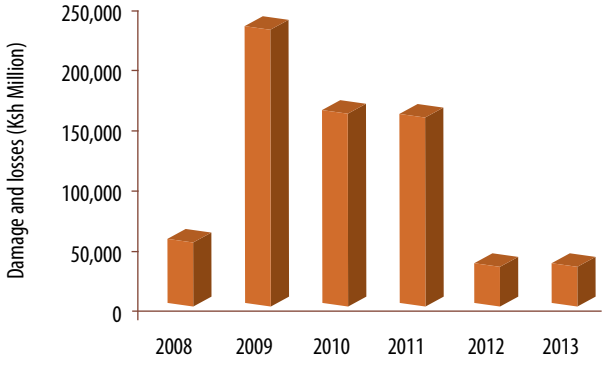



**Figure 36 Variation of drought effects in Kenya**



Kajiado North; Newcastle disease in Kwale; Peste des Petits Ruminants (PPR) in Isiolo, Kajiado Isinya, and Central, Kajiado-Mashuru, and Garissa at varying times between 2010-2011.

Livestock mortalities from starvation and disease outbreaks affected 9 percent of livestock while disease incidence reached more than 40 percent of the herds in the affected districts. This has changed the livestock composition and usage and resulted in depressed livestock productivity. For example in Narok and Kwale, mature cattle used to form 50-60 percent of the herd but currently, this has increased to 80-85 percent on average annually, indicating low productivity. Most families moved with cattle leaving behind sheep and goats. By the end of the drought, most cattle had died leaving households with mostly sheep and goats. In Kajiado County, households have started keeping camels in place of cattle.

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Communities previously who relied on livestock have lost livelihood sources and have hence been rendered destitute. This is evidenced by upcoming settlements along main roads in Marsabit, Wajir and Garissa Counties. The new settlements are by former pastoralists, turned destitute, who have moved to the roadsides to access relief food. Migration of livestock herds and reduced livestock productivity has caused food insecurity, loss of earnings, separation of families, school dropouts, environmental degradation, negative behavioral changes, and resource based conflicts. In addition, high food prices have exacerbated the vulnerability of households through the deterioration of purchasing power. Migration of herders prevented households from accessing livestock products while high food prices occasioned rapid deterioration of terms of trade for pastoralists (50-60 percent below the five year average). For example, goats in the Southern Marginal areas, the most traded livestock species were sold for an average of Ksh 900 in Mwingi and Ksh 1,520 in Meru North compared to the normal Ksh 2,000.

The health status of the vulnerable groups in the ASAL districts was precarious with pastoralists reporting critical rates of acute malnutrition in children (GAM >20 percent) which fall into the WHO emergency threshold. In addition, levels of acute malnutrition deteriorated and were serious (GAM > 10 percent) in districts that had traditionally not been significantly affected in south-eastern marginal and agro pastoral areas, for example Kitui and Kajiado.[28]

Gender roles changed significantly witnessing some households headed by mothers/children – particularly daughters. In some households, fathers migrated with milking herds in search of pasture leaving mothers with children without cash or food to sustain them. For example, in Narok and Kajiado, mothers left behind had no sale rights over the remaining animals and they would only borrow from neighbors but could not sell the livestock left behind for school fees or food. Generally, the droughts led to a

[28] KFSSG-LRA (2009)

breakdown in the family. For example, fathers migrated or abdicated their responsibility to immoral behavior patterns like alcohol and drug abuse or cohabiting with other sexual partners. Child labor intensified and forms of negative sex orientation were witnessed especially in Coastal Counties where child prostitution appears to not only have been accepted but encouraged by vulnerable parents. In Kilifi, girls who appear to be hardly 13 years could be seen in the company of adult tourists who are reported to be sexually exploiting them.

Communities have also resorted to environmentally destructive alternative livelihoods such as charcoal burning, and mineral mining. For example, massive charcoal burning was seen in Kinango District.

Enhanced conflicts and insecurity, particularly in north eastern and north western pastoral areas of Kenya have led to the loss of access to natural pastures, displacements, and market disruptions. In addition, damage to livestock assets has exacerbated conflicts. The current ongoing conflicts in Isiolo, Turkana, Pokot and Marsabit counties can partly be traced to the effects of the drought. Conflict in 2011 in the pastoral areas left more than 350 people dead, compared to 179 in 2010. Conflicts over resources intensify during droughts. OCHA's 2011 tracking of violence in pastoralist areas is comparable to 2009 when Kenya faced another severe drought with 364 killings recorded.[29] These communities resorted to the use of force to restock (through rustling from their immediate neighbors).

Consecutive droughts have led to failure of the natural pasture banks to regenerate and hence expanses of natural pastureland have remained bare and unproductive. For instance, in Turkana, though there has been improved rainfall performance in 2010, no pasture regeneration has occurred. The same scenario was witnessed in Kinango District of Kwale County and in Wajir, Garissa, Marsabit and Mandera.

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The Kenya Food Security Group (KFSSG), Long Rains Assessment Report of 2011 indicated that 3,750,200 people are food insecure, 1,847,500 of whom are in the marginal agriculture areas and 1,903,200 in the pastoral areas. In 2009, however, the number of food insecure people reached over 3.8 million countrywide. There were also 1.5 million school children who were identified to require food aid. The most vulnerable groups are women, lactating mothers and children, people with disabilities (PWD), elderly, and invalids who are usually left

[29] Source UNDSS, media.

behind to be cared for when the household migrate. The care givers - invariably women and children- experience further strain to support the family. Traditional social issues include increased forced early marriages for daughters and female genital mutilation (a premarital preparation of girls in some communities) and a lapse in customs practices. For example, in Isiolo district, the Turkana community have not been able to circumcise two age groups because cattle which they slaughter has been difficult to obtain.

Finally, on delivery of services in the sector, the drought has created weaknesses in institutional capacity. For example, whereas most actors budget for drought risk reduction initiatives, these activities are seldom implemented as the resources are diverted to address emergency interventions thereby limiting the community's capacity to build resilience. There is also an attraction to invest more on emergencies particularly by development partners which is not sustainable.

Coping strategies The communities practiced various coping mechanism to mitigate the effects of the drought including out-migration, herd splitting, distress sales, and slaughter. Out-migration was the most prevalent coping mechanism as inferred to earlier. It involved movement of herds away in search of pastures and water. The migration exposed the herders to further risks of invasion and hostility. For example, in some instances in the Northern parts of Kenya, pastoralists moved into Somaliland covering between 250-400km and while in Somaliland, apart from losing livestock to exhaustion and wild animals, they paid taxes to local authorities.

Splitting of herds during the drought was also prevalent. Some communities divided herds into core and satellite herds. The satellite herds being constituted of males and dry females of the generally larger livestock species such as cattle and donkeys that moved far afield in search of water and pasture. Small ruminants and breeding stock (core herds) were left at the homestead where women and children cared for them. In pure pastoral communities, livestock perceived to not be so important like poultry was abandoned.

Food and feed rationing and change in meal composition was reported with communities reducing quality, composition, and quantity of meals, giving priority to children and the elderly, and shifting from milk and milk products to more of cereals. In some areas, men reportedly secretly sold some livestock and fed themselves from ready-food kiosks and vendors.

There was also some amount of income diversification and generation from non-pastoral activities including subsidiary activities that generate money, rural-urban migration in search of casual labor, drugs and substance abuse, child abuse and immoral practices, petty trade such as tea kiosks, sand harvesting, and charcoal burning.

There was also reliance on relief food aid with close to 25-30 percent of the population relying on relief food in the pastoral, agro-pastoral, and marginal mixed farming areas. Distress sale of livestock (asset stripping) was also prevalent and this entailed selling of livestock to minimize mortalities leading to oversupply of livestock in the market and lower prices for breeding animals.

In some areas, households resorted to slaughtering of newborn calves as a coping strategy for the dams to survive. This essentially led to reduced future breeding stock and output. Other coping mechanism were sharing, loaning and giving of livestock as gifts from kins and kiths, supplementation of grazing with other feeds such as maize Stover, hay, and crop residues from agro-pastoralists.

## *Existing Sectoral Policies and Priorities, and Major Programs*

The government, through various policy documents, has continued to recognize the need to integrate the ASALs in the overall

development strategy of the country owing to the vast untapped resources in these regions. Within the Economic Recovery Strategy for Wealth and Employment Creation (ERS), the government's objective in the development of these areas is to strengthen rural livelihoods through support to livestock and range management, eco-tourism and initiating irrigation projects aimed at improving household food security. Other development objectives for the ASALs include improving marketing infrastructure, security, communication, access to water, education, health, energy, and telecommunication.

The country's economic blueprint Vision 2030 flagship initiatives include creating strategic disease-free zones, prioritizing value additions, rehabilitation of range management, conducting research on livestock breeds, increasing cross-border disease surveillance, and cross-border conflict resolution and management mechanisms, addressing legal and policy barriers and putting in place measures to control environmental degradation.

The Livestock Sector is informed by the Agricultural Sector Development Strategy (ASDS) and the National Livestock Policy. The Livestock Policy objectives include achieving appropriate livestock management systems for sustainable development of the livestock industry, improving and conserving available genetic resources and achieving effective control of animal diseases and pests in line with relevant international codes and standards.[30] The sector mainstreams government policies on gender, alcohol and drug abuse, disability, and environment.

The sector strategic objectives include increasing livestock productivity, enhancing investment in the sector, increasing market access of livestock and livestock produce, and enhancing institutional efficiency and effectiveness in service delivery. The Ministry of Livestock Development implements this strategy through the following functions animal production, range management, livestock marketing, livestock extension services, apiculture and emerging livestock production, value addition and agribusiness, veterinary disease control, vector control, veterinary laboratory disease investigation, veterinary epidemiology surveillance and economics, veterinary public health, clinics, artificial insemination and hides, skins and leather development. Furthermore, the sector should mainstream socioeconomic policies in order to be able to achieve Vision 2030.

Current ongoing programmes include Pan African Tsetse and Trypanosomosis Eradication (PATTEC), ASAL Based Livestock



[30] Republic of Kenya, 2008.

and Rural Livelihoods Support Project (ALLPRO), Smallholder Dairy Commercialization Programme (SDCP), National Agriculture And Extension Programme (NALEP), Kenya Agricultural Productivity Project (KAPP), Sustainable Land Use Project, Kenya Rural Development Programme (KRDP) funded by EC, Regional Drought Decision by ECHO, Central Emergency Response Fund (CERF), among others.

## *Challenges in the Sector*

The livestock subsector faces many challenges and constraints that have had a negative impact on the rate of livestock development. These include weak policy and legal frameworks, low livestock productivity, and erratic and unpredictable weather conditions which affect the quality and quantity of livestock feed and water supply. There is a generation gap and future young farmers are trained to takeover and continue with the industry from their ageing parents.

Other constraining factors include the prevalence of trans-boundary animal and zoonotic diseases and pests coupled with inadequate personnel, infrastructure, transport and financial capacity for disease control, weak delivery of extension services, poor access to local and international markets, and unreliable data and information management in the livestock industry. Weak institutions undermined by low human resource capacity, physical and financial resources further exacerbate the challenges in the livestock sub-sector.[31] The main causes of chronic food insecurity in Kenya may be traced to the challenges facing sustainable development of the livestock sub-sector which include

Attaining sufficient feed and water availability Most livestock farming in Kenya is carried out in the ASALs which are faced with frequent droughts that affect the availability of feed and water resources. Inadequate conservation and lack of strategic feed reserve facilities constrain livestock production especially during the drought periods.

Inadequate markets and marketing infrastructure The domestic market is small and fragmented and lacks an effective marketing information system and infrastructure. The dependence on a few external market outlets has also denied farmers full benefits from livestock production in view of existing international health standards.

Pests and diseases Livestock keepers are burdened by livestock diseases and pests mainly due to their nature of production that demands constant movement with their livestock. This makes disease and pest control delivery difficult for the animal health service providers.

Achieving adequate extension coverage Funding to the livestock sector by government has not been commensurate with the high economic potential of the sector. The geographical area for livestock production is vast punctuated with rough terrain of ASAL. These areas also are not optimally staffed. Therefore, livestock producers are unable to access services on animal husbandry and health services.

Inappropriate legal and regulatory frameworks The livestock sub-sector has been operating with an outdated legal and regulatory framework that has constrained livestock productivity, trade, and effective competition. There is no comprehensive land policy covering use and administration, tenure and security, and delivery systems of land in the ASALs. This has resulted in over-exploitation of the resource leading to environmental degradation.

Limited access to affordable credit One of the main factors causing low productivity in the livestock industry is inadequate credit to purchase quality animals and inputs. Although a number of micro-finance institutions are operating in some areas, they only reach a small proportion of livestock keepers and their lending rates are high. The formal banking

system is yet to develop credit facilities that particularly suit the pastoral communities.

Insecurity Insecurity, particularly in the North Eastern Province and parts of the Rift Valley Province, has resulted in cattle rustling and displacement of people thus contributing to non-sustainable livestock development.

Poor infrastructure Underdeveloped rural roads and other key physical infrastructure have led to high transport costs for livestock and livestock products to the market. This has continued to reduce the ability of livestock keepers to compete adequately alongside others.

Funding for drought risk reduction Government budgetary funding for development and specifically drought risk reduction has not been adequate. Moreover, wherever funding is allocated, it is reallocated to emergency interventions. For instance, in the drought of 2011, the Government reallocated Ksh 1,500 million from its development budget. This effectively reduced its investment for drought risk reduction.

For sustainable development of the sector, funding is critically required to mainstream socio-economic policies for both the staff and the farmers in the sector.

## *Key Objectives of Recovery and Resilience Building and Reconstruction Strategies*

The proposed response strategy is based on the following livelihoods objectives that adopt human rights approach and recognize the role of livestock among the various communities in Kenya.

The first objective is to rebuild key livestock-related assets among disaster-affected communities. The second objective is to protect the key livestock-related assets of disaster affected communities from future shocks and hazards. The strategy to be employed will encompass

i) The need for continued short-term interventions to address reconstruction/ emergency needs to address acute food insecurity for households that have lost most of their livelihood assets, and sustainable mid-term and long-term interventions to accelerate and sustain recovery and resilience of communities;

ii) Facilitating pastoralists to access water and pasture within and without the country's borders to reduce distance to water that usually triples during the drought while availability of pasture is usually constrained and is a source of conflicts/insecurity;

iii) Improving livestock productivity by restoring livestock holding, per capita productivity, introducing drought resilience stock;

iv) Preventing disease incidence through improved immunity (vaccination), pest control, disease surveillance and livestock identification and traceability;

v) Facilitating development of marketing infrastructure and reliable drought early warning information to improve livestock marketing; and,

vi) Capacity building for staff/farmers on sustainable livestock development as well as social and health issue, and environmental principles that add value to the individual, family and community life and hence contribute to national development.

## *Sector Priorities*

The overall goal for recovery in the livestock sector is to restore the livelihood of the affected population and to minimize the suffering of the affected producers. Within a given timeframe and resource envelope, rebuilding livelihoods of the affected households through a targeted restocking program, in particular, develops into a need to consider the households that lost all or a substantial portion of their livestock in the drought since 2005 and have remained destitute.

### Needs Estimation

Table 21 shows the summary of recovery, reconstruction, and disaster risk reduction needs. The recovery needs are equivalent to approximately 30 percent of the losses incurred in 2011, while the reconstruction needs are equivalent to the total damages sustained during the drought period since 2008.

The main priority areas are therefore

Rehabilitation of the resource base in the rangeland through reseeding and water development This will be accompanied by institutionalization of better resource management to guarantee rangeland recovery which involves reseeding, range pitting, bush control, soil conservation, Livestock water rehabilitation and development. Reseeding is an intervention to replenish lost pasture and browse seed in the soil. It is done in combination with pitting to produce quick results in pasture improvement. Reseeding will be done in communal grazing lands using suitable forage and browse seeds (preferably those indigenous to the area), and individual land where forage grown can be harvested and sold or distributed to areas requiring rehabilitation and improvement.

Reseeding is a challenging intervention and can only be successful if the local community takes control, owns and protects the reseeded areas with periodic backstopping and monitoring from technical personnel from various service providers. Therefore, NGOs and local faith based organisations would be required to complement Government agencies in delivering this service. An estimated Ksh 40,000 million would be needed for this priority.

Enhancing livestock diseases and pests control These are key factors that affect the production, productivity and market access of livestock in the ASALs which should be done in the next three years. This priority will be necessary during restocking and management of returning herds. Animal diseases and pests control is important for the viability and sustainability of the livestock sector. Control and eradication of livestock diseases and pests will improve the health status of animals through enhanced immunity and reduce deaths leading to increased productivity.

On the other hand, for trade to flourish in livestock and livestock products both internally and export, there is need to protect humans, animals, plants and the environment against the entry and spread of diseases and pests. It is therefore necessary to establish effective

**Table 21 Summary of Drought Effects and Needs (KSh Millions)**

| Year | Damages | | | Losses | | | Recovery | Reconstruction | DRR | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| | Public | Private | Total | Public | Private | Total | needs | needs | | |
| 2008 | - | 1,291 | 1,291 | 5,533 | 49,800 | 55,333 | | | | |
| 2009 | - | 35,078 | 35,078 | 20,538 | 184,838 | 205,375 | | | | |
| 2010 | - | 4,612 | 4,612 | 16,293 | 146,640 | 162,933 | | | | |
| 2011 | - | 15,160 | 15,160 | 14,940 | 134,463 | 149,403 | | | | |
| 2012 | | | | | | | 50,000 | 45,000 | 20,000 | 115,000 |
| 2013 | | | | | | | 0 | 16,000 | 30,000 | 46,000 |
| 2014 | | | | | | | 0 | | 25,000 | 25,000 |
| 2015 | | | | | | | | | 6,000 | 6,000 |
| 2016 | | | | | | | | | 4,000 | 4,000 |
| Total | | | | | | | 50,000 | 56,000 | 85,100 | 191,100 |

disease control measures to control the spread of trans-boundary and trade-sensitive diseases including facilitating and equipping of local laboratories for effective screening and diagnosis of livestock diseases, promotion of the private sector and community participation in disease and pest control programmes, strengthening of early warning and contingency planning (emergency preparedness) for disease outbreaks and information management, capacity building and strengthening of the public extension service. Livestock identification for traceability will improve security in areas prone to cattle rustling. Ksh 60,000 million is required for this area of intervention.

Establishing and maintaining strategic livestock feed reserve in the ASALs There is need to stabilize livestock feed supply in times of drought disaster shocks. This priority will complement existing grazing systems to cope with adverse weather conditions in the ASALs including wet and dry season grazing and herd splitting. The available options include Establishing fodder banks in strategic locations for hay and acacia pods, restoring of traditional wet and dry season grazing areas in areas where land use has changed, institutionalised conflict resolution and negotiation between hostile communities through grazing for peace, an effective livestock early warning and information system for impeding feed shortages, harvesting of standing hay in tsetse infested areas and other areas to form strategic feed stock, and pelleting of crop residues and forages. Approximately Ksh 35,000 million will be needed for this priority area.

Improving access to credit High initial capital outlay in livestock production and associated development require adequate and focused financing to ensure sustained growth. Reconstruction and part of recovery efforts will be done using this approach. The activities will include identification of pastoral dropouts and other vulnerable groups, purchasing of livestock for redistribution, and participatory extension and disease control services. Owing to the nature of the intervention, this area will attract private sector participation through microfinance institutions, religious banks like First Community Bank and faith based organisations. Other public institutions for channelling the funds are the Livestock Enterprise Fund. Approximately Ksh 55,000 million will be deployed in this area.

Mainstreaming social principles The country's national development plan (Vision 2030) and Constitution are clear on the inclusion of all aspects and socially vulnerable groups such as gender, alcohol and drug abuse- ADA (now considered a disaster in Kenya-NACADA Conference-2012 at KIA-NAIROBI, Kenya), HIV/AIDS, disability, environment, security and safety, information management program, anticorruption etc. Vision 2030 stands on three key Pillars- the Political, the Social and the Economic. It is evident that just like a three legged stool cannot stand without one of the support legs so the country's development vision collapses minus any of the pillars upon which it is founded. The recovery interventions must therefore include funding for this particular aspect of intervention.

## *Methodology*

The assessment covered the entire country. Purposive sampling was used to identify 10 counties (Makueni, Kitui, Kwale, Kilifi, Kajiado, Narok, Isiolo, Turkana, Garissa, and Tana River) for in-depth analysis. These counties lie within the ASAL areas, have high livestock populations (livelihood assets) and experienced highest rainfall deficits across the perennial drought periods.

Secondary data was collected through desk review both at national and district levels. This was validated through key informant interviews and focused group discussions. An interview guide was used among the key informants and farmers to obtain relevant data.

A fully-detailed field assessment of damage, losses, and needs at selected sample counties was analyzed and the results inferred to reflect the entire country. Extrapolation was based on the rainfall indices for every county.

# *Water* and Sanitation

## *Executive Summary*

The frequent occurrence of drought in the country continues to be one of the key challenges affecting development goals. The water and sanitation sector is amongst those most affected by the drought. The assessment indicates that damages as a result of the recent drought spanning from 2008 to 2011 amounted to Ksh 7,736.1 million. This came up as a result of damages to storage facilities, pumping units, transmission systems and damages to sanitary structures. The losses over the same period accumulate to a total of Ksh 72,730.8 million. These were largely due to loss of income at household levels as time was consumed while fetching water. The total recovery and reconstruction needs amounted to Ksh 17,268.2 million. The disaster risk reduction measures to be implemented will cost Ksh 78,627.3 million and will cover the next four years.

**Table 22 WASH Summary Table (all figures in Ksh. Millions)**

| Province | Damages | | Losses | | Total | Recovery | Reconstruction | DRR | Total |
|---|---|---|---|---|---|---|---|---|---|
| | Public | Private | Public | Private | | Needs | Needs | Needs | |
| Central | 491.4 | 0 | 982.7 | 8,844.6 | 10,318.8 | 427.5 | 781.3 | 8,927.3 | 10,136.1 |
| Coast | 838.8 | 0 | 559.2 | 5,032.6 | 6,430.6 | 563.6 | 1,337.2 | 6,771.8 | 8,672.6 |
| Eastern | 2670.5 | 0 | 1,780.3 | 16,022.8 | 20,473.6 | 728.8 | 4,246.0 | 11,542.8 | 16,517.6 |
| Nairobi | 53.9 | 0 | 179.5 | 1,615.6 | 1,849.0 | 403.5 | 85.6 | 6,391.1 | 6,880.2 |
| North Eastern | 1029.3 | 0 | 686.2 | 6,176.1 | 7,891.7 | 297.1 | 1,636.7 | 4,705.7 | 6,639.5 |
| Nyanza | 79.3 | 0 | 793.4 | 7,140.7 | 8,013.5 | 699.8 | 126.2 | 11,083.8 | 11,909.7 |
| Rift Valley | 2446.6 | 0 | 2,038.8 | 18,349.1 | 22,834.5 | 1,286.6 | 3,890.0 | 20,378.3 | 25,554.9 |
| Western | 126.4 | 0 | 252.9 | 2,276.1 | 2,655.4 | 557.3 | 201.1 | 8,826.5 | 9,584.8 |
| Total | 7,736.1 | - | 7,273.08 | 65,457.70 | 80,466.9 | 4,964.2 | 12,304.0 | 78,627.3 | 95,895.5 |

| Year | Damages | | | Losses | | | Recovery | Reconstruction | DRR |
|---|---|---|---|---|---|---|---|---|---|
| | Public | Private | Total | Public | Private | Total | Needs | Needs | Needs |
| 2008 | 577.3 | - | 577.3 | 542.8 | 4,884.9 | 5,427.7 | | | |
| 2009 | 1,385.6 | - | 1,385.6 | 1,302.6 | 11,723.8 | 13,026.4 | | | |
| 2010 | 2,309.3 | - | 2,309.3 | 2,171.1 | 19,539.6 | 21,710.7 | | | |
| 2011 | 3,463.9 | - | 3,463.9 | 3,256.6 | 29,309.4 | 32,566.0 | | | |
| 2012 | | | | | | | 1,241.0 | 6,152.0 | 38,358.2 |
| 2013 | | | | | | | 1,241.0 | 3,691.2 | 23,973.9 |
| 2014 | | | | | | | 1,241.0 | 2,460.8 | 14,384.3 |
| 2015 | | | | | | | 1,241.0 | | 9,589.5 |
| 2016 | | | | | | | | | 9,589.5 |

## *Sector Background*

The WASH Sector covers Water and Sanitation Services in the country. In the water sub-sector, there is both the provision of water services and disposal of waste water. Sanitation entails provision of safe disposal mechanism for human and solid waste. In the Water and sewerage services, the country is divided into 8 regions each under the jurisdiction of a Water Service Boards (WSBs) which is mandated to provide these services. The Boards in turn contracts Water Service providers who operate existing infrastructure and collect revenue from their customers. Though the government aims to achieve 100% coverage, some areas are not yet covered through these service providers and therefore still rely on the traditional methods of fetching water manually from the available sources. These are dams, pans, rivers, springs, wells, privately owned boreholes and simple rain harvesting techniques.

On sanitation, the general public is still being sensitized to provide sanitary facilities using their own resources and the uptake is relatively encouraging but it is being hampered by the damages caused by white ants during dry spells.

**Table 23 Water Coverage Data by Province**

| Provinces | Population | Area Jurisdiction of WSS schemes Km2 | Population within the area of Jurisdiction of WSS schemes | Coverage rate(Population) | Population covered | Population vulnerable to drought (D minus H) |
|---|---|---|---|---|---|---|
| Central | 4,383,743 | 10,806 | 4,399,536 | 57% | 2,305,576 | 2,078,167 |
| Coast | 3,325,307 | 22,730 | 2,643,358 | 55% | 1,358,334 | 1,966,973 |
| Eastern | 5,668,123 | 18,040 | 4,469,874 | 51% | 2,022,353 | 3,645,770 |
| Nairobi | 3,138,369 | 6,414 | 2,196,900 | 98% | 2,152,962 | 985,407 |
| North Eastern | 2,310,757 | 1,531 | 429,100 | 44% | 354,967 | 1,955,790 |
| Nyanza | 5,554,120 | 2,841 | 2,950,508 | 56% | 1,610,664 | 3,943,457 |
| Rift Valley | 10,006,805 | 15,383 | 7,073,294 | 55% | 3,547,165 | 6,459,642 |
| Western | 4,334,312 | 4,353 | 2,010,926 | 61% | 1,269,838 | 3,064,474 |
| Total | 38,721,536 | 82,098 | 26,173,496 | 60% | 14,621,859 | 24,099,680 |

In many cases, water supply and sanitation services for urban and peri-urban areas are centralized, and often coverage is higher. On the other hand, many rural areas rely on household level interventions for sanitation. Pit latrines are the most common sanitation technology in rural areas. 15% of the Kenyan population (18% rural, 2% urban) has no access to sanitation facilities and therefore defecates in the open, and this has huge implications for preventable illnesses like diarrhoea and cholera (usually through contamination of water sources and food). The government with support from partners has launched a programme to scale up sanitation coverage in rural areas through the CLTS (Community-Led Total Sanitation) approach, in which communities are facilitated to analyse their own sanitation situation and the realization of the dangers of open defecation usually triggers immediate latrine construction.

However access to water and sanitation services alone is not sufficient to ensure full benefits, and proper hygiene practices are critical. In particular, it is essential to ensure that all people wash their hands with soap or ash at critical moments (particularly after using the toilet and before handling food), as well as ensure that drinking water is safe (through chlorination, filtration, boiling or other treatment). Research has shown that handwashing with soap alone could prevent 45% of diarrhoeal incidences. Only 5% of caregivers in Kenya regularly wash their hands with soap at critical moments.

The frequency of drought occurrence in the country has been on the rise in the recent years. Among other sectors the Water and Sanitation sector has been adversely affected due to the reduction of water available in the above sources. This has resulted in a decline in the living standards coupled with revenue losses to both private and public sectors. At the household level economic activities get disrupted when the affected families have to spend long hours in search of water. In the public domain, Water Service Providers have incurred massive losses due to reduction in the amount of water supplied to consumers. Increased pressure on the few remaining sources has led to infrastructural damages thus worsening the situation.

The water sub-sector has been undergoing reforms that culminated in the enactment of the Water Act 2002 that led to the creation of several institutions among them 8 Water Services Boards. The water sector reforms aim at enhancing quality, efficiency and transparency

in service delivery by water sector institutions. As a result, water and sewerage services coverage has been on the increase. A National Survey on Water and Sewerage Coverage was conducted from May to September 2010 by the Ministry of Water and Irrigation.

## *Water Sources*

According to the Kenya National Bureau of Statistics (KNBS) 2009 National Population Census, the population of the Republic of Kenya stood at 38,610,097 people. The urban population was 12,487,375 representing 32% of the total population and the rural population was 26,122,722 which correspond to 68% of the total population. Further, the KNBS report highlights sources of water for households in Kenya.

**Table 4.3 Sources of water for households**

| Main Source of Water | Proportion of rural population (%) | Proportion of urban population (%) |
|---|---|---|
| Pond/dam | 5.9 | 1.1 |
| Lake | 1.5 | 0.5 |
| River/stream | 30.4 | 7.6 |
| Spring/well/borehole | 42.6 | 24.2 |
| Piped to dwelling | 2.2 | 14.2 |
| Piped (Yard taps) | 13.4 | 38.4 |
| Jabia/Rain Harvested | 1.3 | 0.7 |
| Water Vendor | 2.3 | 13.2 |
| Other | 0.4 | 0.1 |

## *Drought Impact*

Despite the achievements mentioned above, drought continues to impact heavily on the population that is not covered by water services providers. This arises when some sources dry up forcing the affected population to travel further in search of the commodity. For example, Kinango District has a population of 209,560. The District has 48 dams/pans which serves a population of 173,000. During the serve drought, 80% of these dams/pans dried up and some were extensively damaged as humans and livestock strived to access the last drops.

## *Methodology*

Three trained officials drawn from the Ministry of Water and Irrigation and the Ministry of Public Health and sanitation undertook field trips to collect data and carry out ground surveys on selected districts. Interviews were conducted with the water district heads, public health officers, drought management officers and the local residents. Visits were carried out to areas where drought impact was most adverse to inspect infrastructural damage resulting from the drought disaster and photographs were taken.

The following are the districts that were visited

a) Ganze District - Kilifi County

b) Kinango District - Kwale County

c) Makueni District - Makueni County

d) Narok North District - Narok County

e) Kajiado Central - Kajiado County

The above regions were selected because they experienced varying degrees of impact and therefore were representative of the entire country.

## *Effects of the Drought*

**Damages**

The damages that resulted from the drought arose from destruction of infrastructure. This included failure of borehole accessories due to dry pumping, pan/dam embankment destruction by large number of livestock while accessing the little water inside the few remaining pan/dams. Due to drought, the white ants destroy super structure of sanitary facilities causing losses to individuals who

**Table 25 WASH Damage Summary**

| Province | Damage In Wash Sector (Ksh million) | | | |
|---|---|---|---|---|
| | 2008 | 2009 | 2010 | 2011 |
| | Public | Public | Public | Public |
| Central | 36.7 | 88.0 | 146.7 | 220.0 |
| Coast | 62.6 | 150.2 | 250.4 | 375.6 |
| Eastern | 199.3 | 478.3 | 797.2 | 1,195.7 |
| Nairobi | 4.0 | 9.6 | 16.1 | 24.1 |
| North-Eastern | 76.8 | 184.4 | 307.3 | 460.9 |
| Nyanza | 5.9 | 14.2 | 23.7 | 35.5 |
| Rift-Valley | 182.6 | 438.2 | 730.3 | 1,095.5 |
| Western | 9.4 | 22.6 | 37.7 | 56.6 |
| Total | 577.3 | 1,385.6 | 2,309.3 | 3,463.9 |

have constructed semi-permanent structures. The damage in monetary value for the years 2008, 2009 2010 and 2011 amounted to Ksh 7.7 billion. The damages per province are as tabulated in Table 25.

### Losses

During the drought period, there was reduction in revenue to the service water providers since their production was reduced. However, more significant losses were incurred at the household level because of lost wages. A family member had to spend many hours walking long distances to fetch water instead of undertaking the normal economic activity. Total losses amounted to Ksh 72,730.8 million. The losses per province are as tabulated in Table 26.

## *Social-Economic Impacts of the Drought*

During the drought period, the provinces that suffered greatest stresses resulting from reduced water accessibility, deterioration of sanitation facilities and poor hygiene practices were North-Eastern, Coast, Eastern and Rift-Valley. The effects largely depended on the vulnerability of the water sources. For example, Kajiado district in the Rift-valley province and Kinango in Coast have very few natural surface water sources. The main sources are therefore dams/pans and boreholes most of which dried up during the drought. Once the available sources were depleted, water had to be collected from alternative sources which were further away from the affected households. Evidence on the ground indicates that this duty is mainly borne by women and children.

**Table 26 WASH Loss Summary**

| Province | Loss In Wash Sector (Ksh million) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2008 | | 2009 | | 2010 | | 2011 | |
| | Public | Private | Public | Private | Public | Private | Public | Private |
| Central | 73.3 | 660.0 | 176.0 | 1,584.1 | 293.4 | 2,640.2 | 440.0 | 3,960.3 |
| Coast | 41.7 | 375.6 | 100.2 | 901.4 | 166.9 | 1,502.3 | 250.4 | 2,253.4 |
| Eastern | 132.9 | 1,195.7 | 318.9 | 2,869.8 | 531.4 | 4,782.9 | 797.2 | 7,174.4 |
| Nairobi | 13.4 | 120.6 | 32.2 | 289.4 | 53.6 | 482.3 | 80.4 | 723.4 |
| North-Eastern | 51.2 | 460.9 | 122.9 | 1,106.2 | 204.8 | 1,843.6 | 307.3 | 2,765.4 |
| Nyanza | 59.2 | 532.9 | 142.1 | 1,278.9 | 236.8 | 2,131.6 | 355.3 | 3,197.3 |
| Rift-Valley | 152.1 | 1,369.3 | 365.2 | 3,286.4 | 608.6 | 5,477.4 | 912.9 | 8,216.0 |
| Western | 18.9 | 169.9 | 45.3 | 407.7 | 75.5 | 679.4 | 113.2 | 1,019.1 |
| Total | 542.8 | 4,884.9 | 1,302.6 | 11,723.8 | 2,171.1 | 19,539.6 | 3,256.6 | 29,309.4 |

Access to water makes it possible to practice good hygiene, but more importantly hygiene promotion is required to ensure behavior change and good hygiene practices. Poor or reduced access to water, such as during the drought, makes handwashing with soap impossible or results in its low prioritization. Handling of the scarce water and food, and protection of communal water sources is also critical.

In many cases nutrition and other services to drought-affected communities were provided through local health centres (therapeutic feeding) and schools (school feeding programme). It was therefore necessary to ensure that these groups not only accessed basic WASH services at these centres, but also were educated and enabled to practice good hygiene. In some cases (such as Dadaab), cholera outbreaks were reported during the emergency period.

In Coast province, it was observed that the latrine coverage was very low. This resulted in incidents of water contamination especially where large populations converged on the few remaining water points which were also serving as cattle watering points. Cultural beliefs dictate that there should be no sharing of latrines between in-laws. Since the economic status of most residents does not allow them to construct additional latrines, some family members opted to use the bush as an alternative.

The major impacts related to the sector were the following

- Loss of income due to extra time spent fetching water
- Deterioration of education standards because school-going children miss classes while looking for water
- Incidents of water-borne disease outbreaks
- Low quality of life for women who are overworked
- Low hygiene levels since the little water collected is only enough for domestic purposes and not for cleaning.
- Contamination of surface water due to lack of sanitary facilities.
- Family/clan/tribe conflicts arising from ownership and control of water points
- Reduced revenue by the water services providers due to reduced production
- Cultural practices that discourage the use and sharing of latrines

## *Coping Mechanisms*

In areas where pastoralism is practiced, the affected communities migrated with their animals closer to the remaining water sources (this often meant deteriorating sanitation and hygiene conditions in the areas of concentration). Where established commercial water points were available, people had to



purchase water if alternative sources had dried up. This was made more affordable when the government provided monetary and fuel subsidies to reduce the cost. Water service providers requested for subsidies from the government which include payment for electricity bills and supply of water treatment chemicals. Revision of the country budget was done so as to avail funds for drought mitigation measures.

## *Existing Sectoral Policies and Priorities, and Major Programs*

The Ministry of Water and Irrigation Strategic Plan 2009-2010 provides a road map that will help in the achievement of the Ministry's strategic objectives. The Water Act 2002 provides a legal framework that guided the creation of institutions to manage water resources and manage water services. The implementation of the National Water Services Strategy and the National water Resources Management Strategy has led to improved protection and management of water resources as well as increased access to water services. This will facilitate the achievement of the Millennium Development Goals (MDGs) and the Vision 2030. The Vision for the water and sanitation sector is "to ensure water and improved sanitation availability and access to all by 2030". This objective will be realized in blocks of five-year development plans.



The following are programmes in the Ministry's Strategic Plan

Water harvesting and storage programme This entails the construction of major water storage facilities in Lake Victoria basin along Nyando and Nzoia rivers to contain flooding while conserving enough water for use during the dry spell, inter basin water transfer on Tana river and construction of medium-sized dams in ASAL areas. In addition, improved water harvesting structures will be set up to serve the vulnerable communities.

National water supply and sanitation programme In this programme, several projects are being implemented in the country's major towns to increase coverage. In addition, several medium-sized towns will have their water supplies upgraded. In the rural areas, communities are supported with budgetary allocations to expand existing schemes and construct new ones.

The following programmes exist in the sanitation sub-sector Environmental Sanitation and Hygiene Policy of July 2007.

Approaches for sanitation and hygiene are articulated in the national environmental sanitation and hygiene policy of 2007. Within this framework, the ministry in 2010 developed the sanitation and hygiene strategy whose

thrust was built around Community Led Total Sanitation (CLTS). CLTS was initiated in 2010 by the Ministry of Public Health and Sanitation with support from UNICEF and other partners.

The CLTS approach facilitates communities to analyse their own sanitation situation and triggers them to invest in household latrines to eliminate the dangers of open defecation. The pilot districts were Busia, Siaya, Nyando, Bondo, Kisumu East and Rachuonyo. The successful implementation of the CLTS approach in pilot districts and other similar approaches in the rural and urban, formal and informal areas of the country, all indicate that communities and households can build and manage the local component of excreta disposal. In addition, various partners have been supporting school water, sanitation and hygiene programmes in different districts to improve the learning environment, enrollment and performance. There have also been hygiene promotion projects and campaigns supported by different partners, the most visible of which has been the SOPO campaign.

During the drought, this programme has been scaled up in many of the affected counties including Garissa, Turkana, Pokot and Isiolo, Kwale, Wajir, Marsabit and Kajiado. Other interventions in response to the drought included strengthening of WASH services through the therapeutic feeding centres and schools in affected districts. This included improving access to water (including water trucking and repair of water supply systems) for emergency services, distribution of WASH NFIs (including water treatment products). Capacity building and mobilization of public health officers and hygiene promoters (CHWs) was also undertaken to work with their communities towards adoption of safe hygiene practices.

## *Challenges*

The country is faced with the following key challenges

- High poverty levels
- Continued degradation of water catchment areas
- Increased energy costs
- Lack of comprehensive land policy
- Flooding and drought
- Low storage levels
- Low investment in the water sector
- Cultures in some regions that hinder adoption of basic sanitation

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Right © PDNA 2011

## *Key objectives of recovery and resilience building in the sector*

Expansion of existing water & sanitation infrastructure (to get more consumers connected to reliable water sources). The ongoing expansion of water and sanitation infrastructure by the government aims at ensuring full accessibility by Kenyans. However, its full realization will take long and may not address the immediate needs of those affected by acute water shortage during droughts. There is therefore an urgent need to construct service lines to these areas to cushion the affected population.

Construction of large multipurpose dams Drought situation becomes critical when the available water sources dry up. Since drought periods are often followed by heavy floods, it is necessary to prepare water reservoirs in the form of dams large enough to retain enough water to last during an entire drought period. Within the government's programme on water storage, the dams earmarked for construction should be expanded to accommodate the additional capacity required to cater for the drought period.



Construct more and better pans and medium-sized dams (deeper pans with lining to minimize seepage and evaporation) Water loss in the existing pans and medium-sized dams is attributed to excessive evaporation and seepage. While undertaking repairs on the dams and pans damaged/dried as a result of drought, it is important to deepen them to reduce the effect of evaporation and where possible to introduce linings to eliminate seepage. Protection of the existing pans and dams by fencing and constructing water points and animal watering troughs away from the structure will prevent further damage to these facilities.

Encourage afforestation to restore catchment areas Degradation of catchment areas have significantly reduced the capacity of the available water sources. To re-generate them, there is need to restore and increase the forest cover in all water catchment areas in the country through planting of trees.

Scale up CLTS to reach all of rural Kenya the Ministry of Public Health has launched a campaign to scale up the CLTS programme in an attempt to ensure latrines for all rural households by 2013. This initiative needs to be rapidly taken to scale through mobilization of additional partnerships, resources and capacity. In addition, measures should be taken to lead ODF communities and households up the sanitation ladder. CLTS could be implemented alongside other interventions to scale up sanitation in urban and peri-urban areas

Comprehensive hygiene promotion framework there are many activities and projects undertaken in hygiene promotion by various partners, however a comprehensive/ consolidated and systematic hygiene promotion strategy or programme with adequate consideration for flood, drought and other emergencies is required.

Enhanced WASH in schools programmes as noted elsewhere, schools in disaster prone regions serve as critical epicentres for disaster

response. In addition, lack of WASH services remains a major impediment to ensuring child-friendly spaces. It is therefore necessary to mobilize partnerships and resources to scale up interventions in school WASH targeting the drought and flood regions that are poorly covered.

Encourage construction of more permanent longer lasting latrines In the ASAL areas, latrine coverage is still very low and constructed using the locally available materials. During drought, these latrines get damaged by ants and pests. There is need to facilitate construction of more permanent latrines that can withstand these drought-related damages.

Promote rainwater harvesting at household levels Immediately after the rain season is over, most households embark on fetching water from rivers and streams since they have no storage structures in their premises. When the dry period is prolonged and some sources start drying up, the affected population is forced to walk long distances in search of water some of which comes from unprotected sources. Water harvesting would ensure domestic water availability and reduce exposure to contaminated water.

Commercial / industrial establishment / residential estates to recycle water (avails more water for WSPs to affected consumers during drought) Recycling of waste water will ensure the treated water will be availed for other uses.

## *Needs Estimation*

Recovery in this sector should be carried out in a way that should first and foremost address the humanitarian aspect of the impact. Water is fundamental to all life and in sustaining the environment. Once the drought season is over and adequate rainfall sets in, water availability ceases to be a problem. However, the affected communities will have suffered ravages during the dry spell to such a magnitude that they will be in need of assistance to enable them resume their normal livelihoods and productivity. The heavy losses incurred may reduce people's purchasing power hence the need to provide subsidies. Repairs on storage structures should be carried out immediately, before they dry up since once the rains starts, no further works can be carried out on them.

The second stage in recovery involves reconstruction of the destroyed infrastructure to ensure supply is restored.

The final stage entails the implementation of disaster risk reduction measures. This should ensure that a recurrence of the drought will not subject the people to the same degree of impact and where possible the effects should be completely eliminated.

Annex 1 contains a summarization of preliminary interventions proposed. The following is a summarization of needs

- Repair of dams and pans
- Repair of damaged water infrastructure
- repair of boreholes
- Repair/replacement of latrines
- Water trucking
- Subsidy to alternative water providers

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- Electricity and chemicals subsidy
- additional storage structures
- Sinking, deepening and equipping of boreholes/wells
- Expansion of Existing Water & Sanitation infrastructures
- Construction of large multipurpose dams
- Catchment protection and afforestation
- Promote rainwater harvesting at household levels
- Water recycling for commercial and industrial establishments.

**Table 27 WASH Sector Recovery Action Plan**

| Challenge in Sector | Need | Current Roadblocks (e.g. Information, Institutional Capacity etc) | Activities - What has to be Done to Resolve the Need and to Overcome the Roadblocks | At What Level Should this Activity be Undertaken | Estimated Cost | Responsible | Existing Initiatives and Partners to be leveraged | How Will this Intervention be Different in Delivering Impact | Suggested Indicator of Output Progress | Suggested Indicator of Outcome Success | Baseline and 2014 Target |
|---|---|---|---|---|---|---|---|---|---|---|---|
| I. Degradation of catchment areas, springs and water courses | IA. Rehabilitation and protection of catchment area, spring and water courses | A. lack of fund and institutional capacity of water resources department. Lack of harmonized policies on natural resources (Land forest and water) | Provide financing and build capacity on water resources dep't to ensure enforcement of conservation guidelines. Harmonization of policies to ensure a unified approach to conservation. | County, District, Village | 4,363.8 | Ministry of Water and Irrigation (MWI), Water Resource Management Authority (WARMA) | Ministerial Budget donor partners | Safeguard available water to ensure sufficiency | Acreage of catchment area rehabilitated/ protected. | % of affected people with greater food security | |
| | IB. Sensitization of water resource user association on IA | Formation and operationalization of water users association (WRUAs) very slow | Fast track formation and promote the activities of WRUAs | County, Regional | 2,909.2 | MWI, WARMA | Ministerial Budget donor partners | Initiative targeting water users will ensure ownership of the resource. | No. of operational WRUAs | % population involved in conservation practices. | |
| II. Low water storage capacity nation wide | Increase per capita storage | Insufficient financing | Construction of multi-purpose dams | National, County | 11,636.9 | MWI | Ministerial Budget donor partners | Conserve flood water for use during dry spell | Water storage infrastructures constructed | Per capita water storage | |
| III. Limited access to safe and adequate water. | Increase access to safe water | Insufficient institutional capacity, Ongoing reforms not fully implemented. | Complete ongoing reforms. Development and expansion of water infrastructure | National, County | 10,182.3 | MWI | Ministerial Budget donor partners | Enhance existing programmes to improve access. | Additional water transmission infrastructure constructed | % of population with access to safe adequate water. | |


# *Health*

## *Executive Summary*

Assessment of losses incurred revealed that the health sector incurred Ksh 4.7 billion in losses defined as unplanned expenditure and/or expenditure that would not have been incurred had the drought not occurred. Highest losses were incurred in Rift Valley, Eastern, Central and Western provinces. Recovery needs amounted to KSh 5.1 billion over a period of five years.

**Table 28 Losses and Recovery Needs by Province (Ksh Million)**

| Province | Total Losses | Total Recovery |
|---|---|---|
| | | |
| Nairobi | 284 | 305 |
| Central | 754 | 810 |
| Coast | 431 | 463 |
| Eastern | 797 | 856 |
| North Eastern | 352 | 378 |
| Nyanza | 479 | 515 |
| Rift Valley | 921 | 990 |
| Western | 728 | 782 |
| **Total** | **4,746** | **5,099** |

**Table 29 Losses and Recovery Needs by Year (Ksh Million)**

| Year | Total Losses | Recovery |
|---|---|---|
| 2008 | 1,086 | |
| 2009 | 2,904 | |
| 2010 | 227 | |
| 2011 | 529 | |
| 2012 | | 972 |
| 2013 | | 995 |
| 2014 | | 1,019 |
| 2015 | | 1,044 |
| 2016 | | 1,069 |
| **Total** | **4,746** | **5,099** |

## *Background*

After a period of stagnant and even deteriorating health indicators, the 2008 Kenya Demographic Health Survey began to show some remarkable improvements. Infant mortality declined by 33 percent to 52 per thousand live births and under five mortality decreased by 36 percent to 74 per thousand live births during the period 2004-2008. This decrease can be attributed in part to the successful implementation of disease control programs especially immunization, malaria, tuberculosis, and HIV/AIDS.

While progress has been made in this sector, several challenges still remain. Data on the impact of droughts and other disasters to the health sector is routinely not collected and therefore, it is difficult to isolate the cause of these factors on morbidity and mortality in the country, however, it is clear that these and other shocks can pose serious threats to the well-being of communities across the country.

For example, almost 90 percent of women in Nairobi province deliver at health facilities in sharp contrast to only 17 percent in the north east – Arid and Semi-arid Lands (ASAL) regions - that are highly prone to drought. Women aged 15-24 years are also four times more likely to be HIV infected compared to young men in the same age group (5.6 percent vs. 1.4 percent). There is also a critical gender-gap that can be attributed to gender particularly in North Eastern Kenya.

Over a third (35 percent) of Kenyan children are stunted and 14 percent are severely stunted. The stunting is more prevalent among rural children (37 percent vs. 26 percent) and varies by province from 29 percent in Nairobi to 42 percent in the Eastern Province. Cyclical droughts and resultant food shortages further enhance the nutrition vulnerability especially for children, and pregnant and lactating women resulting in a perpetual cycle of under nutrition. High fertility in dry lands puts further pressure on women.

These are some of the factors impacting the health sector which will be further discussed in the chapter.

## *Damage and Loss Quantification*

### Damages

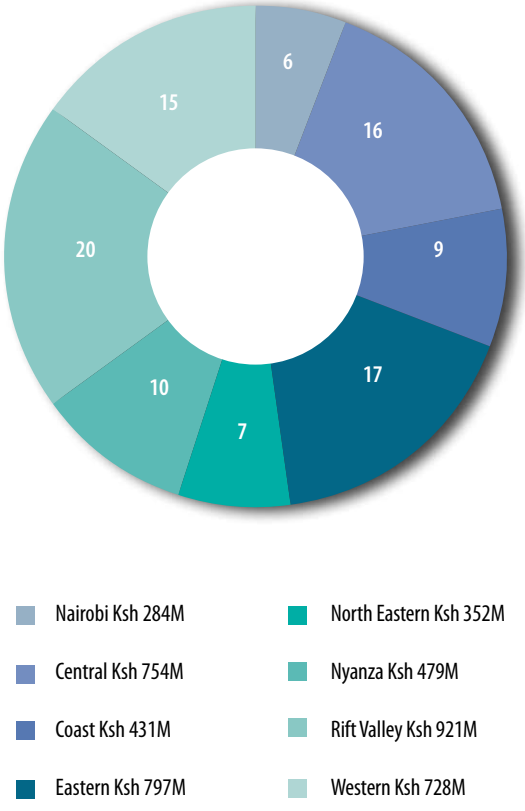
There are no reported damages in the health sector assessment.

### Losses

Losses that were estimated for the health sector included cost of treatment for drought-related morbidity, over and above the regular workload of the sector, and possible lower revenues in hospitals and other centres of the affected areas.[32] Possible unexpected costs to monitor, prevent, and control higher rates of disease and the corresponding vectors were also considered but the data was not available at the time of the assessment.

To estimate these losses, baseline information was collected on the characteristics of existing health facilities historical information on morbidity rates for different diseases for the affected and nearby unaffected areas.

**Figure 37 Higher Cost of Treatment (Losses) in Ksh Million by Province**




It was agreed that drought related morbidity would be determined only from the top ten diseases normally reported. Five diseases were selected, diarrhoea, malaria, skin infections, upper respiratory tract infections (URTIs), and eye infections. Morbidity data was collected for a five-year period 2007 as the baseline or comparative year and 2008 to November 2011 serving as the disaster years. Data was desegregated based on the two age groups the government routinely reports on under five (U5) and over five (O5).

The cumulative differential number of cases was then determined, for example, 2008 cases were compared to those of 2007, those of 2009 were compared to those of 2008 and so on. The resulting higher cost of treatment, based on the incremental cases, was estimated. Unit treatment costs were based on a 2011 published study by Flessa et al. that derived costing methodology per service unit and per diagnosis.[33] Based on this study, the average of the national weighted treatment cost from each public health facility level was derived (Ksh 337), and U5 and O5 treatment costs assumed to be equal.

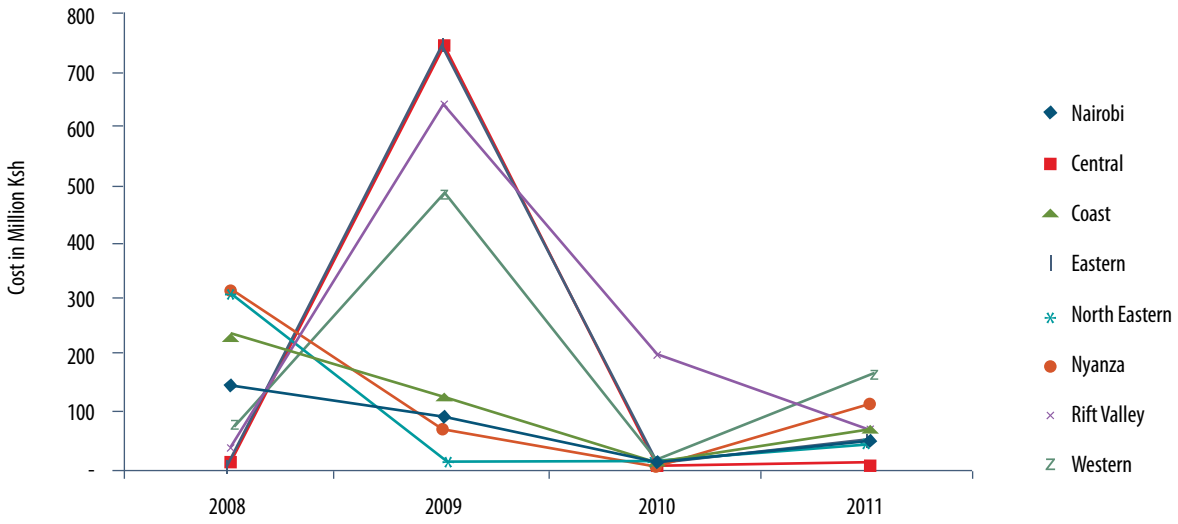
As comprehensive district-level data for extrapolation was not available, provincial level data was used in its place. The highest losses were noted for four of the eight provinces Rift Valley (Ksh 921 million, 20 percent), Eastern (Ksh 797 million, 17 percent), Central (Ksh 754 million, 16 percent) and Western (Ksh 728 million, 15 percent) provinces in that order (refer to Figure 37).

The most affected provinces were also more affected in 2009 when the effects of the drought were felt most. Drought effects generally declined in 2010 but began to increase again in 2011 (refer to Figure 38).

The largest proportion of treatment costs were incurred for URTIs (Ksh 2,075 million [44%]) and Malaria (Ksh 1,517 million [32%]) as illustrated in Figure 39.

[32] Flessa S, Moeller M, Ensor T, Hornetz K Basing care reforms on evidence The Kenya health sector costing model. BMC Health Services Research 2011, 11(1)128.
[33] Ibid.

**Figure 38 Higher Cost of Out-Patient Treatment (Losses) in Ksh by Year and Province**




As with the general trend, diarrhoea cases peaked in 2009, dropped sharply in 2010 and gradually increased in 2011 (refer to Figure 40). Rift Valley and Eastern provinces reported the highest number of drought-related cases and hence incurred the most loss.

Western province recorded the highest losses for the treatment of malaria (Ksh 371 million) with Rift Valley (Ksh 305 million) and Eastern (Ksh 304 million) following. For all provinces, two thirds of these costs were incurred in 2009.

The number of drought-related skin infection cases was generally distributed across the four years, also peaking, comparatively lower, in 2009.

Higher cost of treatment for URTIs was generally consistently high in all provinces especially in 2008 and 2009 and notably in Central, Eastern and North Eastern provinces. While losses dropped for all provinces in 2010, Rift Valley's still maintained a high of Ksh 194 million.

Eye infections recorded lower losses (Ksh 200 million [4%]). Close to 50 percent of these were incurred in North Eastern province (Ksh 96 million), 99 percent of which was in 2008.

**Figure 39 Higher Cost of Treatment (Losses) in Ksh Million by Disease**

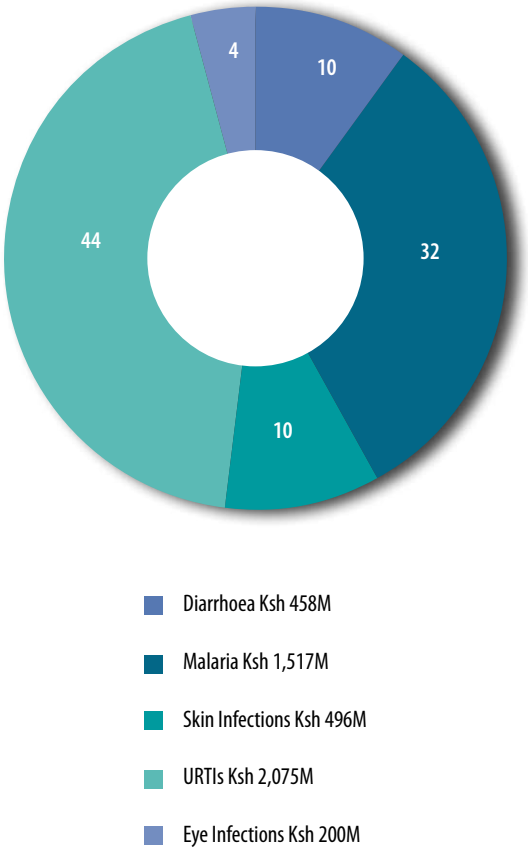


**Figure 40 Higher Cost of Treatment (Losses) in Ksh Million for Diarrhoea**

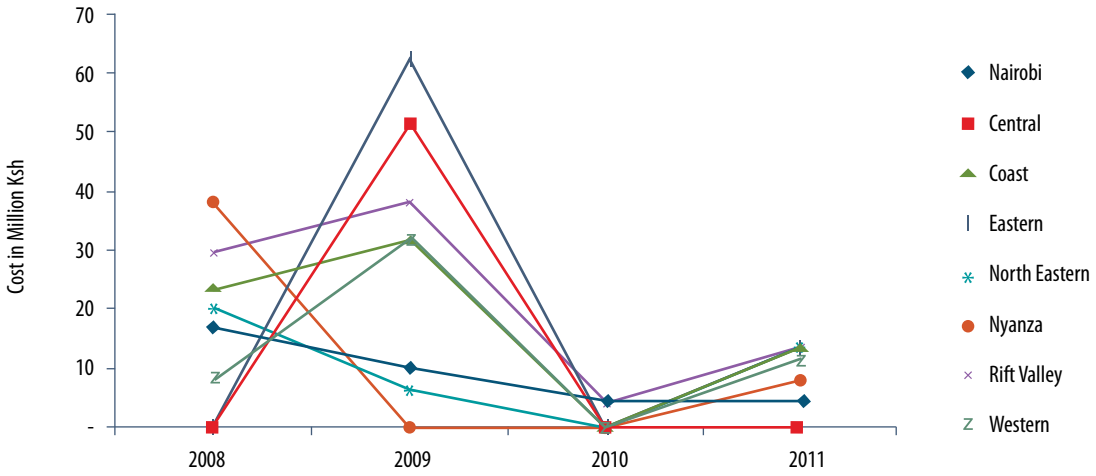



**Figure 41 Higher Cost of Treatment (Losses) in Ksh Million for Malaria**

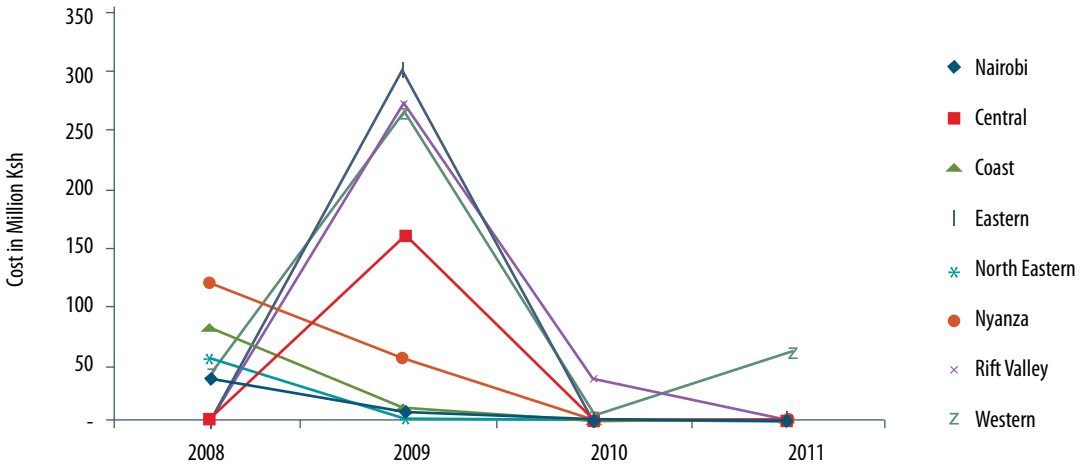



**Figure 42 Higher Cost of Treatment (Losses) in Ksh Million for Skin Infections**

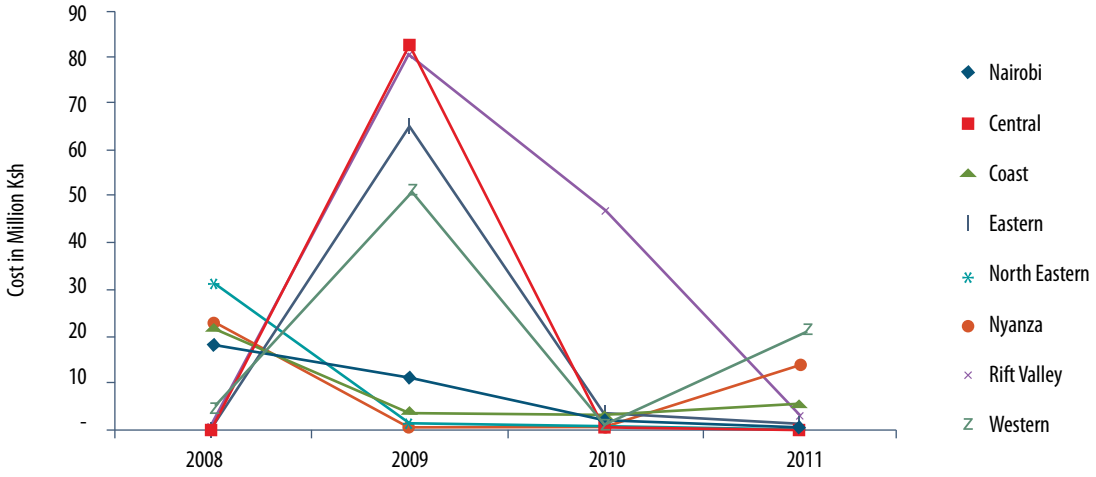


**Figure 43 Higher Cost of Treatment (Losses) in Ksh Million for Upper Respiratory Tract Infections**

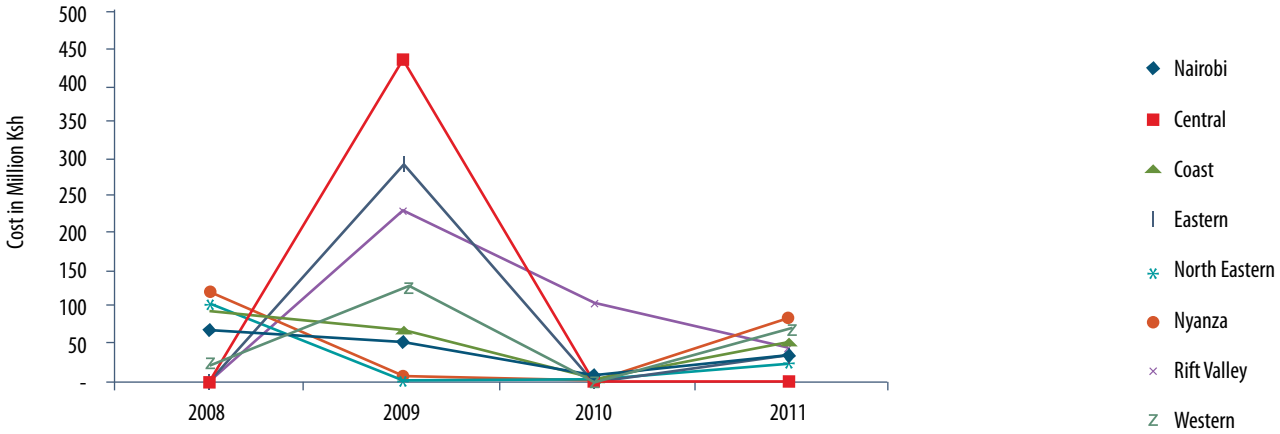
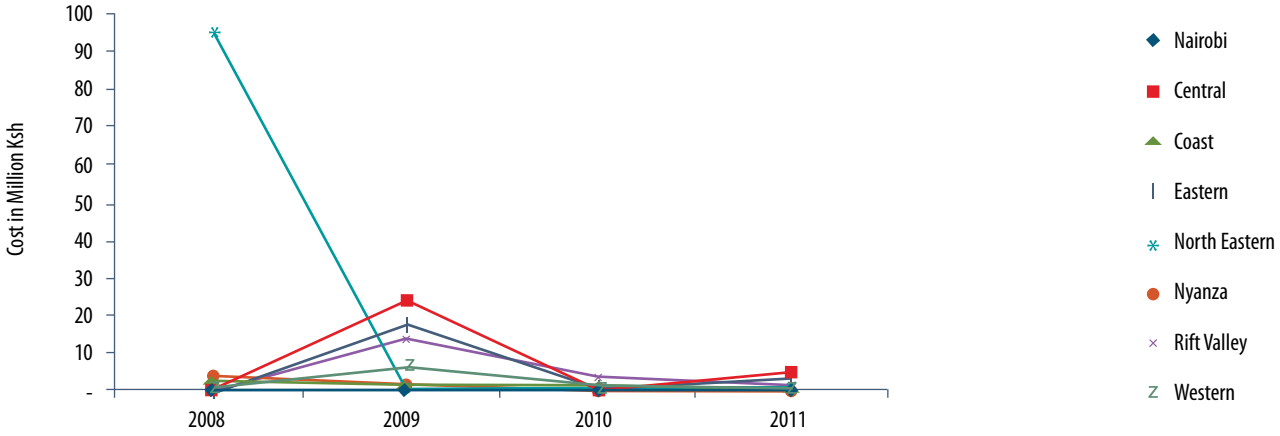



**Figure 44 Higher Cost of Treatment (Losses) in Ksh Million for Eye Infections**




One of the key weaknesses of the case data available was that it catered to out-patient morbidity only. In-patient case data was not available during the period of the assessment hence higher treatment costs were not computed based on the in-patient-out-patient ratio. On average, the in-patient ratio would have been assumed to be 20 percent of all cases for the selected diseases with the in-patient weighted cost 30 times more that of out-patients.

A second limitation was underreporting. With technological advancements in the Health Management Information System (HMIS) beginning in 2008, comparative analysis revealed underreporting in 2007 and part of 2008. Some provinces, such as Nairobi, had higher underreporting than others. Similarly, as earlier indicated, data on outbreak control costs, morbidity specific to exact drought instances, was not taken into account.

## *Socio-economic Impact*

Discussions were held with community members in the six areas visited Kisumu, Nakuru, Murang'a, Kajiado, Makueni, and Kilifi.

The following is a summary of the discussions held

**Table 30 Socio-Economic Impact**

| | |
|---|---|
| Effects of the Drought | • Food insecurity resulting in declining health<br>• Lower health facility (HF) attendance impacting on revenue<br>• Lack of water in the HF<br>• Higher cost of seeking health care<br>• Violence |
| Extent of Damages and Losses | • Higher cost of medical care |
| Coping Mechanisms | • Improved provision of drugs and supplies |
| Humanitarian Needs | • Nutritional supplements<br>• Relief food |
| Recovery Needs | • Sustainable water supply in the HF<br>• Improved sanitation where latrine coverage is low<br>• Relief food and supplements<br>• Functioning cold chains<br>• Improved laboratory services in HFs |
| Disaster Risk Reduction | • Early warning systems<br>• Health promotion initiatives |

## *Needs Estimation*

As the losses summary was at the provincial level, the needs estimation follows the same format. Per capita health expenditure was used as the basis for recovery to baseline prevalence as it ties to all aspects of health systems infrastructure and software needs as well as prevention and curative mechanisms which include i) leadership and governance for health; ii) health service delivery including drugs and supplies and surveillance; iii) human resources for health; iv) health financing; v) health technologies; vi) community ownership and participation; and, vii) partnerships for health development. This would also essentially cover disease prevention and control, and surveillance costs.

The overall cost of recovery amounts to Ksh 5.1 billion which translates to Ksh 400 million above losses (Ksh 4.7 billion).

The recovery needs were also desegregated equally by year.

## *Strategic Initiatives*

The government has already identified double-edged initiatives that will guide the health sector as well as reduce the impact of disasters such as drought. Key principles guiding the sector to attain health goals are shown in Table 33.

## *Sector Priorities*

The current policy framework (under development) has identified health sector priorities by domain. If well implemented, these would serve well to reduce the health effects of drought and other disasters.

**Figure 45 Losses and Recovery Needs by Province**

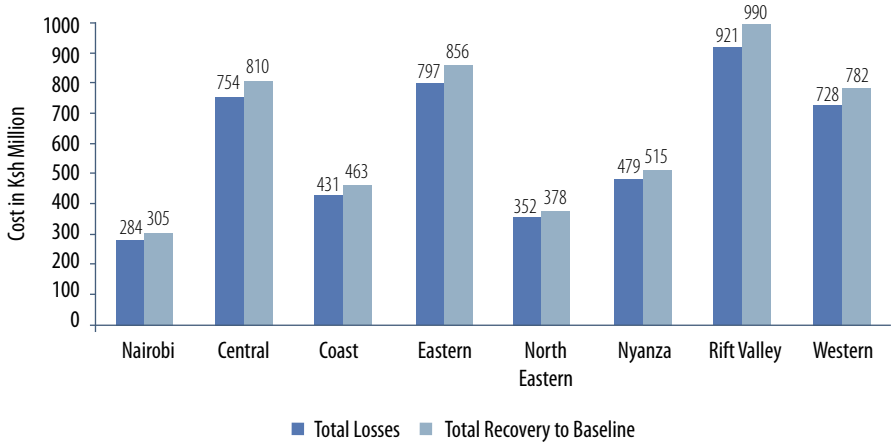


**Table 31 Losses and Recovery Needs by Year**

| Year | Total Losses (Ksh million) | Recovery to Baseline Needs (Ksh million) |
|---|---|---|
| 2008 | 1,086 | |
| 2009 | 2,904 | |
| 2010 | 227 | |
| 2011 | 529 | |
| 2012 | | 972 |
| 2013 | | 995 |
| 2014 | | 1,019 |
| 2015 | | 1,044 |
| 2016 | | 1,069 |
| Total | 4,746 | 5,099 |

**Table 32 Health Sector Priorities[35]**

| Domain | Area of focus |
|---|---|
| Population (public) health | Reproductive Health<br>Child Health<br>Adolescent health<br>Adult and elderly health |
| Individual (medical care) health | Reproductive health<br>Child Health<br>Adolescent Health<br>Adult and elderly Health |
| Risk factors to health | Safe sex<br>Alcohol, and tobacco consumption<br>Physical activity<br>Safe food and nutrition<br>Drug use, and other harmful addictions |
| Health related actors | Safe water access<br>Adequate sanitation<br>Education<br>School health<br>Environmental degradation and solid fuel use<br>Housing<br>Roads<br>Employment<br>Security<br>Urbanization and Health |

**Table 33 Principles Guiding the Health Sector[34]**

| Principle | Focus |
|---|---|
| Participation of Individuals in decisions on their health | Individuals involvement in decisions on matters affecting their health, and so understand, and act in a manner facilitating fulfilment of their right to health |
| Provision of Health services | Individual (medical care), and community (public health) based services provided by duty bearers to allow persons attain their right to health |
| Reducing social inequalities | By class, gender, ethnicity, region |
| Ensuring favourable conditions in early life | Ensuring persons have the best possible start to life |
| Creating Health security | Providing income security, and Social security policies, with an aim of protecting those at risk |
| Promoting environmental and consumer protection | Ensure adequate physical environment available |
| Engagement with sectors that influence health | Influencing strategies, and monitoring of actions in health related sectors, which actions have a significant impact on overall health of the population |

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[34] Ministry of Medical Services (MOMS) [Kenya] T, Ministry of Public Health and Sanitation (MOPHS) [Kenya] T Comprehensive National Health Policy Framework 2011 - 2030. 2011.
[35] Ibid.

# Nutrition

## *Executive Summary*

Drought aggravates food insecurity and increases malnutrition. Overall, there were no damages in the sector as a result of the drought periods but losses were incurred, in the form of higher treatment costs, due to increased morbidity, malnutrition and deaths. The overall losses recorded in the nutrition sector amount to Ksh 6,699.39 million over the four year period. The highest losses were recorded in year 2008 (Ksh 2,543.3 million) and in Rift Valley province (Ksh 2,933.3 million). Total estimated needs for recovery and DRR amount to Ksh 356 Million. This amount will be spent on four key activities prevention and management of acute malnutrition, vitamin A supplementation, nutrition surveillance and capacity building in the sector.

**Table 34 Nutrition Sector Summary by Province (Ksh. Millions)**

| Province | Damages | | Losses | | Total | Recovery | DRR | Total |
|---|---|---|---|---|---|---|---|---|
| | Public | Private | Public | Private | | | | |
| Nairobi | | | 35.8 | 83.5 | 119.3 | | | |
| Central | | | 50.0 | 116.7 | 166.7 | | | |
| Coast | | | 110.7 | 258.3 | 369.1 | | | |
| Eastern | | | 480.8 | 1.122.0 | 1,602.9 | 28 | | 28 |
| North Eastern | | | 115.3 | 269.0 | 384.3 | 47.7 | | 47.7 |
| Nyanza | | | 62.1 | 144.9 | 207 | | | |
| Rift Valley | | | 406.5 | 948.6 | 1,355.2 | 114.0 | | 114.0 |
| Western | | | 49.4 | 115.3 | 164.8 | | | |
| Sub –Total | | | 1,310.8 | 3,058.7 | 4,369.5 | | | |
| P &L Mothers | | | 29.9 | 69.7 | 99.7 | 35.4 | | 35.4 |
| Overall Total | | | 2,009.8 | 4,689.5 | 6,699.4 | 225 | 130.9 | 356 |

**Table 35 Nutrition Sector Summary by Year (Ksh. Millions)**

| Year | Damages | | | Losses | | | Recovery | DRR | Total |
|---|---|---|---|---|---|---|---|---|---|
| | Public | Private | Total | Public | Private | Total | Needs | Needs | |
| 2008 | | | | 762.9 | 1,780.3 | 2,543.32 | | | |
| 2009 | | | | 472.2 | 1,101.8 | 1,574.06 | | | |
| 2010 | | | | 91.71 | 214.0 | 305.71 | | | |
| 2011 | | | | 682.8 | 1,593.4 | 2,276.30 | | | |
| 2012 | | | | | | | 225* | 130.91 | |
| 2013 | | | | | | | | | |
| 2014 | | | | | | | | | |
| 2015 | | | | | | | | | |
| Total | | | | 2,009.8 | 4,689.5 | 6,699.39 | 225* | 130.91 | 356 |

## *Background*

The goal of 'Kenya Vision 2030' is to "transform Kenya into a globally competitive and prosperous nation with a high quality of life by 2030". The first five Millennium Development Goals (MDGs) are to eradicate extreme poverty and hunger; to achieve universal primary education; to promote gender equality and empower women; to reduce child mortality and to improve maternal health. Achievement of these goals requires a healthy and productive labour force which cannot be achieved in the presence of widespread food insecurity. Drought aggravates food insecurity and increases malnutrition due to under nutrition. Under nutrition is recognized as a significant public health problem in Kenya and greatly

impedes socio-economic development. Malnutrition, if not controlled is responsible for growth faltering; aggravates susceptibility to diseases; increases the cost of disease management; impairs mental development and significantly contributes to early childhood death.

Kenya has experienced severe droughts since 2008 to 2011. Although duration of drought periods differ by region, in the ASAL region drought periods were experienced for up to 25 months, between August 2008 to October 2011. Although 2010 was a normal season in the grain basket region of the Country, Western Kenya, Central Rift valley and Central provinces, parts of the ASAL districts continued to experience below average rainfall culminating in the 2011 La Nina which ended in late October 2011. The 2011 drought was considered more severe coming after three failed seasons and had serious consequences on the health and nutritional status of the populations residing in the ASAL areas. Consequently, several interventions were put in place to mitigate the negative effects lessening the negative impact in the health sector. The interventions were informed by the early warning information generated to facilitate timely response, without which the situation would have been totally different, thanks to the Government's efforts with support of partners. Since 2009 Kenya has maintained various interventions to protect lives, livelihoods and maintain productivity of affected individuals.

The problem of child malnutrition is seen as a major threat not only to health and survival of individuals, but also to the larger development aspirations of the nation. Achieving MDGs is proving a challenge to attain and can only be reached if the nutrition of women and children is prioritized through national development programs. Figure 46 shows the National trends in child Malnutrition (1993- 2009).

### Estimated Losses in Nutrition Sector

Overall, there were no damages incurred to the sector during the drought periods but losses were incurred, in the form of higher treatment costs, due to increased morbidity, malnutrition and deaths above the 2007 baseline. This section describes the estimated losses incurred as a result of increased malnutrition during drought episodes from 2008-2011.

**Figure 46 National Trends in Malnutrition Rates**

**Table 36 Summary of losses incurred by the nutrition sector from 2008 -2011.**

| Nutrition Summary (Type, Province, Year) | | | | | |
|---|---|---|---|---|---|
| Higher costs due to drought for Management of Acute Malnutrition in Children (Million Ksh) | | | | | |
| **Province** | **2008** | **2009** | **2010** | **2011** | **Total** |
| Nairobi | 51.40 | 58.80 | 9.30 | - | 119.50 |
| Central | 71.70 | 82.10 | 12.90 | - | 166.70 |
| Coast | 200.50 | 127.70 | 40.90 | - | 369.10 |
| Eastern | 871.80 | 718.30 | 12.80 | 530.60 | 2,133.50 |
| North Eastern | 146.90 | 152.30 | 85.20 | 121.50 | 505.90 |
| Nyanza | 89.10 | 101.90 | 16.10 | - | 207.10 |
| Rift Valley | 1,040.90 | 223.40 | 91.00 | 1,578.00 | 2,933.30 |
| Western | 70.90 | 81.10 | 12.80 | - | 164.80 |
| Sub –Total | 2,543.30 | 1,545.40 | 280.90 | 2,230.10 | 6,599.70 |
| | | | | | |
| **Higher Costs for Treatment of undernourished Mothers (Million Ksh)** | | | | | |
| **Province** | **2008** | **2009** | **2010** | **2011** | **Total** |
| Eastern, North Eastern, Rift Valley, Coast | 0 | 28.70 | 24.80 | 46.20 | 99.70 |
| Total Cost | 2,543.32 | 1,574.06 | 305.71 | 2,276.30 | 6,699.40 |
| **Overall cost (Ksh)** | **6,699.39** | | | | |

The overall losses recorded in the nutrition sector amount to Ksh 6,699.39 million over the four year period. The highest losses were recorded in year 2008, Ksh 2,543.32, followed by year 2011, Ksh 2,276.30. The highest losses were incurred in Rift Valley province Ksh. 2,933.3 million; Eastern province Ksh. 2,133.5 million; North Eastern province Ksh. 505.90 million and Coast province Ksh.369.1 million. While the losses were countrywide from 2008-2010, in 2011 the losses were mainly concentrated in the arid and semi-arid districts in three provinces Eastern, North Eastern and Rift valley provinces where drought was most severe. The other regions recorded improvements in nutritional status due to a better rain season and preventive measures put in place to mitigate drought by the nutrition sector.

## *Methodology*

In order to prepare this report the team reviewed secondary data from several health sector reports including Kenya National Bureau of statistics (KNBS), Kenya Food Security Steering Group (KFSSG) and other baseline data. The team also made a week long field visit to gather first hand information on the impact of drought from 2008-2011 on the health sector. The districts visited for primary data collection were Kajiado, Makueni, Kilifi, Murang'a, Naivasha, and Kisumu in Rift Valley, Eastern, Coast, Nyanza and Central province. Pertinent secondary data was obtained from North Rift (Turkana), Upper Eastern (Marsabit, Isiolo) and North Eastern (Wajir, Mandera and Garissa) provinces which could not be visited for security reasons.

Data on prevalence of acute malnutrition from 2007 to 2011 was gathered and compared. Data for year 2007 was considered as the baseline data since the drought began in year 2008. The observed trends in prevalence of Acute Malnutrition, based on the data gathered from nine districts (Kajiado, Makueni, Kilifi, Turkana, Marsabit, Isiolo, Wajir, Mandera and Garissa) are shown in Figure 47. Generally, as observed there were more cases of malnutrition in 2009 and 2011 indicating more severe droughts. The improving trend of 2010 was interrupted by the drought that followed from October 2010-October 2011.

The rise in malnutrition due to drought among the most vulnerable groups, children under five and pregnant and lactating women was estimated and used for loss calculation.

Further, the actual incremental caseloads in Selective Feeding Programs in the worst affected ASAL districts from 2009 to 2011 are shown in Figure 48. The admission trends for acutely malnourished children under-fives in the Arid and Semi-Arid land showed that the admissions were higher 2011 compared to 2009 and 2010 and this data was used for loss calculations.

**Figure 47 Comparison of annual prevalence of acute malnutrition in nine ASAL districts compared to national average (2007-2011)**

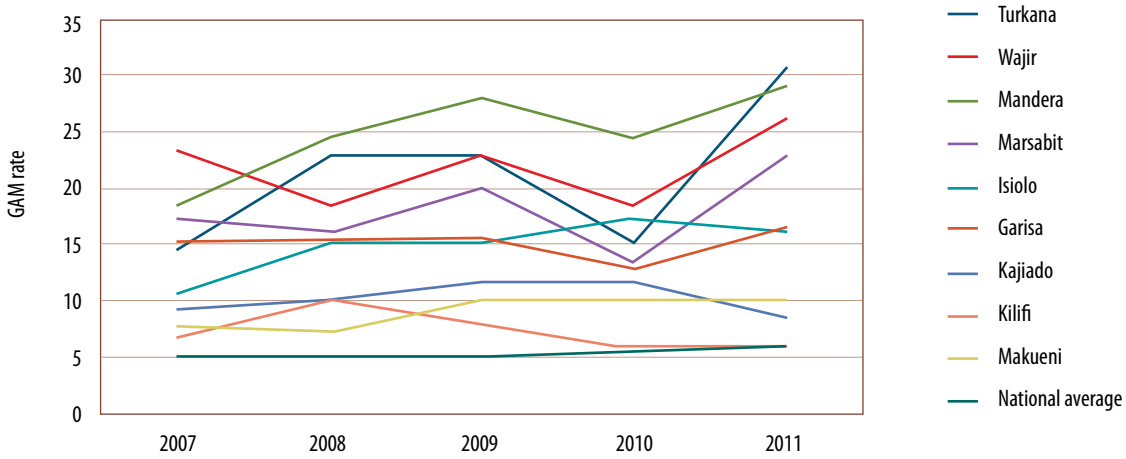
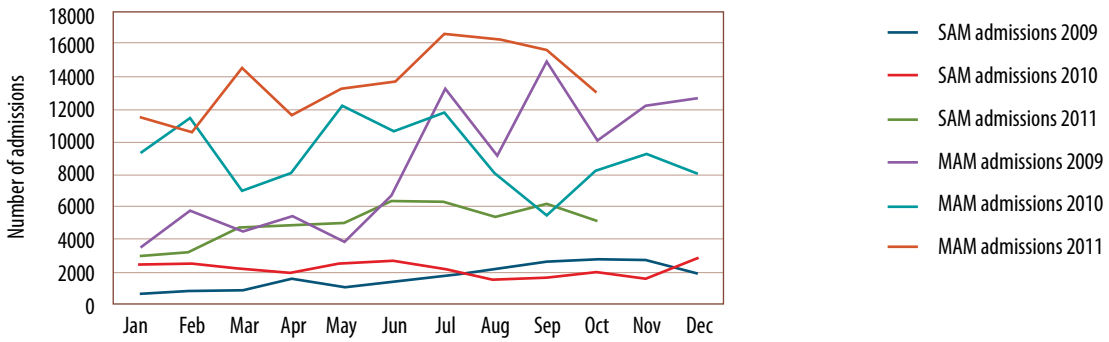



**Figure 48 Comparison of monthly trends in admission of children with severe acute malnutrition and Moderate acute malnutrition (2009-2011)**



### Determination of aggregate losses by province

After isolation of drought months for each year from 2008 to 2011, the results of the incremental caseloads were extrapolated to each province and this increment compared to the pre-disaster baseline (year 2007) prevalence. The figures are based on extrapolation of data obtained from incremental Severe Acute Malnutrition (SAM) and Moderate Acute Malnutrition (MAM) rates of nine districts during drought years.

### Determination of recovery needs

The calculation for recovery needs was based on consideration of the national targets for reduction of wasting to 3% or better and what is considered achievable for the drought prone areas.

The general Recovery and Disaster Risk Reduction (DRR) needs in order to return to the pre-disaster baseline level of 2007, or better, is Ksh 356 million for the Nutrition sector. This is based on the requirements for prevention and management of acute malnutrition in children under five years; pregnant and lactating mothers; vitamin A supplementation and nutrition surveillance costs for this target group. Other associated nutrition interventions are considered as requirements for routine programming for Nutrition and Health promotion under normal development programs for these vulnerable groups.

The recovery and DRR needs are also based on the requirements for promotion of maternal and child health, prevention of malnutrition and reduction of prevailing GAM rates to pre-disaster levels and a more acceptable average beyond 2012. The target is based on the national MDG target of 3% by year 2015. The target prevalence for each province by year 2012 Figure 49, show the desirable reduction of acute malnutrition from year 2012 to 2015 and 2017.

**Figure 49 Target prevalence on acute malnutrition compared to the current situation (2012-2017)**

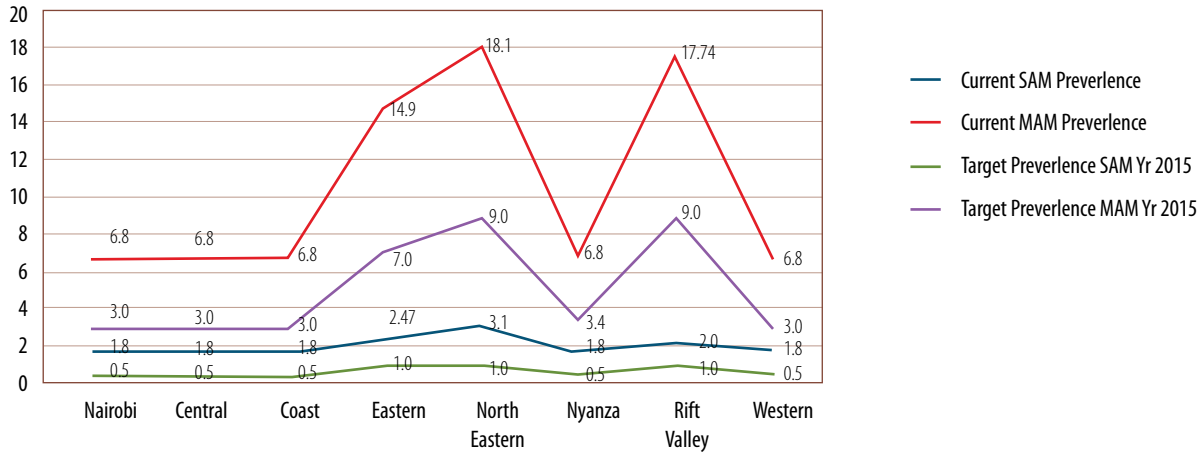
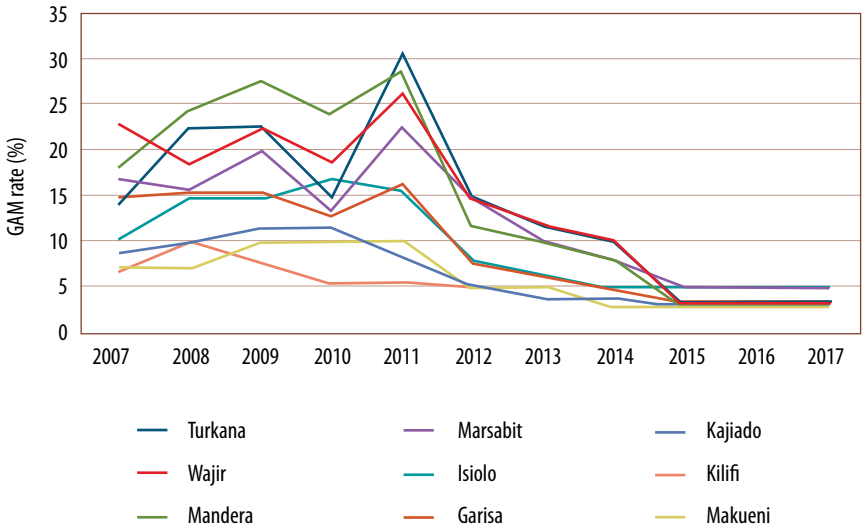


**Figure 50 Projected reduction in GAM rates (2012 to 2017)**




## *Socio-economic impacts of drought*

- Increased malnutrition due to food insecurity. The spikes in malnutrition during drought years are shown in figure 44.
- Increased defaulter rates in health care programs – Supplementary Feeding Programs (SFP) and Anti-Retroviral Therapy (ART).
- Increased length of stay and high relapses in Nutrition Programs. Higher numbers of malnourished individuals are spending more time in SFP programs or high getting readmitted increasing the cost of management.
- Poor dietary diversity due to unavailability of food from the market and at households level
- Increased defaulting from exclusive breastfeeding (by mothers facing hunger). This was particularly reported in areas where there was no SFP in place.
- Poor coverage in remote areas due to poor communication network and inadequate resources.
- Lack of water in health facilities to run programs compromising sanitation in the facilities
- Delay in implementation of nutrition programs due to delayed funding of needs

**Recommendations for recovery and DRR**

- Increased funding for implementation of High Impact Nutrition Interventions (HINI).
- Increase nutrition staff in affected areas
- Capacity building of nurses managing SFP programs
- Enhance community Nutrition Education
- Ensure efficient coordination mechanisms at all levels
- Maintain efficient nutrition surveillance systems to support timely detection and response
- Contingency planning should be done early to avoid delays in emergency response
- Community sensitization and mobilization for nutrition services to be effective

**Other recommendations to improve food security and reduce poverty**

Boost agricultural and livestock production through

- Increased irrigation farming,
- Improved farming methods
- Promotion of appropriate crops (DTC)
- Promote use of certified seeds to increase production.
- Improve livestock management
- Promote destocking during droughts
- Rearing drought resistant breeds
- Promotion of Hygiene at household and community levels
- Improve water availability and accessibility
- Promotion of hygiene in public institutions
- Encourage diversification of income sources
- Capacity building for income generating activities should be enhanced for women and the rural youth
- Education of men to support vulnerable household members

**Coping strategies reported in districts visited**

- Feeding children first,
- Reduction in number/size of meals,
- Migration to urban centers for casual work or tourist attraction.
- Sale of relief food to meet other needs and mnazi.
- Enrolment in FFA especially women.
- Irrigation where possible,
- Water trucking by government to institutions and
- Communities' diversification of income sources.
- Sale of household assets to buy food and medicine

**Existing sectoral policies, priorities and major programs**

Currently, the Ministry of Public Health and Sanitation is spearheading delivery of Essential Nutrition Services and High Impact Nutrition Interventions (HINI) at facility level to promote Maternal and Child health through a partnership agreement with specialized partners. When the droughts were more severe in 2009 and this year 2011 the Nutrition Technical Forum agreed to implement Blanket Supplementary Feeding of all children, and pregnant and lactating mothers to prevent deterioration of their nutrition status besides scaling up selective feeding programs. These interventions are implemented by both government and development partners and targeted the worst affected districts in the North and Northeastern part of the country. The interventions generally focus on promotion of optimal infant and young child nutrition, prevention of micronutrient deficiencies, integrated management of acute malnutrition, de-worming, prevention of diarrheal diseases and nutrition education.

Further, the Ministry of Public Health and Sanitation has set up the Interagency Coordination Committee (ICC) and Nutrition Technical Forum (NTF) with stakeholders who provide policy guidance, technical support and coordination of all nutrition activities in the country. The success registered through the shared cost and responsibility of managing child and maternal nutritional status particularly during drought is attributed to the effective joint planning and coordination of nutrition development and emergency response programs agreed upon through this forums. More emphasis has been placed in drought

prone ASAL areas responsible for the recorded high national averages for stunting, wasting and underweight among children.

## Challenges

- Staff shortages- there are only 520 nutritionists in the country. More are required to handle the high caseloads especially in remote ASAL areas during drought periods.
- Relapses during drought periods
- Inadequate capacity to manage malnutrition by nurses. Due to high turnover regular training is required.
- Lack of capacity to reach all affected children and mothers in due to logistical challenges
- Poor accessibility to remote communities due to poor communication infrastructure affecting coverage
- Poor referral, monitoring and reporting systems from the community level
- High poverty levels in some areas.
- Food safety standards are not adhered to strictly during emergency response
- Increasing HIV cases and poor ART compliance due to food insecurity. In on sub-district hospital in Kilifi it was reported that 3 HIV cases are diagnosed each month.

## Key objectives of recovery and resilience building in this sector

The aim of recovery and resilience building is to reduce the prevalence of malnutrition to pre-disaster levels and support systems to ensure that child health is protected, morbidity reduced and chances of survival increased.

## Needs estimation

Total estimated needs for recovery amount to Ksh 356 Million. This amount will be spent on four key activities prevention and management of acute malnutrition, vitamin A supplementation, nutrition surveillance and capacity building in the sector. These are areas that require additional support to tackle the problem of child and maternal malnutrition morbidity and mortality. It is considered as the requirement to reduce the current prevalence to the national target level of 3.0% by year 2015. Other activities are expected to be part of the routine nutrition programs by government and partners currently set to maintain the trend towards the MDG target and attainment of vision 2030. The recovery needs have been divided into three clusters based on the level of vulnerability to drought and severity of malnutrition. These are 11 arid districts (60%), 12 semi-arid districts (30%) and other areas (10%). The actual recovery needs are shown in Table 37.

The Government directly supports child health care through routine programs up to 30%. The balance of 70 % is shared by the private sector and Donors. See Figure 51. However, after disasters the requirements for humanitarian support increases which cannot be managed without external support. The budget allocation for nutrition programs in Kenya rose to 0.6% of the total health care budget, an improvement from 0.2% in 2007 and 0.4% in 2008.

**Figure 51 Child healthcare support breakup**

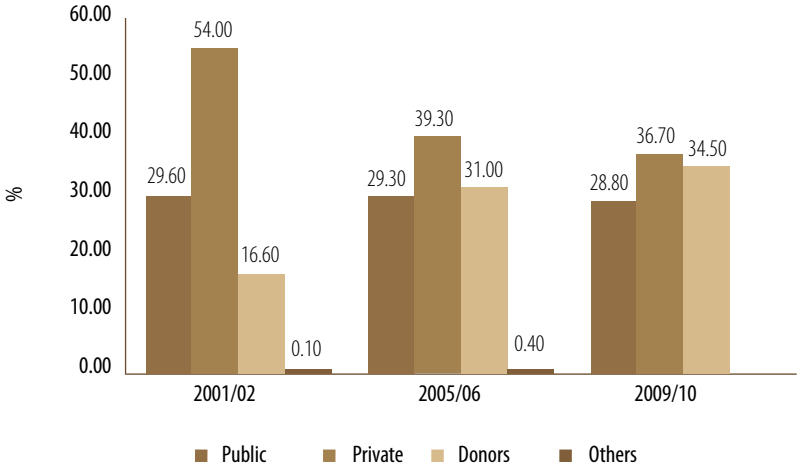
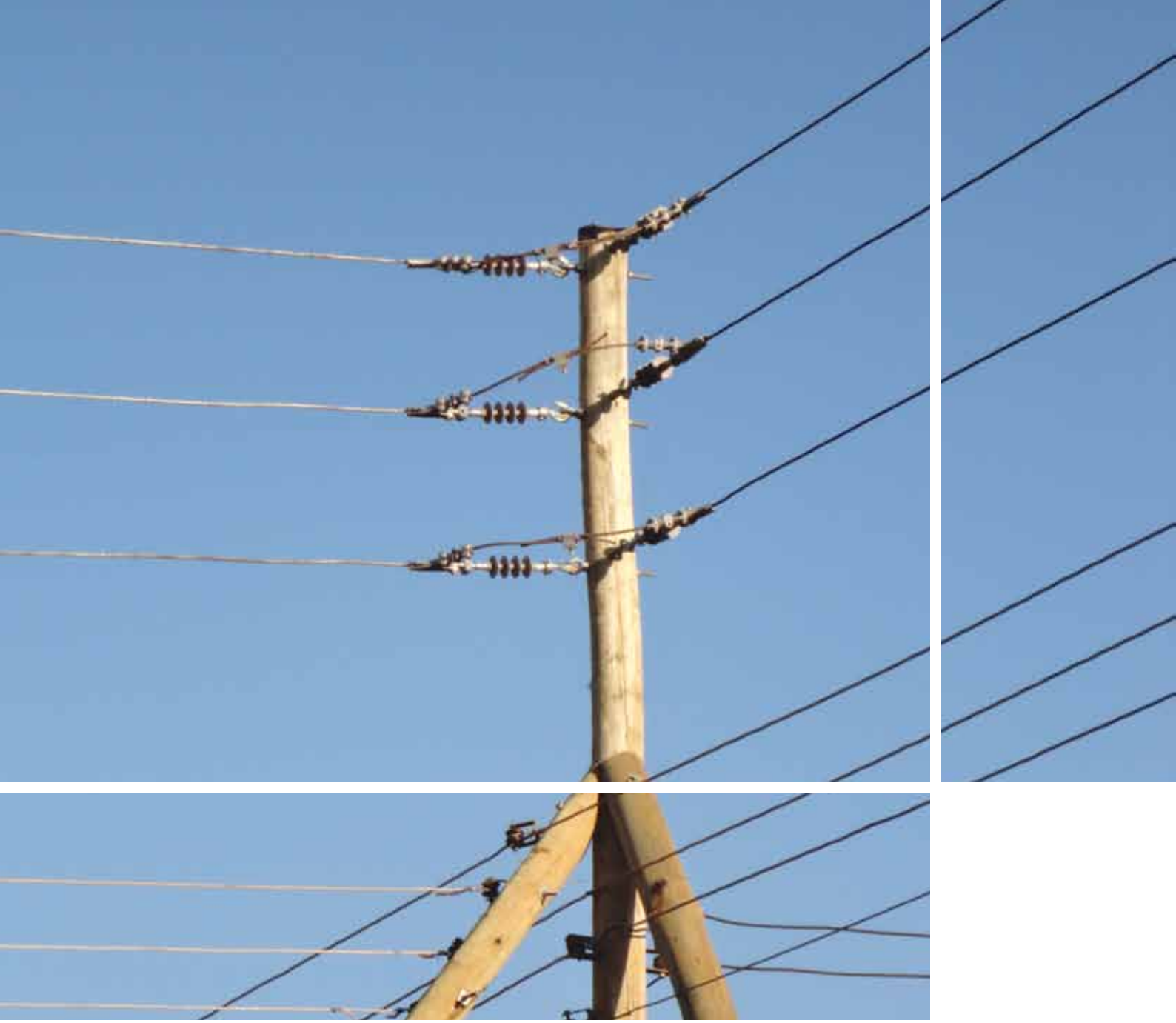



**Table 37 Recovery and reconstruction**

| Subsector needs by province | Recovery Needs | | | | DRR Needs | Total |
|---|---|---|---|---|---|---|
| | 2012 | 2013 | 2014 | 2015 | | |
| **Province -11Arid districts (Ksh 213.6 million)** | | | | | | |
| Prevention and management of acute malnutrition (156.21) | 78.105 | 26.035 | 26.035 | 26.035 | | |
| Vitamin A supplementation | | | | | 31.63 | |
| Nutrition Surveillance | | | | | 4.4 | |
| Capacity building of staff in Health facilities managing acute malnutrition. | | | | | 21.36 | |
| **Sub-total-1** | | | | | | |
| **156.21** | | | | | **57.39** | **213.6** |
| **Province –12 Semi-Arid districts (106.8)** | | | | | | |
| Prevention and management of acute malnutrition (60.07) | 30.035 | 10.012 | 10.012 | 10.012 | | |
| Vitamin A supplementation | | | | | 31.63 | |
| Nutrition Surveillance | | | | | 4.4 | |
| Capacity building of staff in Health facilities managing acute malnutrition. | | | | | 10.7 | |
| **Subtotal** | | | | | | |
| | | | | | **46.73** | |
| | **60.07** | | | | **46.07** | **106.14** |
| **Province –Other districts** | | | | | | |
| Prevention and management of acute malnutrition (35.6) | 19.78 | - | - | - | | |
| Vitamin A supplementation | | | | | 15.82 | |
| Capacity building of staff in Health facilities managing acute malnutrition. | | | | | | |
| **Sub-total-2** | | | | | **15.82** | |
| **Total 19.78** | | | | | **15.82** | **35.6** |
| **GRAND TOTAL KSH 356 MILLION** | | | | | | |



# *Energy*

## *Executive Summary*

Overall, the drought reduced output of hydropower that resulted in reduced revenue for KPLC. The revenue losses are estimated to be about Ksh 2,609 million. Moreover, reduced hydropower production was accompanied by an increased share of thermal power generation resulting in higher cost of generation. The losses due to higher production costs are estimated to be about Ksh 29,782 million contributing to total losses accumulating to approximately Ksh 32,392 million. While there are several medium and longer term interventions that are necessary to build resilience in the sector, the short term needs are estimated at Ksh 13,000 million.

## *Background*

The drought impacted the energy sector to a large extent through reducing hydroelectric power generation and increasing the cost of supply. The installed electricity generation capacity of Kenya's national grid is 1,593 MW as of June 2011 of which 48 percent comes from hydropower, 37 percent from thermal power, 12 percent from geothermal power, and the remainder from cogeneration, wind, and import. Table 39 below shows the various sources and their installed capacity.

**Table 38 Summary of losses in the energy sector due to drought (Ksh million)**

| | 2008 | 2009 | 2010 | Total* |
|---|---|---|---|---|
| Revenue Losses | 327.18 | 1,304.97 | 977.79 | 2,609.94 |
| Higher Production Costs | 6,980.74 | 14,891.19 | 7,910.46 | 29,782.38 |
| **Total** | **7,307.91** | **16,196.16** | **8,888.25** | **32,392.32** |

*Source Estimations by Assessment Team on basis of official information*

**Table 39 Installed Capacity (MW)**

| Sources | FY2008 | | FY2009 | | FY2010 | | FY2011 | |
|---|---|---|---|---|---|---|---|---|
| Hydro | 737 | 56% | 749 | 55% | 759 | 52% | 763 | 48% |
| Thermal | 434 | 33% | 434 | 32% | 473 | 32% | 592 | 37% |
| Geothermal | 128 | 10% | 163 | 12% | 198 | 13% | 198 | 12% |
| Cogeneration | 2 | 0% | 2 | 0% | 26 | 2% | 26 | 2% |
| Wind | 0 | 0% | 0 | 0% | 5 | 0% | 5 | 0% |
| Isolated Grid | 9 | 1% | 12 | 1% | 12 | 1% | 9 | 1% |
| **Total** | **1,310** | **100%** | **1,360** | **100%** | **1,472** | **100%** | **1,593** | **100%** |

**Table 40 Electricity Generated (GWh)**

| Sources | FY2008 | | FY2009 | | FY2010 | | FY2011 | |
|---|---|---|---|---|---|---|---|---|
| Hydro | 3,488 | 55% | 2,849 | 44% | 2,170 | 32% | 3,427 | 47% |
| Thermal | 1,826 | 29% | 2,411 | 37% | 3,011 | 45% | 2,265 | 31% |
| Geothermal | 1,020 | 16% | 1,179 | 18% | 1,339 | 20% | 1,453 | 20% |
| Cogeneration | 9 | 0% | 4 | 0% | 99 | 1% | 87 | 1% |
| Wind | 0 | 0% | 0 | 0% | 16 | 0% | 18 | 0% |
| Isolated Grid | 14 | 0% | 16 | 0% | 19 | 0% | 21 | 0% |
| Imports | 26 | 0% | 30 | 0% | 38 | 1% | 31 | 0% |
| **Total** | **6,383** | **100%** | **6,489** | **100%** | **6,693** | **100%** | **7,302** | **100%** |

Under favorable hydrological conditions, hydropower generates approximately half of the total electricity generated. However, in some drought years, hydropower generation can be reduced by almost 40 percent of normal years, which makes it necessary to increase thermal power generation. For example, as can be observed in Table 40, thermal power generation went up to 37 percent and 45 percent during the drought periods of 2009 and 2010 respectively.

## *Damage and Loss Quantification*

### Damages

While the drought did not damage assets in the energy sector, it exacerbated electricity supply shortages and the increase in cost of supply in the country and thereby affected all the institutions and private and public companies relying on supply of electricity.

### Losses

Hydropower and load shedding Daily load shedding occurred due, in part, to reduced output of hydropower as a result of the drought as shown in Figure 52 below. The majority of hydro-based generation is on the Tana River and the effective capacity of hydropower plants on the cascade below the Masinga Dam depends on water inflows to the Masinga reservoir. There are eight large hydropower stations in total in addition to a few small hydros. Reduction in power production was most felt during the drought period between April 2008 and April 2010 (Figure 52).

Below-normal hydrology in the Tana catchment above Masinga reduced water inflows and hydropower generation along the river where major hydro power stations are located. The reservoir levels at the Masinga dam (Figure 53) gradually dropped from 1,048 m in July 2008 to a minimum of 1,024 m in August/September 2009 before rising back to an average of 1,050 m in March 2010, which is the normal level for hydropower operation. The effect of drought is similar in all hydro dams for power generation. Due to the drastic reduction in hydroelectric power generation in FY2009 and FY2010 (Table 38), overall power generation could not meet the demand and hence a regime of load shedding was intensified in some months. The reduction in electricity generation impacted the electricity sold by KPLC, which was below the long-term trend in FY2009 and FY2010 (Figure 54).

**Figure 52 Gross Hydro Power Production (GWh)**

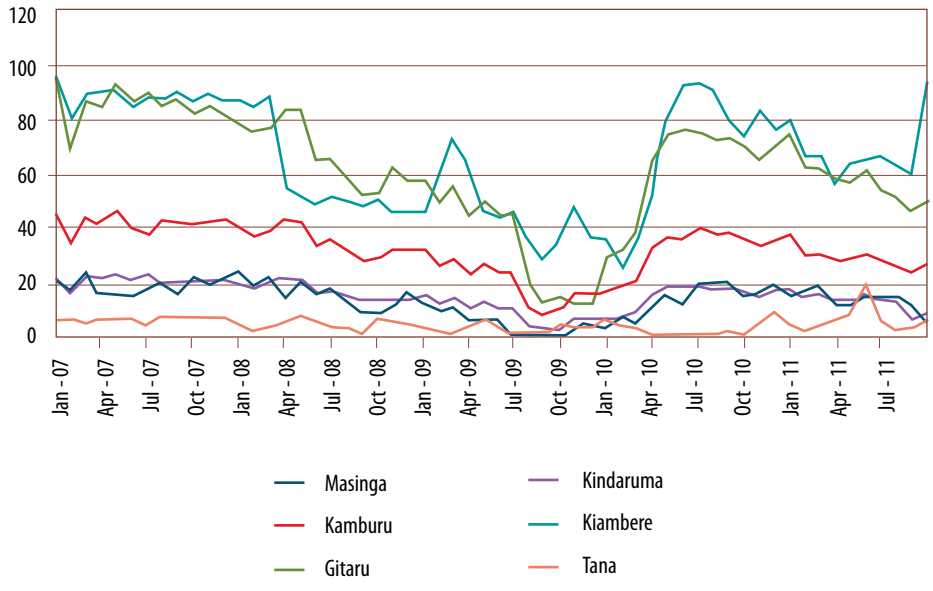


**Figure 53 Reservoir Levels at Masinga Dam (meters above sea level)**

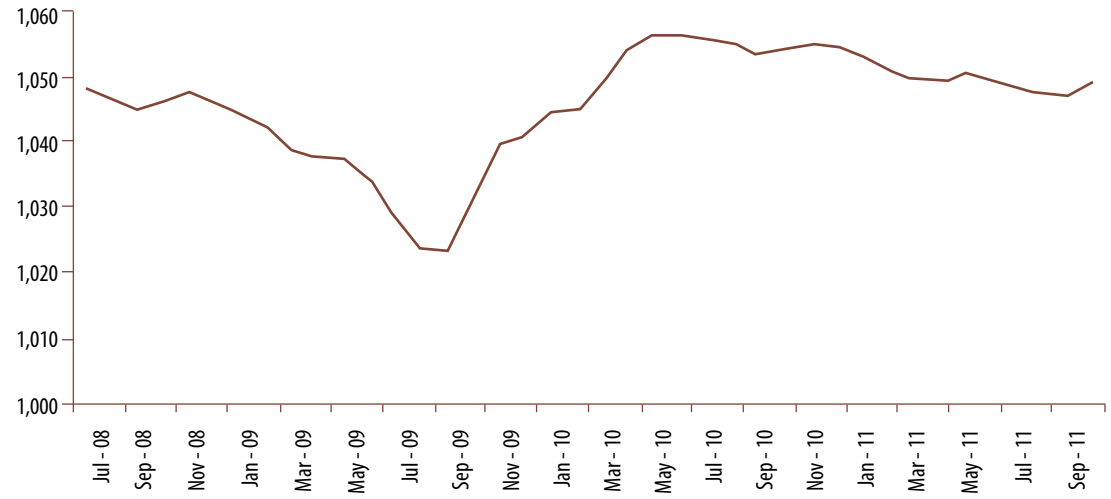
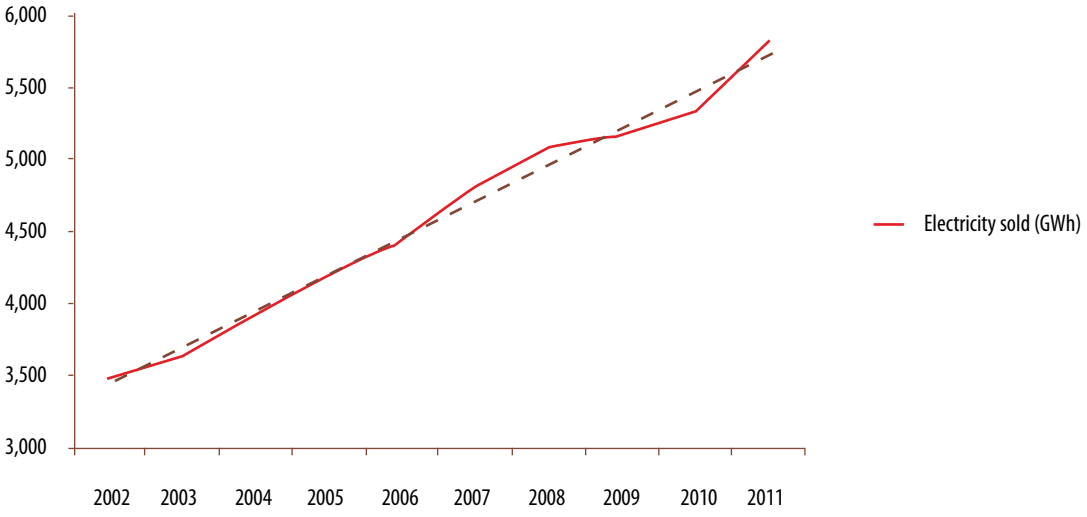



**Figure 54 Electricity Sales Trend and the Actual (GWh)**




The decreased revenue from electricity sales is estimated to be approximately two percent of KPLC's sales. Using the long-term trend, forecasted electricity demand in FY2009 was 5,234 GWh and 5,488 GWh in FY2010. However, due partly to the drought, the actual demand was 52 GWh less in FY2009 and 143 GWh less in FY2010, totaling 5,182 GWh and 5,345 GWh respectively. Multiplying the reduced demand by the average tariff in these years, Ksh.12.58/kWh and Ksh.13.69/kWh respectively, the estimated losses of revenues are Ksh.2,609.94 million.

## *Higher production costs*

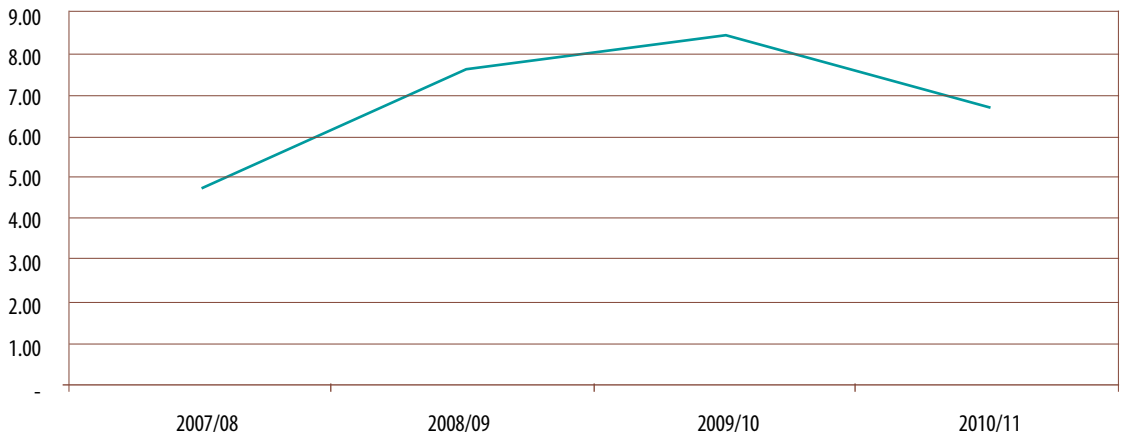
The drought also increased the share of thermal power generation in the electricity supply. In order to address the power supply deficit, the government is authorizing the contracting of emergency power generation. The engines that provide this generation are supplied in containerized units and therefore can be commissioned quickly (in a matter of a month or less). Their drawback is their high cost due in part to the cost of diesel fuel that they use. Power supplied from these emergency units can cost up to eight times that of hydropower generation that they replace. Some of the cost (capacity charges) is absorbed by the government and fuel used is exempt from some taxes. The tariff regulation ensures that fuel costs and energy charges are passed through in the tariffs paid by consumers. Also, when hydropower output was reduced, thermal power generation other than the emergency power plants also increased, which adds to fuel costs.

As a result, the grid average production cost of electricity increased from Ksh 4.83/kWh in FY2008 to Ksh 7.66/kWh in FY2009, and Ksh 8.53/kWh in FY2010 before coming down to Ksh.6.72/kWh in FY2011 (Figure 55). Taking the trend line connecting the average production cost of FY2008 and FY2011, the increase in average production cost in FY2009 and FY2010 is estimated to be Ksh2.27/kWh and Ksh.2.51/kWh respectively. Multiply these additional costs by the electricity purchased by KPLC, 6,149 GWh and 6,315 GWh in the same years, estimated losses due to higher production cost amount to Ksh 29,782.38 million.

## *Socio-economic impact*

Besides losses in electricity sales and higher cost of electricity generation, there are socio-economic impacts, many of which are not easily quantifiable. As a result of inadequate supply of electricity, the Kenyan economy is likely to have suffered short-term and potential long-term effects such as reduction in employment, a deterioration of Kenya's profile as an investment location, and reduced growth rates. The World Bank's Africa Infrastructure Country Diagnostics (AICD) study estimated that poor power supply lowered annual sales revenues of Kenyan firms by approximately seven percent and reduced Kenya's annual GDP growth by approximately 1.5 percentage points. A reduction in economic activity, if realized, has a bearing on the tax intake

**Figure 55 Grid Average Production Cost of Electricity**



and subsequently reduces the Government of Kenya's ability to support the drought-affected areas and its ability to shoulder investments in the energy sector as well as others. It is likely that the supply crisis of electricity has a general inflationary impact on the country while specific impact on prices of food stuffs that require processing. This disproportionally impacts the poorer segments of the population and makes food in the markets more expensive for people in drought-affected areas and Kenyans in general.

Moreover, lack of affordable energy has a number of implications for poor households and for women in particular as follows

- Health problems related to the use of traditional fuels such as charcoal and firewood;
- High opportunity costs in fetching fuels rather than engaging in income generating activities; and
- Hindering access to useful media information for trade, health and education.

## *Existing sectoral policies and priorities, and major programs*

Under Vision 2030, Kenya's long-term development plan, the government has a long-term strategy to drive the country into a globally competitive and prosperous economy and this, among other things, calls for expanding access to energy. The broad objectives of the energy policy in Kenya, articulated in the Sessional Paper No.4 of 2004, are to ensure adequate, quality, cost effective and affordable supply of energy through use of indigenous energy resources in order to meet development needs, while protecting and conserving the environment. The Energy Act of 2006 stipulates the institutional framework for achieving the energy policy objectives. To implement these policies frameworks, the government prepared master plans and strategies, including the Least Cost Power Development Plan (LCPDP), the Rural Electrification Master Plan (REMP), the Feed-in Tariff Policy, the Kenya National Climate Change Response Strategy, and the Scaling-up Renewable Energy Program (SREP) Investment Plan.

Building resilience towards natural disasters is an important part of the government's endeavors. The government has identified the need to establish appropriate disaster preparedness and mitigation mechanisms within the energy sector in its energy policy (Sessional Paper No.4 of 2004). Climate and weather hazards are identified as one of potential threats that could impact the sector, and the government takes disaster risk reduction and sustainable response to disasters in the sector planning. In this context, the government plans to build resilience in the electricity sector by promoting private sector investment in electricity generation as well as diversifying energy-mix in the grid away from hydro to incorporate geothermal, wind, and imports from neighboring countries. The estimated cost for these measures to incorporate drought-resilience, as detailed below in the Needs Analysis section, is Ksh.276 billion.

## *Addressing Challenges in the Sector*

Drought exacerbates some of the key challenges identified in the sector. These include low access to electricity and inadequate supply capacity to meet the growing demand for electricity; over-dependence on hydropower, which has increasingly become unreliable due to changing weather patterns and climate change; the high cost of electricity supply exacerbated by drought and emergency response; and insufficient amount of investment by the private sector to meet the growing demand. The inadequacy of hydro-meteorological data and deforestation in river basin catchment areas also affect the hydrology and operations of the dams along the major hydropower sites. These challenges are described below.

In order to achieve Vision 2030, the Government has established ambitious targets for scale-up

and supply expansion with a goal of achieving 40 percent electrification by 2030 amid a rapidly growing and urbanizing population with increasing aspirations for a better quality of life. Intermediate targets include electrifying one million new customers in the next five years and extending electricity service to priority loads. The current installed capacity of the Kenyan grid is 1,473 MW. However, available capacity can vary due to overhauled or otherwise out of service units as well as unpredictable hydrology affecting hydropower generation.

The Ministry of Energy in 2010 developed the country's LCPDP for the next 20 years. The LCPDP forecasts an increase in power demand from 1,227 MW in 2010 to 4,220 MW in 2020 and 11,510 MW in 2030 in a Low Case Scenario, and 4,755 MW in 2020 and 15,026 MW in 2030 in a Base Case Scenario, representing average energy growth rates of 14.5 percent for the period from 2010 to 2020, and 13.4 percent for the entire period. It emphasizes the need to expand Kenya's current installed power generation capacity in order to secure the sustainability of the current growth rate, to support future economic growth, and to improve the quality of life of the population.

The government recognizes that the dependence on hydropower makes the system especially vulnerable to serious shortages during periods of drought, as has been experienced in recent years. For this reason, the LCPDP calls for the development of a diversified portfolio of generation assets. This portfolio balances sources of power and types of technology that will help meet demand projections over time in a least-cost and environmentally friendly manner. Generation capacity will shift over time from increasingly unpredictable hydropower and fuel price-sensitive thermal options to greener, more sustainable technologies such as geothermal and wind, in addition to inexpensive potential regional imports. Increasingly erratic rainfall patterns and the destruction of key water catchment areas have affected hydroelectricity output.

As an interim measure, Kenya will turn to more efficient thermal generation to help meet urgent needs for base load generation until cleaner, lower cost options come on line. Within five years, the government aims to diversify its portfolio by adding up to 500 MW each of geothermal and wind energy to the grid, for which Kenya's favorable geology and meteorology make cheaper over time. Kenya has considerable geothermal resources which are located in the Rift Valley with an estimated potential of between 7,000 MW to 10,000 MW. Development of this resource will represent an important low-cost base load. Wind is an intermittent resource and in order for it to be deployed successfully, the grid will require a spinning reserve that can be provided from hydro and thermal sources. All of these investments will be complemented by hydropower imports from Ethiopia and other East African Power Pool (EAPP) countries in the medium- to long-term.



## *Key objectives of recovery and resilience building in this sector*

Short-term response (up to 1 year) Hydropower generation has recovered in FY2011. Nonetheless, the Government of Kenya has responded to the impact of drought by

contracting emergency power plants to meet the demand for electricity. The electricity generation from thermal power units was increased to minimize the disruption of electricity supply.

Medium-term response (1-3 years) In the medium-term, thermal, geothermal, and wind independent power producers (IPPs) will be contracted to support the growing need for electricity supply capacity and help stabilize the national grid.

Long-term response (3-5 years) In the long-term, the Government is diversifying the energy-mix of the grid away from unreliable hydropower to other sources, including geothermal, wind, and import of electricity from Ethiopia and other neighboring countries, to build resilience of the national electricity supply to natural hazards such as droughts. Off-grid thermal stations are converted into hybrid schemes with renewable energy sources, such as wind and solar, under the Rural Electrification Program to reduce dependence on unsustainable biomass and diversify energy sources further in off-grid areas.

## *Needs Estimation*

The key needs identified in this sector are short-term emergency power points with increased capacity, energy and fuel payment to emergency power plants, estimated to cost Ksh 13 billion.

## *Methodology*

The estimation of losses was based on grid data between FY2008 and FY2011. Given the hydropower trend, FY2008 and FY2011 were treated as normal years while FY2009 and FY2010 were the years affected by drought. Losses are assumed to be caused by (i) decreased revenues for KPLC; and, (ii) increased cost of supply from alternative sources such as thermal plants. For the decrease in revenues, the actual sales were compared to a long-term trend of sales since FY2002. While not all the drop in KPLC's revenues may be attributable to drought, distinction of different factors is not made due to data limitations. For the increased cost of supply, the actual average cost of electricity production was compared to the trend line between the two normal years in FY2008 and FY2011. Since most of the data available in the sector are reported by fiscal year, the estimated losses were converted into calendar year format assuming half of figures in each fiscal year belong to the preceding calendar year. Due to unavailability of data in off-grid areas, this estimate focused exclusively on grid-connected electricity supply in the country.

**Table 41 Provisional Cost Estimate for Needs**

| Short Term Measures | Cost Estimate |
|---|---|
| Emergency power plants | Ksh.13 billion |
| Total | Ksh.13 billion |

*US$1 = Ksh.90*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# *Fisheries*

## *Executive Summary*

The fisheries sector was one of the 16 sectors affected by the drought. The total values of the effect of the drought amounted to Ksh 4163.6 million comprising of Ksh 3,661 million in losses and Ksh 502.6 million in damages since 2008. The total recovery and reconstruction needs amounts to Ksh 4,151.5 million comprising of Ksh 406.4 million for recovery for the first year, Ksh 753.9 million for reconstruction over two years and Ksh 2,991.2 million for disaster risk reduction over a three year period.

The rehabilitation of ponds, use of better quality pond liners which are more resilient to drought, provision of seeds and feeds for the fish farmers; the replacement of fishing gears, enforcement of Law (Monitoring, Control and Surveillance (MCS) in the inland and marine fisheries to ensure sustainable management of the resources are the key priority areas which affect the production and productivity of the fisheries.

**Table 42 Fisheries Damage, Loss and Needs Summary by Province**

| Province | Damages | | Losses | | Total | Recovery | Reconstruction | DRR | Total |
|---|---|---|---|---|---|---|---|---|---|
| | Public | Private | Public | Private | | | | | |
| Nairobi | 0 | 3.0 | 0 | 0.95 | 3.95 | 0.1 | 113.6 | 14.3 | 128.0 |
| Central | 0 | 75.7 | 0 | 24.0 | 99.6 | 3.3 | 242.5 | 60.0 | 305.8 |
| Coast | 0 | 35.8 | 0 | 525.6 | 561.3 | 58.0 | 126.4 | 569.0 | 753.4 |
| Eastern | 0 | 58.6 | 0 | 125.4 | 184.0 | 14.3 | 87.9 | 164.6 | 266.8 |
| North Eastern | 0 | 0 | 0 | 0 | 0 | 0.0 | 125.5 | 0.0 | 125.5 |
| Nyanza | 0 | 161.6 | 0 | 2,162.2 | 2,323.8 | 238.9 | 53.6 | 1,449.5 | 1,742.0 |
| Rift Valley | 0 | 83.6 | 0 | 273.2 | 356.9 | 30.7 | 4.5 | 343.4 | 378.6 |
| Western | 0 | 84.3 | 0 | 549.8 | 634.1 | 61.1 | 0.0 | 390.4 | 451.5 |
| Total | 0 | 502.6 | 0 | 3,661.0 | 4,163.6 | 406.4 | 753.9 | 2,991.2 | 4,151.6 |

**Table 43 Fisheries Damage, Loss and Needs Summary by Year**

| Year | Damages | | | Losses | | | Recovery | Reconstruction | DRR |
|---|---|---|---|---|---|---|---|---|---|
| | Public | Private | Total | Public | Private | Total | Needs | Needs | Needs |
| 2008 | - | 20.5 | 20.5 | - | 509.7 | 509.7 | | | |
| 2009 | - | 50.4 | 50.4 | - | 957.9 | 957.9 | | | |
| 2010 | - | 114.8 | 114.8 | - | 1,177.6 | 1,177.6 | | | |
| 2011 | - | 317.0 | 317.0 | - | 1,015.9 | 1,015.9 | | | |
| 2012 | | | | | | | 406.4 | 664.2 | 2,663.9 |
| 2013 | | | | | | | - | 89.7 | 220.7 |
| 2014 | | | | | | | - | - | 106.6 |
| Total | - | 502.7 | 502.7 | - | 3,661.0 | 3,661.1 | 406.4 | 753.9 | 2,991.2 |

## *Background*

The fisheries sector contributes about 5% of Kenya's Gross Domestic Product (GDP) and plays a significant role in the social and economic development through the sector's positive contribution to employment creation, revenue generation and food security – all of which are crucial for the attainment of the Millennium Development Goals. The sector continues to support about 76,263 people directly as fishers/ farmers deriving their livelihood from the various fishery resources in the country. Out of this number, 19% were fish farmers while the rest were fishermen. The sector supports about a million people directly and indirectly, working as fishers, traders, processors, suppliers and merchants of fishing accessories and employees and their dependants.

Kenyan fishery is mainly artisanal with very few commercial/industrial vessels. The artisanal

fishery accounts for almost all the inland and marine water catches and consequently it is currently the most important fishery in the country, even though our EEZ which is predominately for commercial fishing is under exploited with an estimated potential of between 150,000 to 300,000 metric tons .[36]

During the period (2008 to 2010), the total national fish production was as follows; 135,408 metric tons with an ex-vessel value of Ksh 11,454,415,000 in 2008, 133,600 metric tons with an ex-vessel value of Ksh 13,001,017,000 in 2009, and 140,751 metric tons with an ex-vessel value of Ksh 15,369,477,000 in 2010.

Inland capture fisheries contributes 85% of Kenya's total fish production, with the principal fishery being that of Lake Victoria which continues to account for over 80% of the country's total annual fish production. Other freshwater-bodies of commercial importance include lakes Turkana (the largest Lake in Kenya) Naivasha, Baringo, Jipe, the Tana River dams and the Tana River delta. Marine artisanal fisheries contribute about 6.0% of the national production while aquaculture contributes about 8.6% of the total production.

Inland fisheries continue to contribute between 85-90% of the total production with aquaculture increasing to 9% from 3.3% in 2008 and marine remaining at 6%. Production from inland and marine fisheries has been declining and more so inland fisheries yet aquaculture has been increasing. This is because of government intervention in aquaculture through the Fish Farming Enterprise Productivity Programme (FFEPP) Phase I under the national Economic Stimulus Programme in 2009-2010 financial year and FFEPP phase II under the Economic Recovery, Poverty Alleviation Programme (ERPAP) in 2011 that saw 48,000 ponds constructed and stocked in 160 constituencies countrywide.

**Pre-Disaster**

Early fish production indications for the 2008 long rains and short rains seasons for the high rainfall, semi arid and arid areas of Kenya were promising due to steady early rains in March and October respectively. The country's aggregate fish production was provisionally forecasted at 165,129 tons, which would represent an increase in output of 56 percent, compared to 2007 production. However, failure of the rains occurred in March and April 2008, and again in October – November reducing the production to 135,408 tons (Table 44). Out of 5,185,620 households in the country, about 101,751 (0.8%) are engaged in the fisheries sector as fish farmers or fishermen or both (Table 45).

From 2007, although fish production from inland capture fisheries has been declining, the price of fish has been increasing (Figure 56).

**Table 44 Annual Fisheries Production and Ex-vessel Value (200-2010)**

| | 2008 | | 2009 | | 2010 | |
|---|---|---|---|---|---|---|
| | Production MT | Ex-vessel Value Ksh Million | Production MT | Ex-vessel Value Ksh Million | Production MT | Ex-vessel Value Ksh Million |
| Aquaculture | 4,452 | 917.86 | 4,895 | 1,041.42 | 12,153 | 2,620.79 |
| Inland Fisheries | 122,220 | 9,799.79 | 120,799 | 11,232.87 | 120,192 | 11,926.34 |
| Marine | 8,736 | 736.77 | 7,926 | 726.73 | 8,406 | 822.34 |
| **TOTAL** | **135,408** | **11,454.42** | **133,620** | **13,001.02** | **140,751** | **15,369.47** |

[36] Commonwealth secretariat report 2003 by Dr. George Habib

**Figure 56 Forecast and Actual Fish Production (2007-2011)**

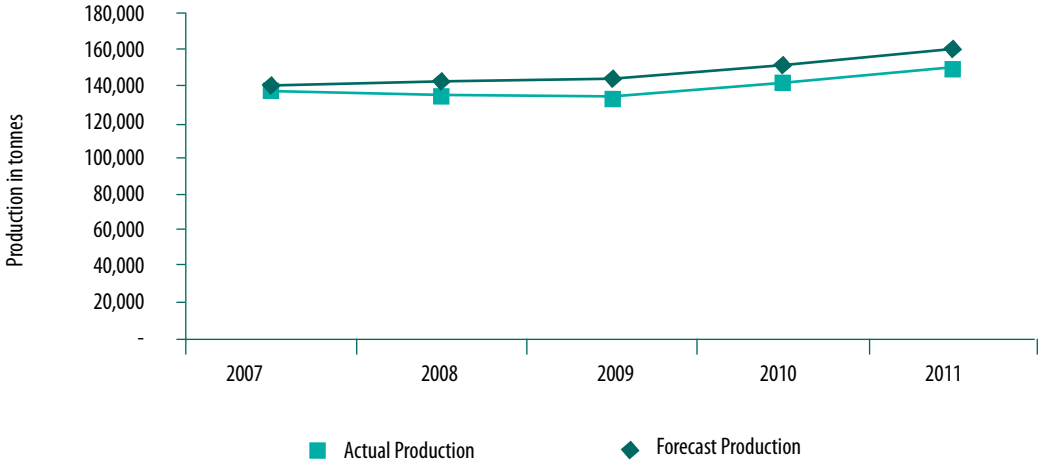


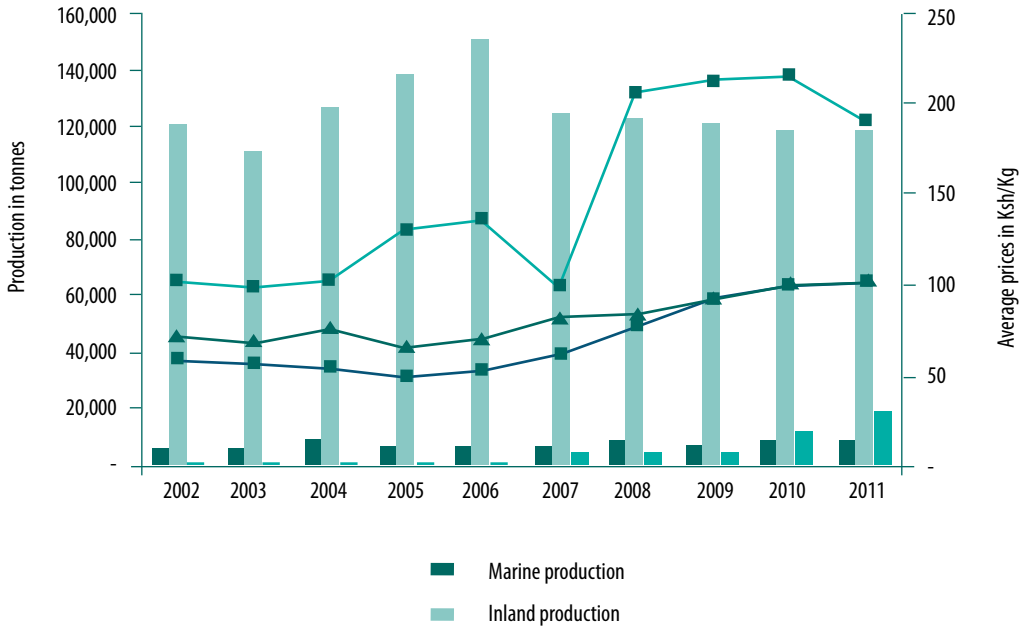

**Table 45 No of fisher households by Province**

| Province | Households | | | | |
|---|---|---|---|---|---|
| | | Number of fishers | | | |
| | Total No. of Households | Total No. of HH with Ponds | Total No. of HH with fishermen | Total No. of HH who are fishers | % of Households who are fishers |
| Central | 626,249 | 8,325 | - | 8,325 | 1.3 |
| Nyanza | 777,530 | 8,424 | 33,712 | 42,136 | 1.1 |
| Western | 619,183 | 7,495 | 8,382 | 15,877 | 1.2 |
| Eastern | 809,732 | 5,548 | 1,684 | 7,232 | 0.7 |
| Rift Valley | 1,429,544 | 8,041 | 5,797 | 13,838 | 0.6 |
| Coast | 475,044 | 1,571 | 12,496 | 14,067 | 0.3 |
| Nairobi | 448,338 | 276 | - | 276 | 0.1 |
| **Total** | **5,185,620** | **39,680** | **62,071** | **101,751** | **0.8** |

## Post-Disaster

The 2008-2011 drought impacted Kenya's fisheries sector in a variety of complex and interrelated ways aggravating the already dire situation of increased fishing effort in the Kenyan fisheries resources. The country's aggregate fish production was provisionally forecasted at 165,129 tons, which would represent an increase in output of 56 percent, compared to 2007 production. However, failure of the rains occurred in March and April 2008, and again in October – November reducing the production to 135,408 tons (Figure 57). The production

**Figure 57 Fish Production and Prices (2002-2011)**




increased in 2010 and 2011 due to the increased number of otherwise crop farmers moving into fishing after their crops failed due to the drought as well as the government's intervention in aquaculture through construction of 48,000 fish ponds countrywide. Production in 2010 was 140,751 metric tons while in 2011 it will be approximately 150,880metric tones.

Low inflows into the lakes and reservoirs as a result of prolonged drought condition coupled with the high evaporative effects have contributed to receding water levels (e.g. Lakes Turkana, Naivasha, Baringo etc) and the drying up of ponds. The receding water in the Lakes reduced the breeding grounds and also the fishing grounds.

Some of the streams feeding the lakes dried altogether. The River Omo, River Turkwel and River Kerio which feed Lake Turkana were significantly affected and there were low inflows into Lake Turkana. Rivers Maraigushu and Karati which feed Lake Naivasha dried up.

## *Methodology*

The assessment covered the entire country. Field trips were made to five districts namely, Kwale, Kisumu, Kakamega, Machakos, Makueni and Naivasha. Information for Turkana was collected through the officers in the field.

Baseline data for the fisheries sectors were assembled from a variety of sources and collected by the PDNA team. Secondary data was collected through desk review while the primary data was collected through interviews and focused group discussions. The data was used to extrapolate the assessment results to the entire country.

The limitations were as follows; the numbers of districts visited were too few; majority of the districts that were affected could not be visited.

**Results of the Assessment**

The assessment for the period 2008-2011 indicate that the fisheries sector sustained

negative effects to the tune of Ksh 4,164 million comprising of Ksh 503 million in damages and Ksh 3,661 million in losses. The damages represent the value of destroyed fish ponds, pond liners and fishing gears while losses occurred from a reduction in catches by the fishers, reduced harvests from the ponds and higher production costs from repair of fishing crafts.

## *Effects of the Drought*

### Damages

The total damages associated with the fisheries due to the rainfall deficit and high temperatures amounts to Ksh 503 million. The highest damages were incurred in 2011 amounting to Ksh 317 million, with the highest damage in Nyanza Province amounting to Ksh 162 million and minimal damage in Nairobi Province (Table 46).

### Losses

Total Losses in the fisheries sector were estimated at 3,661 million shillings. They include production losses of 3,583 million shillings and higher production costs of 79 million shillings.

The highest losses occurred in 2010 (1,177.5 million shillings) and the least in 2008 (509.7 million shillings). Nyanza Province incurred the highest losses of 2,162 million shillings and Nairobi Province incurring the least at 1 million shillings. The losses were as a result of decreased production in aquaculture due to dried fish ponds, damaged liners, and reduced catches from capture fisheries as a result of damaged gears. Higher production costs will be incurred due to repair of fishing crafts that have lost their life span from six years to three due to the drought (extremely high temperatures).

**Table 46 Total Damages in Fisheries Sector by Province ( Ksh millions)**

| | Damages | | | | |
|---|---|---|---|---|---|
| Province | 2008 | 2009 | 2010 | 2011 | Total |
| Central | 0.87 | 3.71 | 14.95 | 56.18 | 75.72 |
| Nyanza | 10.73 | 23.43 | 41.26 | 86.23 | 161.65 |
| Western | 3.17 | 7.97 | 18.96 | 54.18 | 84.27 |
| Eastern | 1.13 | 3.65 | 12.05 | 41.78 | 58.61 |
| Rift Valley | 2.00 | 5.91 | 17.61 | 58.12 | 83.64 |
| Coast | 2.57 | 5.53 | 9.34 | 18.32 | 35.76 |
| Nairobi | 0.03 | 0.15 | 0.59 | 2.22 | 2.99 |
| **Total** | **20.50** | **50.35** | **114.75** | **317.03** | **502.63** |

### Overall Value of Damage and Losses per Province

The overall value of damage and losses was highest in Nyanza Province at 2,323.8 million shillings, several times higher than the other provinces due to the impact on Lake Victoria which has the highest contribution to the national production (about 80%). The rest sustained less values of damage and losses but were still significantly affected (please see Table 47).

**Table 47 Total Losses in Fisheries Sector by Province (Ksh Millions)**

| Province | Losses | | | | |
|---|---|---|---|---|---|
| | 2008 | 2009 | 2010 | 2011 | Total |
| Central | 0.02 | 7.11 | 8.66 | 8.14 | 23.93 |
| Nyanza | 307.20 | 564.12 | 693.67 | 597.18 | 2,162.17 |
| Western | 76.14 | 143.95 | 176.95 | 152.74 | 549.78 |
| Eastern | 15.56 | 33.29 | 40.87 | 35.65 | 125.37 |
| Rift Valley | 35.93 | 72.03 | 88.49 | 76.77 | 273.22 |
| Coast | 74.83 | 137.08 | 168.57 | 145.09 | 525.58 |
| Nairobi | 0.00 | 0.28 | 0.34 | 0.32 | 0.95 |
| **Total** | **509.67** | **957.87** | **1,177.56** | **1,015.90** | **3,660.99** |

**Table 48 Total Damage and Loss Assessment 2008 -2011 (Ksh Million)**

| Province | Damages | | Losses | | Total DaLA |
|---|---|---|---|---|---|
| | Public | Private | Public | Private | |
| Central | - | 75.7 | - | 23.9 | 99.6 |
| Nyanza | - | 161.6 | - | 2,162.2 | 2,323.8 |
| Western | - | 84.3 | - | 549.8 | 634.1 |
| Eastern | - | 58.6 | - | 125.4 | 184.0 |
| Rift Valley | - | 83.6 | - | 273.2 | 356.9 |
| Coast | - | 35.8 | - | 525.6 | 561.3 |
| Nairobi | - | 3.0 | - | 0.9 | 3.9 |
| Total | - | 502.6 | - | 3,661.0 | 4,163.6 |



It is important to note that all of the damaged assets and losses fall within the domain of the private sector, including private individuals and enterprises. This pattern of ownership of the effects of the drought is of special relevance, since it provides evidence of the efforts and investments that are to be made by the Government and by the private sectors to overcome the negative impact of the disaster.

## *Socio-Economic Impacts of the Drought*

The most affected provinces are Eastern, Coast, North Eastern, and parts of Rift Valley. Classification of the drought prone areas in Kenya is shown in Table 48.

As indicated in the table below, although most of the counties comprise largely of pastoralists, some of the most affected areas have fisheries activities. Turkana and Marsabit counties have fisheries activities from Lake Turkana. Tana River county has marine fisheries as well as fresh water fisheries from Ox-bow lakes. Aquaculture activities are found in Kitui, Makueni and Taita Taveta counties.

The major impacts of the drought are the following;

- Loss of livelihood due to drying up of fish ponds- reduced incomes
- Receding Lake levels reduced the fishing area therefore causing increased fishing effort
- Disruption of fish farming activities due to the drying up of the ponds
- Landing beaches/sites distances from Lake and Sea shore increasing up to 3kms (Lake Naivasha), causing fishermen to incur extra costs of paying for transport in order to get the fish to the landing site
- The levels of the jetties (Lake Victoria) reduced disrupting the offloading of fish
- Increased fishing effort and illegalities in the Lakes because of the influx of agricultural farmers
- Replacement cycle of the physical assets was reduced

## *Impact of the Drought on the Community*

The years 2005-2006 and 2009 received depressed rainfall which was below normal and poorly distributed. This led to the devastating drought of 2009. The ASAL areas as usual were the worst affected with depletion of water and vegetation. This resulted in lake water levels receding, drying up of ponds and destruction of pond liners.

Although in some lakes due to the low or reduced water levels, catches increased due to reduced surface area for the fish to swim, the fish sizes and even numbers started reducing due to reduced breeding grounds. There was also an influx of more people going into fishing after their crops failed and livestock died. This caused excessive fishing effort in the lakes with an increase of illegal fishing gears also being used to increase catches for increased earnings. This caused food insecurity as the production levels reduced. Although the catches or production reduced, the price of fish increased (Figure 57).



**Table 49 Classification of ASAL Districts in Kenya**

| Category | Counties/Districts | Main Livelihoods including Fisheries Presence | % ASAL in area |
|---|---|---|---|
| 100% ASAL | Turkana, Moyale, Marsabit, Isiolo, Wajir, Mandera, Garissa | Pastoralism, Fisheries- Lake Turkana | 62% |
| 85-100% ASAL | Kitui, Makueni, Tana River, Taita Taveta, Samburu | Pastoralism, Marginal Agriculture- Aquaculture, capture fisheries – Tana River -Ox-bow Lakes | 25% |
| 50-85% ASAL | Machakos, Tharaka, Laikipia, West Pokot, Kwale, Kilifi, Baringo, Meru, (Meru North and Mbeere) | Agro-pastoralism ; Aquaculture, Capture fisheries – L Baringo, Tana River dams, Marine fisheries | 8% |
| 30-50% ASAL | Lamu, Narok, Keiyo, Marakwet | Pastoralists, Agro-pastoralism; Marine fisheries, Aquaculture | 3% |
| 10-25% ASAL | Nyeri (Kieni), Rachuonyo, Migori (Suba and Kuria), Kiambu (Thika) Baringo (Koibatek). | Mixed Farming- Aquaculture, Inland Fisheries- Lake Victoria | 2% |

## *Coping Strategies*

During this period the communities practiced various coping mechanisms to mitigate the effects of the drought such as

- Income diversification/generation
- These included fishermen/farmers diversifying into other activities such as harvesting papyrus and making mats / baskets, others went into bicycle transport, making charcoal while some of the BMUs engaged in fish farming (cages)
- The fishermen increased the price of fish
- The fish farmers turned to seasonal fish farming where they only stocked the ponds during the rainy seasons. A few farmers are constructing concrete ponds.
- Reliance on Relief Food aid
- In some of the ASAL areas such as in Eastern Province some of the population relied on relief food.

## *Existing Sectoral Policies and Priorities and Major Programs*

The country's economic blue print vision 2030 flagship initiatives include reforming of the legal and regulatory framework governing fisheries operations in order to make it fair and just to all fishers/fish farmers, processors; promotion of research and technology development; ensuring there is an effective extension service system to create a more effective linkage between research, extension and farmers as the ultimate beneficiaries. Ensuring there is market-based credit and inputs system for the fishers; and promoting domestic processing of fisheries products in order to provide increased opportunities for value- adding, wealth creation and employment and foreign exchange earnings.

The fisheries sector is informed by the Agricultural Sector Development Strategy and the National Oceans and Fisheries Policy. The Fisheries Policy[37] focuses on the promotion,

[37] National Oceans and Fisheries Policy, GOK 2008

implementation and monitoring of sustainable management and responsible fishing practices. The main aim is to

- promote fish consumption as a means of increasing food security, employment, income, and foreign exchange earnings arising from trade and related activities.
- secure the rights of vulnerable and traditional fisher communities.
- promote gender equity, and to integrate HIV/AIDS prevention and management.

## *Challenges*

The fisheries subsector has been unable to realize its full potential due to the open access resource utilization system; inadequate supportive infrastructure such as cold storage (ice making), roads, fish port and electricity; inadequate budgetary provisions; environmental degradation due to invasive weeds such as water hyacinth, weak producer organizations, lack of collateral and access to credit facilities; absence of a saving culture; ineffective marketing information; and inadequate quality fish seed and feed. Other major hindrances are inadequate research-extension links, illegal unregulated and unreported fishing; weak monitoring control and surveillance systems, low fishing technology; stringent sanitary and phyto-sanitary standards set by major export destinations; tariff and non-tariff barriers; and diminishing stock .[38]

## *Key Objectives of Recovery and Resilience Building and Reconstruction Strategies*

The proposed response strategy is based on the following livelihoods objectives that adopt basic human rights approach and recognize the role of fisheries among the various communities in Kenya. The strategy to be employed will encompass ensuring that the short term-intervention addresses the recovery and reconstruction needs which include addressing the acute food insecurity for households that have lost their livelihood assets and sustainable medium-term and long-term interventions that will ensure accelerated recovery and resilience of the communities.

In terms of short-term recovery, actions to enable fish farmers and fishermen (fishers) successfully harvest fish in ponds/ fisheries resources in the coming production cycle/year require significant government interventions.

There will be need to rehabilitate the damaged ponds and purchase liners, fingerlings and feeds. Without external assistance, long term reduction in household fish availability is forecasted in the country. The total fish ponds area affected by the drought was over 9,000 ha. Required inputs will therefore be liners, fingerlings and rehabilitation of ponds.

Due to the damages of the liners, they seem not to have been resilient enough in the past due to



[38] Agriculture Sector and Development Strategy 2010-2020 (GOK 2010)

temperatures, there is need to raise the quality, as well as fence the fish ponds.

The quality of the gears used by fishermen also needs to be improved

**Recommendations for recovery and DRR**

The following are the recommendations for recovery, reconstruction and disaster risk reduction

- Promotion of alternative livelihood encourage the crop farmers and fishers to engage in other forms of livelihood e.g. fish farming
- Improve water availability and accessibility Construction of water pans – to ensure that when the rivers dry, there is adequate water for use in fish farming during the drought
- Strengthen the capacities of communities through training of Beach Management Units (BMUs) and Fish Farmer groups on Disaster Risk Reduction strategies
- Increased funding for enforcement interventions.
- Maintain efficient monitoring control and surveillance (MCS) systems to support timely detection of illegal fishers and illegalities and response (Enforcement of sound fishing practice - Enforcement of the law through strengthening MCS)
- Contingency planning should be done early to avoid delays in response
- Encourage diversification of income sources
- Capacity building for income generating activities should be enhanced for women and the rural youth
- Funding interventions to enable re-investment in the capital stocks (wooden boats, nets, fish ponds, pond liners) that was degraded by the weather; upgrading of the technology e.g. bigger boats in the marine waters to access deep sea



## Needs Estimation

The recovery framework for the fisheries sub-sector can be divided into an early recovery phase, during which the food security needs of the affected population must be addressed, a medium term recovery phase during which the needs of the fish farmers to restock and ultimate harvest during the 2011/2012 season must be addressed, and finally a long term recovery phase which should address the recommendations made in the DRR section of this report.

The drought dried up the rivers and wells resulting in the drying up of the ponds and recession of the water levels of the Lakes. The reduction in production from both aquaculture and capture fisheries has reduced the fish availability (food availability) and affected vulnerable households in both urban and rural areas. Furthermore, the situation can be expected to worsen in most of the Lake Basins due to un expected high rainfall (climate change) causing flooding in the lowlands from November 2011, at which point even those fish farmers who managed to raised their pond dykes and stock their ponds are still losing their ponds. External assistance will be required for the drought-affected areas. The needs are estimated to be about Ksh 4,151.5 million, with recovery needs being Ksh 406.4, reconstruction needs totaling Ksh753.9 and Disaster Risk Reduction being Ksh 2,991.2 million (Table 42 and 43).

In terms of medium-term recovery actions to enable farmers to successfully harvest in the 2011/2012 season, significant government interventions are needed. The main harvest next year may be affected due to the reduction in fingerling availability, as it is likely that the most vulnerable households might not have the capital to be able to purchase fingerlings and demand may be higher than normal. At the same time, the household annual budget to purchase fingerlings might be used to obtain food commodities. Without external assistance, long term reduction in household food availability is forecasted in the affected areas. Required inputs will be fingerlings, pond liners, and fishing gears.

## Sector Priorities

The overall goal of developing priorities is to ensure that the livelihoods of the affected fishers are restored and that their suffering is reduced. Within a given time frame and financial resources, rebuilding the livelihoods of the affected households through rehabilitation of the assets and a restocking program as well as ensuring the targeted fisher communities adopt alternative livelihoods.

The main priority areas are

- Provision of working capital for purchase of fingerlings and feeds
- Provision of pond liners and pond rehabilitation for the fish farmers
- Replacement of fishing gears, repair of fishing crafts, working capital, enforcement of law (MCS) in the inland and marine fisheries
- Rehabilitation of 3 water pans/reservoirs per county
- Capacity building on disaster management, alternative livelihood e.g aquaculture, development of ice-making facilities at county level and selected beaches, advocacy (sensitization and awareness) of cross cutting issues including environmental management, gender participation etc and community-based disaster risk reduction and preparedness training
- Working capital (including purchase fingerlings, feeds etc)
- Enforcement of Law (Monitoring, Control and Surveillance (MCS)
- Alternative Livelihood e.g aquaculture
- Development of ice-making facilities at county level and selected beaches



# *Tourism,* forestry, wildlife, and environment

## *Executive Summary*

The magnitude of the drought impact was estimated at Ksh 582.4 million in losses and Ksh 211.5 in needs to the environment sector, Ksh 22.2 million in damages, Ksh 24.3 million in losses and Ksh 1,198.2 in needs to the forestry sector and Ksh 155.7 million in losses and Ksh 6,625.7 million in needs to the wildlife sector.

**Table 50 Environment, Forestry and Wildlife Summary (Ksh Million)**

| Year | Damages | | | Losses | | | Recovery | Reconstruction | DRR |
|---|---|---|---|---|---|---|---|---|---|
| | Public | Private | Total | Public | Private | Total | Needs | Needs | Needs |
| **Environment Subsector** | | | | | | | | | |
| 2008 | | | 0 | 565.1 | | 565.1 | | | |
| 2009 | | | 0 | 10.1 | | 10.1 | | | |
| 2010 | | | 0 | 0.0 | | 0.0 | | | |
| 2011 | | | 0 | 7.1 | | 7.1 | | | |
| 2012 | | | | | | | | | 70.0 |
| 2013 | | | | | | | | | 48.5 |
| 2014 | | | | | | | | | 48.5 |
| 2015 | | | | | | | | | 44.5 |
| Total | 0 | 0 | 0 | 582.4 | 0 | 582.4 | | | 211.5 |
| **Wildlife Subsector** | | | | | | | | | |
| 2008 | | | 0 | 11.1 | | 11.1 | | | |
| 2009 | | | 0 | 41.1 | | 41.1 | | | |
| 2010 | | | 0 | 24.8 | | 24.8 | | | |
| 2011 | | | 0 | 78.7 | | 78.7 | | | |
| 2012 | | | | | | | 3,139.0 | | 42.0 |
| 2013 | | | | | | | 2,666.5 | | 46.0 |
| 2014 | | | | | | | 297.7 | | 50.0 |
| 2015 | | | | | | | 330.5 | | 54.0 |
| Total | 0 | 0 | 0 | 155.7 | 0 | 155.7 | 6433.7 | | 192.0 |
| **Forest Sub-sector** | | | | | | | | | |
| 2008 | 21.4 | | 21.4 | 6.0 | | 6.0 | | | |
| 2009 | 0.2 | | 0.2 | 7.4 | | 7.4 | | | |
| 2010 | 0.5 | | 0.5 | 5.2 | | 5.2 | | | |
| 2011 | 0.0 | | 0.0 | 5.6 | | 5.6 | | | |
| 2012 | | | | | | | 538.9 | | 69.0 |
| 2013 | | | | | | | 184.0 | | 58.0 |
| 2014 | | | | | | | 172.2 | | 58.0 |
| 2015 | | | | | | | 59.0 | | 59.0 |
| Total | 22.2 | 0 | 22.2 | 24.3 | 0.0 | 24.3 | 954.2 | | 244.0 |

## *Background*

Kenya's natural resources, in particular its rich flora and fauna are among the country's most valuable natural assets. Drought threatens this rich biodiversity. Species loss has been observed, while in some places, the number of indigenous and important species has tremendously dwindled. Kenya's closed canopy forest cover currently stands at approximately 1.7 percent of the country total land area. This is low compared to other African countries with an average of 9.3 percent and the world with an average of 21.4 percent. Most of the closed canopy forests in Kenya are montane forests and are the nation's water towers. Among the most important are the Mau Forests Complex, Mt Kenya, Aberdare and Cherangany.

**Wildlife** is an important natural resource and national heritage of common concern, a public asset at local, regional, and global levels. National Parks and Reserves occupies approximately 8% of the total landmass of the country comprising of 22 terrestrial National Parks, 4 Marine National Parks, 28 Terrestrial National Reserves, 6 Marine National Reserves and 5 National Sanctuaries. Wildlife has a far-reaching and indeed cross-cutting role geared towards realization of the objectives of Vision 2030. Wildlife conservation and management continues to attract attention of the world for the value of wildlife resources. This has necessitated the need for increased innovation in the management and wildlife conservation.

**Tourism** Wildlife conservation is closely linked with economic development particularly where it underpins tourism. Wildlife tourism in Kenya, accounts for 90% of the safari tourism and 75% of the total national tourism earnings. Tourism is the second largest contributor to Kenya's economy. The industry's strength is mainly based on Kenya's natural attractions, which include wild game. The industry accounts for 21% of total foreign exchange earnings and 12% of the Country's GDP. The economic survey of 2005 shows that, earnings from tourism rose to Ksh 39.2b in the year 2004-2005. The sector is forecasted to grow at an estimated rate of between 4.5% and 5%. The contribution of the industry has multiplier effects in other sectors of the economy such as agriculture, horticulture, transport and communications. Tourism will be a leading sector in achieving Vision 2030 with a specific aggressive strategy of developing Kenya's coast (north and south) by developing resort cities in two key locations in addition to the Isiolo resort cities; achieving higher tourism revenue yield by increasing the country's premium safari parks and improving facilities in all under-utilized parks; creating new high value niche products (e.g. cultural, eco-sports and water-based tourism); revamping business-visitor offerings by attracting high-end international hotel chains; and by investing in new conference facilities.

**Forestry** Major economic contributions from the forest are the market value of goods and services generated in the tourism, agriculture, water and energy sectors and other environmental services (production of wood, protection of water cycle and flood control, soil maintenance and stabilization and biodiversity).

## *Impact of drought on the sectors*

Drought produces a complex web of impacts that spans many sectors of the economy and reaches beyond the area experiencing physical drought. Direct impacts include environmental losses as a result of damages to plant and animal species, wildlife habitats, reduced forest productivity and water levels, increased livestock and wildlife mortality rates. The incidence of forest and range fires increases substantially during extended periods of droughts, which in turn places both human and wildlife populations at higher levels of risk.

Drought causes poorer habitat suitability in terms of food, water, cover and useable space. Lower habitat suitability leads to increased wildlife mortality through starvation, predation, reduced production and recruitment (survival of young ones). Lack of food normally results in reduced reproduction by adult animals, such

as the production of milk by lactating animals. Consequently, this leads to food deficiency for the young wildlife. With reduced production of milk, young animals are likely to starve or succumb to diseases, parasites, and predation.

With the shrinking growth of vegetation which provides cover for wildlife, animal species such as antelopes will be more vulnerable to predators. Lack of water will provide fewer habitats for waterfowl, and other species which may crowd them into smaller areas and make them more vulnerable to diseases, predators as well as competition with members of same species.

Drought represents one of the most important natural triggers for wildlife loss and human-wildlife conflict, a problem experienced in many parts of Africa and in other countries as well. For example, with reduced forage lands, elephants move outside protected areas in search of food, in the process they invade peoples' farmlands and these results in human-wildlife conflict. Further, pastoralists or ranchers may view wildlife as competing for forage with their livestock. The rate of charcoal burning has also been on the rise.

Due to drought, the number of flamingoes in Lake Nakuru is diminishing as a result of diminishing water levels of the lake. The great migration of the wildebeest across the Mara River is under threat as the river's flow is reduced. All these do and will continue to impact negatively on Kenya's tourism sector. Pastoralists in search of pasture and water have encroached into game parks, chasing wildlife away from their natural habitats. Drought has also pushed lions and other wildlife closer to waterholes and vegetation near to human settlements.

## *Methodology*

The PDNA assessment covered Coast, Tsavos, Amboseli, Nakuru and Maasai Mara ecosystem and covered Malindi, Kilifi, Voi, Narok, Nakuru, and Kajiado districts within these ecosystems and National parks. The team interviewed District Commissioners, departmental heads, leaders, local community and a few appointed representatives in the various districts.

## *Damages and Losses*

### Wildlife mortalities

There has been an increase in reported cases of elephant deaths as a result of either direct effects of the drought or due to human-wildlife conflicts over scarce resources. The drought condition is forcing wild animals out of protected areas and on to farmlands, where they are prone to killings by local people in the process of protecting their limited crops. Conservationists have reported increased dispersals of elephants, out of the Masai Mara, Samburu, Ambosel, Marsabit and Tsavo ecosystems as animals forage farther afield.

An elephant carcass that was reported to have died lies on dried up vegetation of starvation in Samburu.

In the month of May 2009, an unusual number of wildlife, including 23 elephants (mostly young ones) died in the Meru conservation area. The rare and endangered Grevy's zebra which inhabit the northern rangelands of Kenya are already struggling with the searing drought that has hit the region for the past three years. As at June 2009, their deaths have been alarming (Table 51) and reports indicate that the mortality increase is a result of starvation, lack of water and due to babesiosis infections. There are fears that if the drought condition persists, there could be anthrax outbreak as the zebra-livestock competition for the diminishing water and pasture resources intensifies. In Lamu district, along the Kenyan coast all fresh water sources dried up in the last few months. As a result, over 300 buffaloes and other wildlife species died of dehydration after drinking sea water between the months of March and April 2009. In the Samburu – Laikipia ecosystem, more than 40 elephants have died due to drought related causes. The table below summarizes the loss in wildlife losses.

**Table 51 Showing Wildlife losses due to drought**

| Wild animal | Ecosystem | | | | | |
|---|---|---|---|---|---|---|
| | Nakuru/ Mau | Malindi/ Kilifi Arabuko | Amboseli Kajiado | Tsavo Taita Taveta | Northern Kenya | Laikipia Samburu |
| | 2009 | 2009 | 2009 | 2009 | 2009 | |
| Elephant | | | 35 | 40 | | 40 |
| Buffalo | 22 | 310 | 95 | 122 | | |
| Wildbeast | | | 149 | 61 | | |
| Zebra | 5 | | 132 | 29 | | |
| Hippo | | | 1 | 45 | | |
| Warthog | 22 | | | | | |
| Gazzele | 24 | 4 | | 25 | | |
| Grevy's Zebra | | | | | 26 | |

**Table 52 Showing cost incurred due to Translocation of wildlife**

| Year | Area | Species | No. | Cost (Ksh Million) |
|---|---|---|---|---|
| 2009 | Meru park | Zebras | 800 | 20 Million for 5 Million Vet drugs and transmitters |
| | | Grevys | 20 | |
| | | Impala | 1000 | |
| | | Giraffe | 50 | |
| | | Redbuck | 200 | |
| 2010 | Amboseli | Zebras | 200 | 8 Million Logistic • 2 Million Vet Services |

Many species including the endangered Grevy's zebra have been recorded at Lake Paradise (Crater Lake) which has been the main watering point for the animals during the dry season but its water volume has significantly declined and there is higher probability that it will dry up soon. The elephant pool at Marsabit Lodge the other Crater Lake that is an important water and grazing point for wildlife dried up in March. The lake is an important habitat water fowls such as white stocks, Ibises, ducks and geese but they have all migrated after the lake dried.

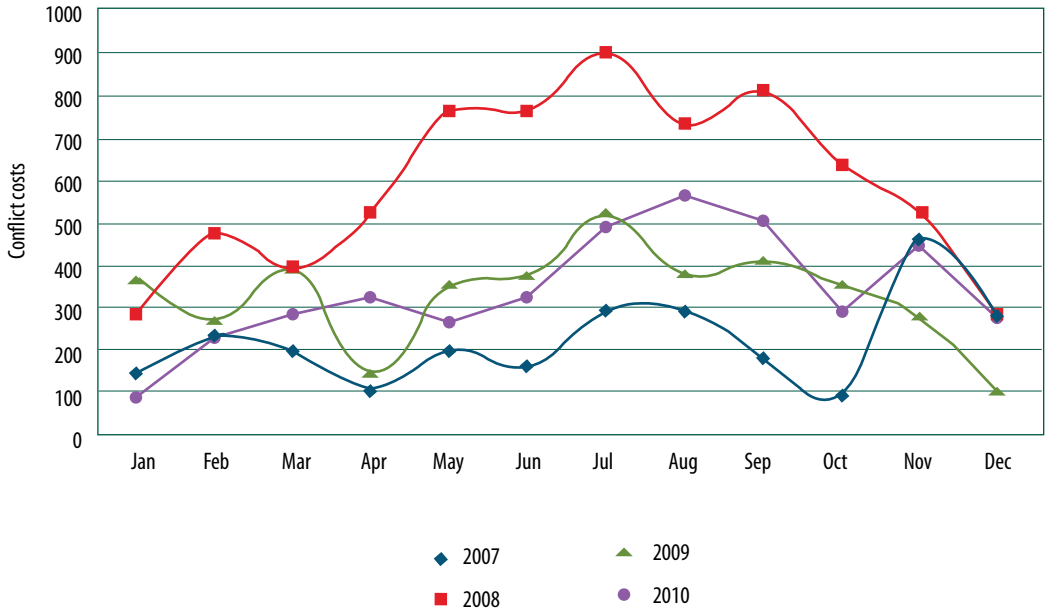
Lake Paradise, Marsabit before and now



## *Human-Wildlife Conflicts*

In western Kenya, increases in crop destruction and wildlife attacks have been recorded in the last two years. In Marsabit, there are increased human - elephant conflicts as elephants look for succulent plants in the farms. Wildlife destruction of crops, fences and water systems are common reports of the conflict during the drought period. Elephants unearthed water pipe systems in Badasa, Songa, Leyai and Marsabit lodge inconveniencing the residents and visitor facility in the park.

**Figure 58 Cases of Human Wildlife Conflict 2007- 2010**



**Charcoal burning and livestock incursion into protected areas**

Drought effects had reached devastating proportions especially in the arid and semi-arid lands. Wildlife habitats had experienced increased deforestation during the drought period due to increased charcoal burning. There has also been intensified livestock grazing in protected areas such as Tsavo, Mt Kenya forest reserve, Mau forest complex and Marsabit. Agriculture was affected leading to food insecurity in the country. With no alternative sources of income and with the high costs of fuel, rural communities turned to use and trade in wood fuel for sustenance of their livelihoods. This has had serious impacts on the indigenous trees which are most favoured plant species and which usually take long to regenerate, thus affecting the environment.

**Wild fires Impacts to the forest and environment**

As a consequence of the prevailing drought periods in the country, increase in forest and other vegetation fire occurrence have been observed. Strong winds and dry conditions have catalysed several recent wildfires, especially in western Kenya and some parts of Rift valley province. For the last three years, over 60 wildfires have claimed approximately 3,000 acres of wildlife protected areas land in western Kenya (Table 53). A major wild fire leaves a large amount of scorched and barren land. These areas may not return to pre-fire conditions for decades. If the wild fire destroyed the ground cover, then erosion becomes one of several potential problems. Smoke and other emissions contain pollutants that can cause significant health problems both wildlife and human. The short-term effects contain destruction of timber, forage, wildlife habitats, scenic vistas, and watersheds. Furthermore the long-term effects contain reduced access to recreational areas; destruction of community infrastructure and cultural and economic resources.

**Table 53. Acres affected by Wild fire incidences in Western Kenya**

| Year | 2007 | 2008 | 2009 |
|---|---|---|---|
| Burnt area (acres) | 27 | 1269 | 1841 |



## *Tourism*

Drought may not have had direct effects to international visitors, but had an impact on the operational costs (water, foodstuff, power outages, and power bills) of tourism sub-sector and activities of boat operators. The average operational cost increased from Ksh 350,000 to Ksh 800,000 per month. The loss of electric equipments (cold-rooms, fridges, air fans, air-conditioners) was also incurred. In some cases, due to high cost, some hotels had to lay off of casual laborers by about 50%. Increased sea temperature leads to death of plankton, and hence fish population, leading to a negative impact on sport-fishing tourists.

**Figure 59 Monthly fire frequency from 2008-09 in the Parks**

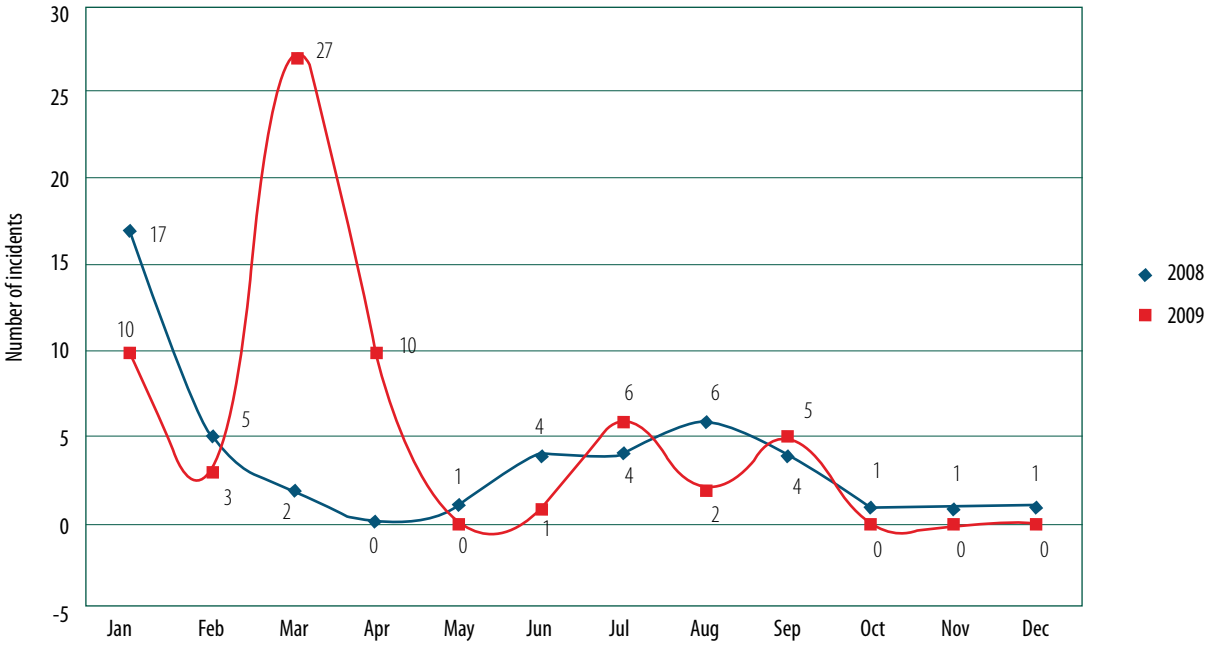



**Table 54 Hotel Bed Occupancy by Zone**

| ZONE | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|
| Coastal-Beach | 1,269,600 | 1,883,500 | 2,273,700 | 3,228,800 | 3,768,100 | 1,643,700 | 3,011,400 |
| Coastal-Other | 36,500 | 29,400 | 43,500 | 108,600 | 153,500 | 118,100 | 152,500 |
| Coastal-Hinterland | 60,900 | 52,900 | 75,100 | 83,700 | 210,500 | 93,900 | 210,900 |
| Nairobi-High class | 572,700 | 793,700 | 870,900 | 946,800 | 1,028,400 | 716,200 | 1,164,100 |
| Nairobi-Other | 124,000 | 194,500 | 180,500 | 257,200 | 302,700 | 224,500 | 498,100 |
| Central | 143,800 | 247,800 | 265,100 | 300,300 | 388,900 | 255,100 | 347,500 |
| Masailand | 130,400 | 272,300 | 361,900 | 460,900 | 519,800 | 231,800 | 312,800 |
| Nyanza Basin | 127,900 | 167,700 | 196,700 | 284,100 | 246,600 | 185,400 | 213,200 |
| Western | 97,200 | 100,800 | 128,000 | 167,600 | 234,400 | 224,600 | 319,000 |
| Northern | 42,900 | 48,800 | 81,200 | 83,700 | 86,300 | 5,700 | 13,300 |
| **Total occupied** | **2,605,900** | **3,791,400** | **4,476,600** | **5,921,700** | **6,939,200** | **3,699,000** | **6,242,800** |
| **Total available** | **7,765,700** | **10,030,700** | **1,084,500** | **13,003,500** | **14,711,600** | **14,233,600** | **17,125,300** |

The overall value of damage and losses for each of the sectors is as follows

**Table 55 Damage and Losses in Environment sub-sector**

| Ecosystem | Damages M Ksh | | Losses in M Ksh | | Total in M Ksh |
|---|---|---|---|---|---|
| | Public | Private | Public | Private | |
| Nakuru/Mau | | | 82.56 | | 82.56 |
| Malindi/Kilifi /Arabuko | | | 0.22 | | 0.22 |
| Kajiado/Loitoktok | | | 0.32 | | 0.32 |
| Tsavo/Taita Taveta | | | 481.21 | | 481.21 |
| Narok/Masai Mara | | | 18.17 | | 18.17 |
| **Sub-Total** | **0** | **0** | **582.48** | **0.00** | **582.48** |

**Table 56 Damage and Losses in Wildlife Sub-sector**

| Ecosystem | Damages M Ksh | | Losses in M Ksh | | Total in M Ksh |
|---|---|---|---|---|---|
| | Public | Private | Public | Private | |
| Nakuru/Mau | | | 4.36 | | 4.36 |
| Malindi/Kilifi Arabuko | | | 10.80 | | 10.80 |
| Kajiado/ Loitoktok | | | 10.00 | | 10.00 |
| Tsavo/Taita Taveta | | | 130.59 | | 130.59 |
| Narok/ Masai Mara | | | 0.00 | | 0.00 |
| **Sub-Total** | **0** | **0** | **155.75** | **0.00** | **155.75** |

**Table 57 Damage and Losses in Forest Sub-sector**

| Ecosystem | Damages M Ksh | | Losses in M Ksh | | Total in M Ksh |
|---|---|---|---|---|---|
| | Public | Private | Public | Private | |
| Nakuru/Mau | 126.71 | | 23.00 | | 149.71 |
| Malindi/Kilifi Arabuko | 0.14 | | 0.02 | | 0.16 |
| Kajiado/ Loitoktok | 0.14 | | 0.14 | | 0.28 |
| Tsavo/Taita Taveta | 20.23 | | 0.00 | | 20.23 |
| Narok/ Masai Mara | 0.76 | | 1.15 | | 1.91 |
| **Sub-Total** | **147.98** | **0** | **24.30** | **0.00** | **172.29** |

## *Socio-Economic Impacts of the Drought*

The ecosystems most affected by the drought are Tsavo, Laikipia Samburu and Northern Kenya and parts of Rift Valley especially Nakuru, Hells gate. The vast majority of community members living around protected areas directly depend on natural resources to meet their livelihood needs. As populations have increased, and land use practices and livelihood strategies have intensified and diversified, human activities in the greater landscape have increasingly impacted the conservation of the protected areas.

As the drought persisted, there was a conversion of once suitable wildlife habitat into permanent agricultural land, and water that would have entered the parks was being used to irrigate crops. At the same time, the impacts of wildlife on these neighboring communities have also increased, primarily through damage to crops or livestock by animals that were dispersed from protected areas. This affects the livelihood of the society. Forest dependent communities incurred losses as result of not being able to sell seedlings and not being able to offer labour for pruning transplanting seedlings forest plantations. The drought also affected apiculture especially for those who depend on forests for beehives.

## *Existing Sectoral Policies and Priorities and Major Programs*

**Wildlife and Tourism** KWS Strategy 2.0 aims at moving the organization from good to great and builds on the strengths of the good results from the previous strategic plans. The KWS shared vision is informed by the need to "Save the last great species and places on earth for humanity". Achieving their mission and delivering customer and stakeholder value depends on successfully executing three priority areas of the strategy, namely conservation stewardship, people excellence, and collaborative partnership. All the initiatives are aligned to these strategic focal areas.

**Forest** The new Forest Policy emphasizes the development of farm forestry as a way of increasing the low forest cover, diversifying subsistence products and incomes while



contributing to soil and water conservation. The policy underlines the need to support farmers with sound management and utilization principles, incentives, information, better germplasm and marketing strategies. Farmers need to have a list of priority products from multipurpose trees in order to optimise production. Vision 2030 has also put similar emphasis on the contribution of forestry in conservation of water resources. To achieve these objectives, the programme will strengthen linkages amongst extension agents researchers and farmers through development of effective extension approaches as well as production of appropriate management guidelines.

To achieve the strategic goals, there are specific strategies that will be implemented as follows

1. Conservation strategies

- Rehabilitation of degraded water catchments areas while promoting on-farm forestry;
- Implementation of compensation for environmental services to include carbon markets;
- Promote use of biotechnology in forest conservation;
- Secure wildlife corridors, migratory routes and reverse wildlife loss;
- Brand premium parks in line with the tourism sector;
- Intensify conservation of coastal, mangrove and marine wildlife resources; and



- Develop a sustainable land use policy for common grazing areas.

2. Pollution and waste management strategies

- Development and enforcement of mechanisms targeting pollution and solid waste management regulations;
- Establish a national air quality monitoring system;
- Apply market-oriented instruments to regulate the use of plastic bags.

3. ASALs and high-risk zones strategies

- Shift policy from disaster response to disaster- risk education;
- Intensify research on impact of climatic changes in Kenya and development of appropriate policy responses for each geographic zone;
- Aggressively promote adaptation activities in high-risk disaster zones;
- Formulate a national disaster strategy for seismic events and pestilences affecting human and animal habitation;
- Undertake measures to integrate climate change into development planning.

4. Environmental planning and governance strategies

- Upgrade the capacity of institutions for enhanced environmental data and information coverage and application;
- Develop a policy framework to harmonize environment-al related laws and institutions, and promote the capacity for collective enforcement of environmental standards;
- Strengthen institutional capacities of multi-sectoral planning and strengthen linkages between institutions of planning and environmental management;
- Establish a baseline on the state of the environment for future environmental planning;
- Strengthening negotiating on capabilities through top talent development and compliance with consistency in Multi-lateral Environment Agreements (MEAs).

## *Challenges*

**Forest** Most of the forests, especially the high productive ones including both indigenous and plantations are located in relatively fire prone areas. These fires continue to be one of the biggest forest health hazards. Prolonged drought and low moisture content has been a major contributor to forest fire and other wildfires. Also in line with is lack of modern firefighting equipment and inadequate human capacity.

**Wildlife** The major external factors are those that deal with the environment and its impact on wildlife management and conservation. It should be understood that some of these include - global climatic and ecological changes, lack of national environmental policy. As wildlife search for water, their interactions with humans continue to increase, leading to severe conflicts. Over the years, many of the artificial water points in the parks dried up due to siltation.

**Tourism** The Coastal area of the country was highly vulnerable as they solely rely on tourism whereby there was high dependence on relief which was at a significant cost to the government. Hotel industry was affected through the cost of foodstuffs going up.

## *Recommendations for Recovery and DRR*

The following are the recommendations for recovery, reconstruction and disaster risk reduction for drought management in wildlife sector, tourism, forestry and environment-

- Institutional capacity building on disaster preparedness
- Community-based Disaster Preparedness training

- Compensation (Human injuries and or death)
- Human-wildlife conflict resolution measures
- De-silting of water pans in the National Parks
- Drilling of boreholes for both wildlife use and seedlings planting
- Fence construction and maintenance at hotspot areas of human-wildlife conflict
- Procurement of firefighting equipment
- Provision of supplementary feeding to distressed wildlife [i.e. hay, minerals]
- Provision of water to wildlife both in the rhino sanctuary and outside
- Recharging of water into ponds and swamps
- Replanting/Restoration of degraded forestry areas
- Reseeding of rangelands
- Restocking of wildlife (Logistics)
- Tourism marketing and promotion
- Provision of wildlife related veterinary services
- Water tracking
- Enhancing the capacity of the local community in efficiently and effectively dealing with drought hazards

## *Needs Estimation*

The recovery framework shall be spread over a four year term. The tables below indicate sub-sectoral recovery, reconstruction and DRR needs.

**Table 58 Recovery and reconstruction needs in Environment Subsector**

| Ecosystem | Recovery | Reconstruction | DRR | Total |
|---|---|---|---|---|
| Nakuru/Mau | | | 40.00 | 40.00 |
| Malindi/Kilifi Arabuko | | | 40.00 | 40.00 |
| Kajiado/ Loitoktok | | | 30.00 | 30.00 |
| Tsavo/Taita Taveta | | | 55.50 | 55.50 |
| Narok/ Masai Mara | | | 46.00 | 46.00 |
| Sub-Total | 0.00 | 0.00 | 211.50 | 211.50 |

**Table 59 Recovery and reconstruction needs in Wildlife Sub-sector**

| Ecosystem | Recovery | Reconstruction | DRR | Total |
|---|---|---|---|---|
| Nakuru/Mau | 686.00 | 55.00 | 76.50 | 817.50 |
| Malindi/Kilifi Arabuko | 251.00 | 10.00 | 10.00 | 271.00 |
| Kajiado/ Loitoktok | 268.00 | 22.00 | 30.00 | 320.00 |
| Tsavo/Taita Taveta | 1253.00 | 45.00 | 190.00 | 1488.00 |
| Narok/ Masai Mara | 208.50 | 10.00 | 24.00 | 242.50 |
| **Sub-Total** | **2666.50** | **142.00** | **330.50** | **3139.00** |

**Table 60 Recovery and reconstruction needs in Forest Sub-sector**

| Ecosystem | Recovery | Reconstruction | DRR | Total |
|---|---|---|---|---|
| Nakuru/Mau | 123.00 | 126.71 | 12.50 | 262.21 |
| Malindi/Kilifi Arabuko | 61.00 | 0.14 | 6.50 | 67.64 |
| Kajiado/ Loitoktok | 0.00 | 0.14 | 14.00 | 14.14 |
| Tsavo/Taita Taveta | 0.00 | 20.23 | 8.50 | 28.73 |
| Narok/ Masai Mara | 0.00 | 0.76 | 17.50 | 18.26 |
| Sub-Total | 184.00 | 147.98 | 59.00 | 390.98 |

## *Sector Priorities*

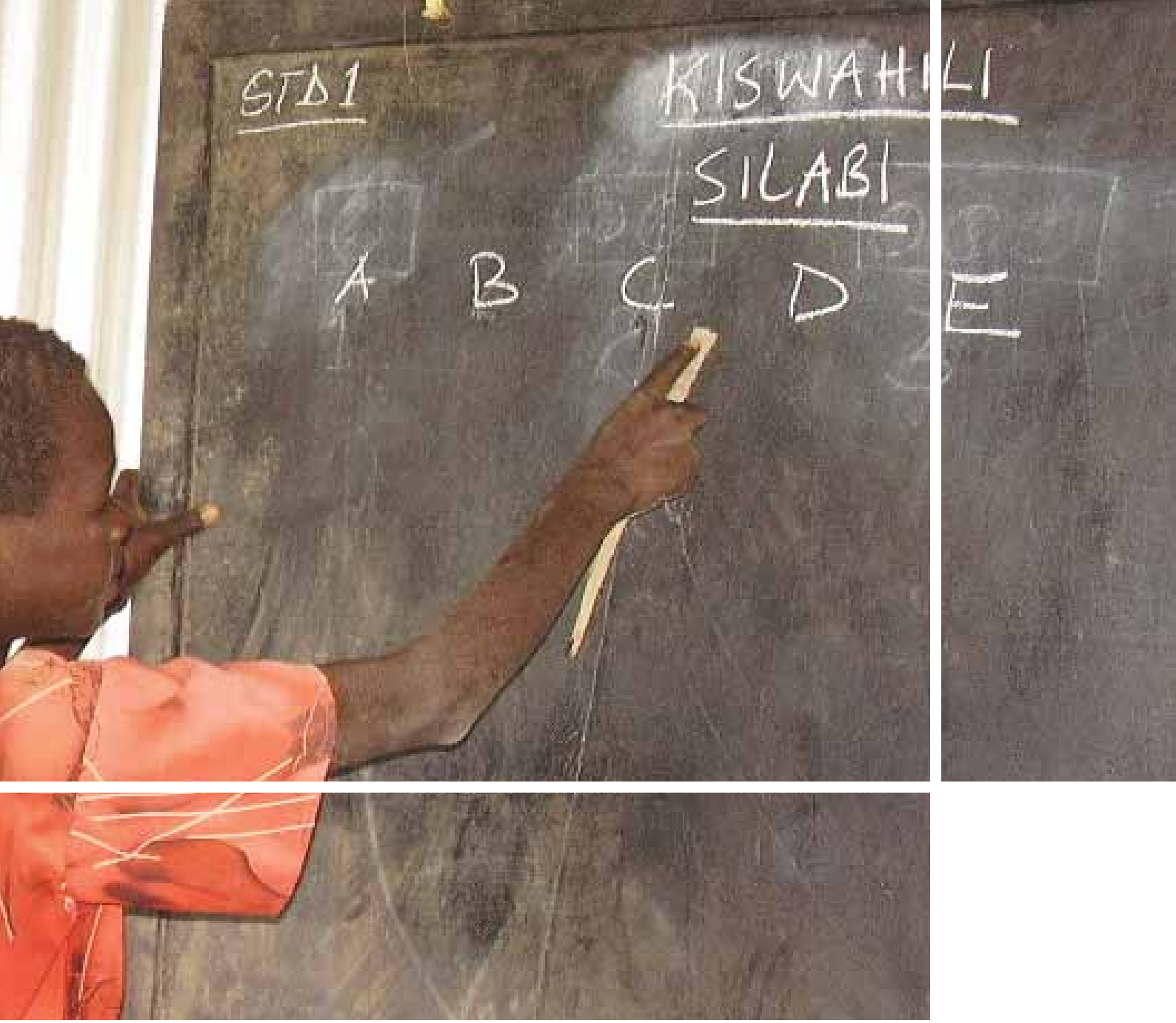
The overall goal of developing priorities is to ensure that the areas that are likely to mitigate immediate and future drought effects are implemented with some urgency in order to build and restore the environment to healthy levels. The main priority areas are

### First tier critical

- Development of disaster early warning system
- Institutional capacity building on disaster preparedness
- Community-based Disaster Preparedness training
- De-silting of water pans in the National Parks
- Drilling of boreholes for both wildlife use and seedlings planting
- Procurement of firefighting equipment
- Replanting/Restoration of degraded forestry areas
- Reseeding of rangelands
- Tourism marketing and promotion

### Second tier critical-

- Fence construction and maintenance at hotspot areas of human-wildlife conflict
- Restocking of wildlife (Logistics)
- Provision of wildlife related veterinary services
- Human-wildlife conflict resolution measures




# *Education*

## *Executive Summary*

The education sector was negatively impacted by the 2008-2011 drought. Overall, the value of damages incurred to school infrastructure in the 5 coastal districts assessed was estimated at Ksh 41.9 million and the value of losses was estimated at Ksh 3,937.8 million. The losses include Ksh 1,575.1 million in lower revenues due to school dropouts and Ksh 2,362.6 million in higher costs of operation incurred as a result of the drought. Rift Valley appears to be the most affected province. The total needs for the sector are estimated to be Ksh 4,237.8 million which can be broken up as Ksh 590 million, Ksh 55.7 million and Ksh 3,592.1 million for recovery, reconstruction and disaster risk reduction respectively. The table below provides a summary of the damages, losses and needs.

**Table 61 Damage, Loss and Needs Summary by province (Million Shillings)**

| Province | Damages | | | Losses | | | Needs | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Public | Private | Total | Public | Private | Total | Recovery | Reconstruction | DRR | Total |
| Coast | | | | 303.0 | | 303.0 | 45.4 | | 299.8 | 345.2 |
| Rift Valley | | | | 1,014.2 | | 1,014.2 | 152.0 | | 860.4 | 1,012.4 |
| North Eastern | | | | 60.7 | | 60.7 | 9.1 | | 285.6 | 294.7 |
| Eastern | | | | 687.4 | | 687.4 | 103.0 | | 538.5 | 641.5 |
| Central | | | | 428.5 | | 428.5 | 64.2 | | 348.0 | 412.2 |
| Nyanza | | | | 692.5 | | 692.5 | 103.8 | | 625.1 | 728.9 |
| Western | | | | 599.6 | | 599.6 | 89.8 | | 502.2 | 592.0 |
| Nairobi | | | | 151.9 | | 151.9 | 22.8 | | 132.5 | 155.3 |
| **Total** | **41.9** | | **41.9** | **3,937.8** | | **3,937.8** | **590.0** | **55.7** | **3,592.1** | **4,237.8** |

**Reconstruction needs are estimated on the basis of damage value plus reinforcement for disaster resilience**DRR needs are not disaggregated by year*

**Table 62 Damages and Loss by year and ownership (Million Shillings)**

| Year | Damages | | | Losses | | |
|---|---|---|---|---|---|---|
| | Public | Private | Total | Public | Private | Total |
| 2008 | | | | | | |
| 2009 | | | | 722.7 | | 722.7 |
| 2010 | | | | 728.5 | | 728.5 |
| 2011 | 41.9 | 0.0 | 41.9 | 2,486.6 | | 2,486.6 |
| Total | 41.9 | 0.0 | 41.9 | 3,937.8 | | 3,937.8 |

## *Sector Background*

Drought is a recurrent phenomenon that affects large areas and number of people in the country. On average, drought events affect an estimated 250,000 school going children and 8000 teachers annually with varying severity levels. Movement of population affected by drought has resulted in an increase in enrolment in some schools while other schools suffer from depleting or irregular attendance. The education sector is not flexible enough to deal with fluctuations in attendance and school resources cannot adapt to the influx of students, resulting in poor quality teaching in overcrowded schools and lack of water and food. The government has responded to the drought in the past. For example, in 2009 school children in ASAL areas were provided with feeding in the holiday months of August and December and in August 2011, school feeding was provided under both regular and emergency school meals programs. Indeed, it has been acknowledged that natural hazards pose significant challenges to countries in meeting their Education for All (EFA) goals and would require international level support.

The following tables provide baseline information on the number of and enrollment in educational institutions

**Table 63 Number of Education Institutions, 2002, 2008 and 2010**

| Category of Institution | 2002 | | | 2008 | | | 2010 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Public | Private | Total | Public | Private | Total | Public | Private | Total |
| ECD | 19,682 | 8,606 | 28,288 | 23,823 | 14,424 | 38,247 | 23,980 | 14,543 | 38,523 |
| Primary | 17,683 | 1,441 | 19,124 | 18,543 | 8,124 | 26,667 | 19,059 | 8,430 | 27,489 |
| Secondary | 3,247 | 437 | 3,583 | 5,019 | 1,952 | 6,971 | 5,296 | 2,012 | 7,308 |
| Adult Education | | | | | | | 7,858 | | 7,858 |
| Teacher Training Colleges | 21 | 8 | 29 | 21 | 75 | 96 | 21 | 89 | 110 |

**Table 64 ECDE Enrolment, GER and NER by Gender, 2002, 2003 and 2010**

| Category of Data | 2002 | | | 2003 | | | 2010 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Boys | Girls | Total | Boys | Girls | Total | Boys | Girls | Total |
| Enrolment | 74 | 712,863 | 1,455,62 | 782,018 | 756,051 | 1,538,069 | 1,100,890 | 1,092,181 | 2,193,071 |
| Gross Enrolment Rate (GER) | 53.4 | 50.1 | 51.7 | 58.0 | 54.9 | 56.5 | 60.3 | 61.4 | 60.9 |
| Net Enrolment Rate (NER) | - | - | - | 31.3 | 30.7 | 31.0 | 42.3 | 41.2 | 41.8 |

**Table 65 Primary Schools Enrolment, GER and NER by Gender, 2002, 2003 and 2010**

| Category of Data | 2002 | | | 2003 | | | 2010 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Boys | Girls | Total | Boys | Girls | Total | Boys | Girls | Total |
| Enrolment | 3,680,176 | 2,933,156 | 5,926,067 | 3,674,398 | 3,485,124 | 7,159,522 | 4,751,943 | 4,629,268 | 9,381,211 |
| Gross Enrolment Rate (GER) | 88.9 | 87.5 | 88.2 | 105.0 | 100.5 | 102.8 | 109.8 | 109.9 | 109.8 |
| Net Enrolment Rate (NER) | 76.5 | 78.0 | 78.0 | 80.8 | 80.0 | 80.4 | 90.6 | 92.3 | 91.4 |

**Table 66 Secondary Schools Enrolment, GER and NER by Gender, 2007, 2008 and 2010**

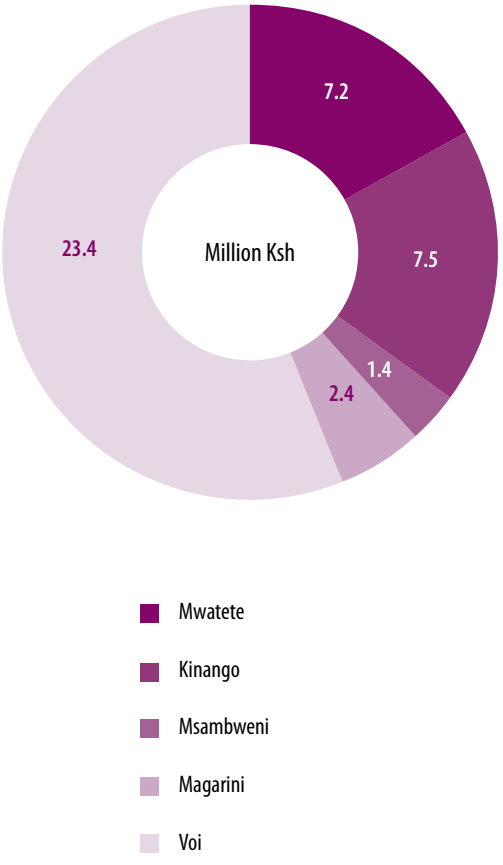
| Category of Data | 2007 | | | 2008 | | | 2010 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Boys | Girls | Total | Boys | Girls | Total | Boys | Girls | Total |
| Enrolment | 639,393 | 540,874 | 1,180,267 | 746,513 | 635,698 | 1,382,211 | 914,971 | 786,530 | 1,701,530 |
| Gross Enrolment Rate (GER) | 40.4 | 33.3 | 36.8 | 46.3 | 38.8 | 42.5 | 50.9 | 46.3 | 47.8 |
| Net Enrolment Rate (NER) | 25.2 | 23.2 | 24.2 | 29.8 | 27.9 | 28.9 | 32.4 | 32.9 | 32.0 |

*Source EMIS- Ministry of Education, Kenya 2011*

## Damages

The damages caused by the drought include damage to school infrastructure with school roofs being blown away by strong winds caused by the drought and destruction to education materials due to increased invasion of termites. The impact of the drought was felt in both Arid and Semi Arid (ASAL) areas and non-ASAL areas. The data for damages was collected from the selected coastal districts of Mwatate, Kinango, Msambweni, Magarini and Voi as shown below

**Figure 60 Damages by District**
**Education Sector Damage Summary Over the Duration of Drought in Millions KSh**




## Losses

The following are some of the major effects of the drought with respect to the education sector

- Brief disruption of school calendar in some areas of the country
- Children were without access to sufficient nutrition at home and hence were not able to concentrate in class or retain information
- Psychosocial trauma leading to an attention deficient (difficulties and a lack of focus in the classroom)
- Scarcity of water in schools
- Increased enrollments in some areas that has strained existing school resources i.e. education materials, furniture, equipment; conversely enrollment decline in some schools
- Reduced food rations as a result of increased enrolment in primary andEarly Childhood Development (ECD) centres
- A combined effect of high food prices and lack of fees payment in some secondary schools
- Low-cost boarding schools used as feeding centres and safe areas

The following chart summarizes the losses by province and by year

**Figure 61 Losses by province and year**
**Education Sector Losses Summary (By Province, Year, Type)**

## *Socio-economic impact*

The assessment team conducted an HRNA based analysis to assess the socio-economic impact of the drought. One observation made was that there was a preference towards the boy child which was prevalent among the communities which puts girl's education at stake. Temporary dropouts and irregular attendance in schools had also increased due to pressure on children to contribute to the survival of the families through domestic chores (like fetching water) to free up the time of their parents and contribution to income generating activities.



The longer term impact of the drought towards the quality of education could also mean that children who drop out lose their learning forever which impacts the healthy development of the child and the long term growth of the community. Furthermore, the need to raise money to alleviate the scarcity of food, leads parents to marry off their daughters, which is common during these periods. This often denies these girls an opportunity to realize their future dreams.

### Major programs in place for drought mitigation

In response to the drought, the Ministry of Education in FY 2010/2011 allocated Ksh 464.6 million to mitigate the effects of drought by providing meals under the following programmes[39]

- Homegrown - benefitting 592,638 pupils and costing Ksh 118.5 million.
- Expanded Homegrown - benefitting 1,052,126 pupils and costing Ksh 234.8 million.
- Low Cost Boarding schools - benefitting 111,189 pupils and costing Ksh 111.1 million.
- Regular School Feeding Programme (SFP) - The World Food Programme (WFP) supported the Ministry to feed 678,216 pupils.

## *Needs Analysis*

### Key objectives of recovery and resilience building

The key objectives of recovery and resilience building in the education sector are to

- Ensure equity of access to basic education during drought and related emergencies
- Enhance quality and learning achievement during drought emergency and related periods

[39] These amounts are already included in terms of losses in previous tables.

- Strengthen the home-grown school feeding program which is critical to ensure that poor children are healthy and to minimize dropouts
- Build capacity and confidence of teachers who are expected to provide appropriate psychosocial support to drought and related emergency affected students
- Ensure availability of temporary shelters in drought and related emergency affected areas
- Ensure availability of teaching and learning materials in areas affected by drought emergency
- Assist in detecting and effectively responding to early warning signs that may impede the realization of providing quality education
- Create and maintain a safe, secure, caring and child friendly learning environment

## *Challenges faced in the sector*

There are several challenges that the education sector faces in a disaster situation. The assessment team has observed that the sector is not flexible enough to deal with fluctuations in attendance caused by droughts. School resources cannot adapt to influx of students which results in poor teaching quality in overcrowded schools with lack of food and water. There is no budgetary provision in the Ministry of Education's financial estimates that specifically target drought and related disasters. Finally, although there is an Emergency Preparedness and Response Plan (EPRP), this has not been rolled out.

In addition, there are several areas of concern which may warrant attention There may be a need to undertake a review of the capitation grants provided to the above mentioned feeding programmes in light of the increased rates of inflation that has brought about a sharp rise in the prices of food commodities. This review could facilitate an inclusion in the capitation, of the new community low cost boarding schools which have been registered but are yet to be provided with funding. There is an increased demand for low cost boarding schools which have proved to be a safe haven for children whose livelihoods have been swept away by the ravaging drought or who are left behind by parents who move in search of pasture and water. There is a need to upscale water harvesting technologies and infrastructure in all educational institutions in addition to providing a water boozer specific to the education sector in each of the drought prone counties. Finally, there is an urgent need to mainstream Disaster Risk Reduction (DRR) interventions in the sector.

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## *Needs estimation*

The key needs identified for the sector fall under three broad categories

1. **Reconstruction Needs** 55.7 million Shillings. This includes the repair of damaged infrastructure (using stronger design standards) in the 5 Coastal districts that were visited.

2. **Recovery Needs** 590 million Shillings, to be used for recovery of education coverage and access for students.

3. **Disaster Risk Reduction Needs** The five areas for mitigation of the effects of future disasters are

    a. Enhancement of capacity on EPRP at county, district and school levels

    b. Provision of water boozers to 30 drought prone counties specifically to education

    c. Home grown school feeding in targeted drought districts

    d. Recreation supplies to schools in drought affected areas that have seen an increase in enrolment due to migration of families for psychosocial integration

    e. Boarding school supplies to schools in affected areas so that dormitories can cater for the drought induced increased number of students not catered for previously



The table below provides a breakup of the reconstruction, recovery and DRR needs

**Table 67 Reconstruction, Recovery and DRR Needs**

| Reconstruction Needs | Mwatate | Kinango | Msambweni | Magarini | Voi | Total |
|---|---|---|---|---|---|---|
| Repair of damaged infrastructure in the 5 districts, with disaster resilient standards | 9.6 | 10.0 | 1.9 | 3.2 | 31.1 | 55.7 |

| Recovery Needs | Coast | Central | Western | North Eastern | Eastern | Nyanza | Nairobi | Rift Valley | Total |
|---|---|---|---|---|---|---|---|---|---|
| Recovery of access | 45.4 | 64.2 | 89.8 | 9.1 | 103.02 | 103.8 | 22.8 | 152.0 | 590.0 |

| Disaster Risk Reduction Needs | Coast | Central | Western | North Eastern | Eastern | Nyanza | Nairobi | Rift Valley | Total |
|---|---|---|---|---|---|---|---|---|---|
| Enhancement of capacity on EPRP at district and school levels | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 12.0 |
| Provision of water boozers to 30 drought prone counties specifically to education | 165.0 | 179.9 | 250.8 | 250.8 | 287.1 | 290.4 | 64.4 | 425.7 | 1,914.0 |
| Home grown school feeding in targeted drought districts | 96.8 | 121.1 | 181.6 | 24.2 | 181.6 | 242.1 | 48.4 | 314.7 | 1,210.6 |
| Recreation supplies to schools in drought affected areas that have seen an increase in enrolment due to migration of families for psychosocial integration | 6.4 | 8.0 | 12.0 | 1.6 | 12.0 | 16.0 | 3.2 | 20.8 | 80.0 |
| Boarding school supplies to schools in affected areas so that dormitories can cater for the drought induced increased number of students not catered for previously | 30.0 | 37.6 | 56.3 | 7.5 | 56.3 | 75.1 | 15.0 | 97.6 | 375.6 |
| **Total DRR Needs** | **299.8** | **348.0** | **502.2** | **285.6** | **538.5** | **625.1** | **132.5** | **860.4** | **3,592.1** |

# *Gender*

## *Introduction*

The drought in Kenya has clearly had a devastating impact on many communities in Kenya, destroying livelihoods and increasing the vulnerability of women, men, boys and girls. However, as in many countries affected by disaster, women and girls are especially vulnerable; therefore, particular attention has been paid by the Gender Team to women and girls, while at the same time recognizing the impact on men and boys. In this context, the PDNA reveals that women in Kenya have been disproportionately affected by the drought because pre-existing gender discrimination exposes them to higher rates of poverty and insecurity and because of the extra socio-economic burden they have meeting the needs of households, children, vulnerable and the elderly. The PDNA was able to identify serious concerns in relation to women and girl's safety and security in drought-affected areas, including increased risk of many forms of gender-based violence.

In addition, many women and girls have been forced to make a trade between their protection and their livelihood, and in a situation where there are limited economic opportunities women and girls are often forced to resort to harmful measures to survive.

To address this, and ensure sustainable recovery for all from the drought, the PDNA must ensure that all short and long-terms economic recovery programmes are sensitive and respond to the needs of both women and men, as well as not increasing risks for women. Special effort must also be made to promote women's participation in planning, particularly in regards to DRR measures. Building the resilience of communities is a central principle of PDNA's; however, unless women in Kenya are central to this, and gender equality and the empowerment of women is actively promoted, the resilience of communities to future disasters will not be achieved.

Unfortunately, a Sector Team dedicated to looking at Protection was not established as part of the PDNA. Therefore, a number of key concerns relating the situation of refugee, IDP and host communities and the drought are not fully reflected in the PDNA and as result this is a serious gap in the assessment, which must be acknowledged. Moreover, due to the limited capacity and time constraints, the Gender Team was not able to look at broader protection issues, in particular child protection, which is an obvious concern that needs to be addressed in the drought recovery planning.

## *Summary of key findings* - Impact of the drought on gender and the situation of women and girls

- Significant increase in the socio-economic burden on women and girls drought induced mobility and loss of livelihoods is impacting on existing gender-roles increasing the vulnerability and socio-economic burden on women;
- Increased risk of physical insecurity for women and girls increased incidence of resource based conflict due to drought is further heightening the vulnerability, safety and security of communities, in particular women and girls;
- Women and girls are resorting to harmful measures to survive (risky survival strategies) limited livelihood options, high levels of illiteracy, women's historically low status in society, and limited role in decision making; women are being forced to resort to harmful measure to survive, often having to make a trade between their protection and their livelihoods.
- Increased risk of Gender Based Violence including sexual exploitation and abuse (SEA) and early marriage and early pregnancy in drought affected areas, child trafficking and sexual violence;

## *Pre-drought situation*

Over half of the population (45%) of Kenya lives in absolute poverty, with the highest levels recorded in North Eastern (73.9%) and Coastal Provinces (67.7%). While estimates suggest the overall poverty levels are falling, in drought-affected communities they remain extremely high, for example in Turkana poverty levels are as high as 93%. Rural communities, in particular those living in Arid and Semi-Arid areas make up the majority of poor households in Kenya and it is these poor households who have been most severely impacted by the drought.[40] Women in Kenya are more likely to be poor than men and are therefore more vulnerable to adverse shocks. 54% of rural and 63% of urban women and girls live below the poverty line.[41]

The Kenya Demographic and Health Survey reveal that women head an average of 34 % of households in Kenya, an important characteristic that indicates the general level of welfare in households. Women in rural areas head a

[40] The Africa Development Bank Kenya Gender Profile, 2008
[41] Kenya UNDAF, 2011

slightly higher number of households (36%) than women in urban (29%) areas. The survey states households headed by women (single, temporarily female headed, widowed) in Kenya are typically poorer than households headed by men, constituting a particularly vulnerable group of the population, reports suggest this number has increased due to resource-based conflict and drought. In addition, the share of the population under the age of 15 is 45%, leading to a high dependency burden.[42] Pre-existing high-levels of food insecurity in Kenya have been impacted by the drought, with the worst affected areas in the north, north-eastern and eastern areas. Drought assessments reveal that female headed households face particular challenges in accessing government assistance and food relief in times of drought, due to their lack of access to land, credit and gender discrimination.

Access to employment and sustainable livelihoods remains a serious challenge for many Kenyans, in particular for women. In regards to employment the recent demographic survey (2009) reveals that 57 % of women and 86 % of men, between ages of age 15-49 categorize themselves as currently employed (those who answered yes to being employed referred to being employed at the time of interview only). Women from North Eastern have the highest rates of unemployment where only 17 % consider themselves employed.[43] Of those employed women, the informal sector has become a major employer of women. Employment activities for women in this sector include shops, kiosks, carpentry and other small enterprises. Responding to the challenges in income generation, the recent 2011 Kenya UNDAF report highlighted the critical need to 'promote opportunities for women and men to obtain decent and productive work in conditions of freedom, equity, security and human dignity' as central to economic development.[44] However, women tend to do the majority of unpaid work and often receive little remuneration for their labour in comparison to men.

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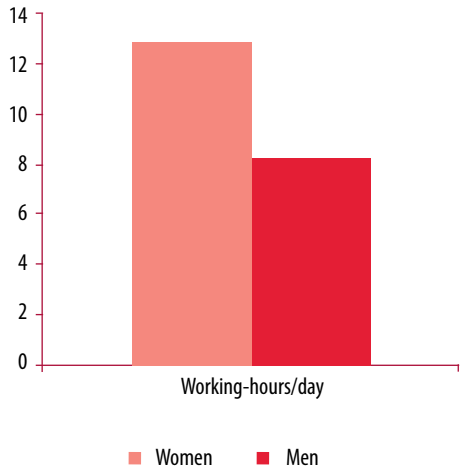
In Kenya, women play a critical role in agriculture, in both productive farming and subsistence farming. In productive farming, women and girls mostly provide most of the labour force. Gender discrimination and a series of legal and administrative barriers also continue to block women contributing to agricultural productivity, and to the Kenyan economy. Sustained efforts to remove these barriers would not only allow women to contribute and improve livelihoods and those of their families, but would increase agricultural productivity helping to ensure adequate food for the population, thereby reducing poverty levels. Despite constituting over 70% of the labor force in the agricultural sector, women only hold 1% of land titles. Women's limited ability to own land and property means they are unable to receive cash remuneration for their labour, benefit from agricultural extension services, or participate in food producer groups.[45] Removing these barriers could provide a significant boost to Kenya's economy and have an untold impact on the lives of Kenyan women and their families.

[42] Kenya Demographic Health Survey, 2003
[43] Ibid.
[44] Kenya UNDAF, 2011
[45] Gender and Economic Growth in Kenya Unleashing the Power of Women. The World Bank. 2007

It is clear that all PDNA recovery frameworks must be aligned with existing Government productive sector policies, as well as gender policies that aim to reduce gender discrimination and its impact on economic growth in Kenya.

In addition to high levels of poverty, women in Kenya are time poor because of their dual roles in the household economy and the labour market, adding to their vulnerability. Women work longer hours (12.9%) in comparison to men (8.2%) yet they earn less because these hours are not remunerated.[46]

**Figure 62 Women's time burden in Kenya**




*Source Gender and Economic Growth in Kenya. The World Bank, 2007*

A number of social protection mechanisms, supported by donors are being implemented in Kenya, in particular they target Older People (Older Person Cash Transfer) and Orphans and Children (Cash-Transfer to Orphans and Young Children). These programmes are critical to supporting vulnerable communities in drought affected areas, however, they are not sufficient to cover the overwhelming need, and must expended to ensure all vulnerable individuals are targeted. A Hunger Safety Net Programme (HSNP) also provides cash transfers to vulnerable households and individuals in the arid and semi-arid lands (ASAL), there are also plans to upscale this programme in response to the drought. These programmes provide essential support to women who often carry the socio-economic burden of caring for families. However, these programmes must be designed in a way that takes into account the gender dimensions in many households, which often dictate that women have little decision making power in regards to finances. Moreover, vulnerable female-headed households in drought affected areas, must have equal access to economic support and targeted accordingly.

Gender Based Violence continues to be a pervasive problem in Kenya, with over half of all Kenyan women having experienced violence at some time in their lives.[47] Forms of GBV include assault, rape, defilement, battery, sexual harassment, emotional abuse and female genital mutilation and domestic violence is still widely accepted and condoned in Kenyan society. The Africa Development Bank concludes that the prevalence of GBV in Kenyan society 'confirms the deep-rooted systematic inequality between women and men, with men dominating women by using physical abuse'.[48] In response the Government of Kenya has taken a number of steps to address the problem, in particular the recently adopted Kenya Constitution (2010) outlawed a number of discriminatory customary laws and practices which permitted violence against women. The constitution has also domesticated a number of international legal instruments and frameworks in respect of women's rights and gender equality including the Convention on the Elimination of all forms of Discrimination against Women (CEDAW), Beijing Declaration and Platform for Action,

The Kenya Economic Recovery Strategy for Wealth and Employment Creation (2003-2007) recognizes that Kenyan women have unequal access to opportunities and assets and that this is the single greatest determinant of poverty for women. Though there is a severe lack of up-to-date sex-disaggregated statistics in Kenya, available data show that women are actively contributing economically, despite various gender-based constraints. Removing these could provide a significant boost to Kenya's economy. Examining the implications of gender-based inequality and addressing the linkages between gender and economic growth are critical for the following objectives Meeting the Government of Kenya's 7% GDP, increasing formal sector employment, reducing poverty levels by at least 5%, increasing agricultural productivity and exports, increasing access to finance, reducing HIV/AIDS rate for women and meeting the Millennium Development Goals (MDGs).

***Gender and Economic Growth Unleashing the Power of Women. The World Bank, 2007***

[46] Ibid
[47] Kenya Demographic Health Survey, 2003
[48] The Africa Development Bank Kenya Gender Profile, 2008

the Declaration on Violence against Women and the Maputo Protocol.[49] In addition the National Gender Equality Commission (NGEC) launched the National Framework towards response and prevention of GBV in Kenya to improve coordination and drive forward the Government's efforts to tackle GBV.

Despite these efforts GBV is still a serious problem in Kenya, therefore the challenge does not lie with the legislative framework but instead with weak implementation and enforcement of existing laws. Drought and conflict are also both factors that are exacerbating the current situation and increasing the risk for women and girls. Moreover, a recent survey that mapped GBV services in Kenya concluded that current GBV services are not able meet the requirement, and highlighted serious gaps in service provision across Kenya[50]. Gender machineries, like the National Commission are have limited capacity to lead on such large-scale issues given they are generally underfunded and limited in their capacity. It is essential that capacity of these gender machineries developed and invested in, in order for them to support other Government Ministries in addressing the impact of the drought.

In regards to governance, women in Kenya are significantly underrepresented in leadership and decision-making in central government and in local government institutions. In line with the Government of Kenya's national commitments to gender equality, the Kenya PDNA should actively support equal participation of men and women in short, medium and long-term recovery frameworks and activities. Women's participation in decision-making and public life is an essential pre-requisite to economic and social development in Kenya, as well as to the full realization of women's rights.

## *Impact of the drought on gender and productive sectors* Agriculture, Livestock and Fisheries

In the wake of the ongoing drought, the challenge of production across key sectors, agriculture, fisheries and livestock are many.

### Agriculture and food

The agricultural assessment confirmed that women and children have been the hardest hit and the drought is impacting on gender roles in the agricultural sector. Assessment teams confirm that despite women's central role in agricultural production in Kenya in both the formal and informal agricultural sector, women's limited land ownership and role in decision-making over income and finance makes them especially vulnerable when drought occurs. As a result, women have limited access to extension services or credit, or in regards to selling or marketing produce. Drought induced male migration compounds this situation, because women are then unable to access such services or markets. It was reported that in many cases men who migrated to urban areas, were barely able to meet their own basic needs, and are mostly unable or unwilling to remit income home. Some women interviewed stated that some men are not returning home once the drought has ended, increasing the economic and social burden on women. As men are migrate further for livestock pasture and move to urban areas for work, women taking on full responsibility for feeding households, caring for the elderly and the sick and caring for sick animals and in many cases have to seek high-risk survival strategies including begging, transactional sex and prostitution.

Gender roles in agricultural production are different in each community of Kenya. In general, men control cash crop farming like cotton, coffee, commercial maize farming, and fruits while women control subsistence farming which includes maize, pigeon peas, millet, and sisal. Although women make up the bulk of agricultural labour force in cash crop farming, women interviewed confirm they often have little control or no control in decisions to

[49] A Baseline Survey on Gender Based Violence in Kenya, National Commission on Gender and Development 2010

[50] Gender Based Violence Mapping Survey in Five Selected Counties in Kenya, National Commission on Gender and Development, 2010.

sell produce, have limited access to markets, making it hard to sustain household food security. Moreover, those women who work as agricultural laborers in the formal sector often have little control of their income.

In regards to food distribution, women interviewed revealed in the majority of cases men sit on committees that distribute food, single or female-headed households are often discriminated against in these processes. It was also noted that nursing and expectant mothers were disadvantaged as they could not queue for food and relied on other women to get them the food allocation or share what they got. In response to the food security crisis, the Government has been providing food relief to affected people, however, the coverage is limited and not sufficient.

### Livestock

In pastoral and agro pastoral communities in Kenya entrenched gender roles dictate that livestock groups men and women own and manage. Assessment teams confirm that men and boys predominantly own and manage large livestock herds (cattle and camels), and tend to be responsible for economic production and income generation, whereas women tend to manage small household livestock such as chickens and goats (and in some cases sheep and donkeys), primarily focusing on livestock's contribution to food and nutrition and the household. However, while the general picture reveals livestock is the domain of men, available data shows that women too keep livestock, which they acquire through own purchase or donation from husband, relative or local CBOs. Most importantly, the field assessment confirms that most women remain excluded from decision-making in regards to selling livestock for commercial purposes.

As a result of the drought men and boys have been forced to leave household for extended periods in search of pasture and water for livestock. Assessments reveal that male members migrating with livestock or to urban areas are barely able to meet their own basic needs, and are unable to remit income home to rural areas. The loss of livelihood is reported to have had a severe impact on men and their ability to provide for their family, and some women interviewed confirmed that as result, men are choosing not return, leaving many families destitute. Also, many women interviewed highlighted that the drought has increased the level of alcohol abuse amongst men, which is impacting on social cohesion within families. Moreover, young boys are often required to attend to remaining cattle and are no longer attending school.

Women, the elderly and children are extremely vulnerable in regards to food security and nutrition, because the milking herd, a vital asset for household nutrition has either

become largely unproductive, taken by men migrating with herd, and in some cases sold for cash. Male members often sell herds without the knowledge of women. It is clear that programmes that support both men and women in finding alternative livelihoods are needed. Moreover, existing Government programmes that provide extra livestock for milking purposes, need to be up scaled.

### Fisheries

Women occupy a central place in the fishing sector in Kenya, for example in Lake Victoria women represent 70% - 87% of workers active in the fish trade. Despite this, women do not take part in fishing, which is solely men's domain and men own the majority of boats. The fisheries sector around Lake Victoria is characterized by a high participation level of single, divorced, separated and widowed women, a situation mirrored in other lakeside communities. Ongoing droughts have over the year increased the vulnerability of women in the fisheries sector. Assessment teams confirm that when the catch is low women exchange sex for fish as a survival strategy, directly impacting on the rates of HIV/AIDS in communities around Lake Victoria. A number of organizations have been running campaigns warning against the risks, including the 'No fish for sex' campaign to address the severity of HIV/AIDS. These programmes have been essential in educating people on HIV/AIDS, however, following the drought and increased hardship, it is essential these sensitization programmes continue

As a result of the drought, assessment teams also founds that Lake fish traders, who are predominantly women have been seeking alternative coping mechanisms such as firewood collection and agricultural work, while men have found employment in working in quarries and in the building industry. Some men have also started fishing illegally depleting existing stocks of fish. Assessment teams confirm that women tend to participate and lead in the Beach Management Units (BMUs), which are primarily responsible for managing fishing markets. On the coast, gender roles in the fisheries sector are different and women tend not do not act as the main fish traders. The team reported that number of women working on fish farms has increased twofold.

## *Social sectors* Protection, Health and Education

Increased physical insecurity for women and girls due to resource- based conflict

In some regions (particularly Turkana and Pokot) the drought has contributed to an increase in resource-based conflicts, boundary disputes, cattle rustling and conflict induced displacements due to the ongoing shortage of water and pasture. In June 2011, 76 conflict related death were reported linked to resource-based conflicts.[51] Amongst the pastoral communities in Northern Kenya, men have tended to move their livestock (cattle and camels) further distances in search of pasture and water leaving the women and children in the households. This has increased protection risks for women, particularly Gender Based Violence (GBV) and Sexual Exploitation and Abuse (SEA). Drought also translates into longer distances traveled in unfamiliar territory for women and adolescent girls to carry out household activities. This coupled with the context of environments where the social fabric has either disintegrated or affected by instability and insecurity further exposes them to risks and vulnerabilities.

### Community cohesion and changing gender roles

In some drought-affected areas, displacement has led to a change in gender roles for both men and women. The loss of livelihoods for men can impact heavily (particularly livestock in the pastoral communities and cash crops in cropping communities) and many men, who

[51] FEWSNET. Kenya Dekadal Food Security Monitoring, August 3 & 11, 2011

migrate alone in search of alternative income options for their families, have faced the trauma of not being able to provide for their households. Assessment teams report problems with alcoholism, particularly amongst men. Normally pastoralists move together with their whole families and family unit is kept in together, however, the drought is said to have impacted on the social fabric of communities. Once left alone, women often become the defacto head of household. The loss of economic support from the household heads has been reported to contribute to increased movements by women to nearby towns for survival in search of casual labour. This further heightens their risks to GBV and Sexual Exploitation and Abuse as indicated in a recent drought impact assessment carried out by the national protection working group fact finding mission on internal displacement in Turkana. Prevailing high illiteracy levels amongst women, the status and position of women in the society and the lack of skills puts women and girls at the bottom ladder in terms of access to opportunities further driving them to poverty and adoption of risky survival strategies.

### Increased vulnerability of female and child headed households

There has been anecdotal (data not available of the percentage or relative increase) information on the increase of single (mostly female headed) and child headed households as a result of either drought-induced mobility.[52] Significant too is the increased pattern of migration for unaccompanied minors especially boys and young men to towns, for example from the rural areas in the rift valley and its environs to Kitale and Eldoret towns in search of employment and livelihood means. Although not fully documented and quantified, this may or could likely lead to increased child labour, drop out from schools, trafficking and exploitation in exchange for basic needs as the target groups are already disenfranchised and vulnerable due to family separations. There have also been indications of families sending out their boys and girls to live with relatives during the drought or offering them as domestic labourers as a result of the crisis and loss of income and food at the household level.

### Survival Strategies and Gender Based Violence

Alternative coping mechanisms and survival strategies have been identified in some of the areas, for example in Turkana, Kenya Protection Cluster fact finding mission found increased incidences of transactional sex in exchange for food and work, increased commercial sex work especially amongst adolescent girls and young women and families sending off their girl children to the streets in the urban centres in search of any available work opportunities. Women are being forced to make unacceptable tradeoffs between their protection and livelihoods, in order to feed their families.

Increase in early marriages, trafficking in young boys and girls, sexual exploitation and abuse for food and work, rape, defilement, female genital mutilation and domestic violence including forced separation due to socio-economic reasons as a result of the drought, have been reported. Most of these cases, especially rape, defilement and domestic violence are dealt with at community level without using the formal justice mechanisms and also because of the social stigma associated with these forms of GBV within the cultures particularly in Northern Kenya. One of the obstacles documented in some assessment reports indicates that the services are very expensive e.g. in Lodwar it costs Ksh. 1,000-2,000 to obtain a P3 medical form which is otherwise free and therefore restricts legal access to justice. Other GBV services such as legal, medical and psychosocial services are either inadequate or non-existent particularly for the host communities in Northern Kenya but are well developed in the camps. It was also noted that prevention initiatives to raise awareness and advocate for prevention of gender-based violence were also inadequate

[52] Ibid

**Ensure the integration of gender** and other cross-cutting issues such as environment, protection and HIV/AIDS in assessment, planning and implementation through the use of appropriate expertise and tools.

**Promote gender equality** by assessing particular needs and vulnerabilities in gender analysis. Women's roles in transition and development are profoundly affected by how far early recovery efforts include them and their needs in assessment, planning and programming.

*Early Recovery Guidance Note Cluster Working Group on Early Recovery in cooperation with the UNDG-ECHA Working Group on Transition, 2008.*

or limited to some areas only. In Turkana it was noted that there has been an increase in early pregnancies and unsafe abortions amongst adolescent girls, which is linked to transactional sex and SEA.

### Education

A number of issues emerging from the education sector during the PDNA in the coastal, upper Easter and parts of Central and Rift valley regions with regard to drought included the dropout rate of girls and boys mainly from poorer socio-economic groups who have to forgo school to free meager resources for family survival including food and medical attention. This has increased absenteeism and negatively impacted on performance in school level and national level tests and examinations and also affected the quality of education. The drop-out rate has also increased with a number of girls and boys who drop out during drought periods opt to stay away from school even when the drought period is over.

Boys in the coastal region tend to move to urban centres in search of economically viable activities to contribute to the family income leading to long absence from school. In the other areas boys move with fathers and other male relatives in search of pasture for their livestock while others participate in khat related businesses while others join outlawed groups as they seek for livelihoods. Women take responsibility of fending for their families in this respect the children, and spend hours and sometimes days looking for food and other means of basic survival for food and other basic needs.

Girls on the other hand take responsibility for siblings as the mothers and fathers leave home to seek for sources of livelihoods. They miss out on schools and perform poorly as a result. A number of households have been left in the care of young girls without adult supervision and protection, consequently exposing these girls to sexual exploitation, and sexual abuse, violence including rape. Some of the girls as young as eleven and twelve also leave home in search of an income to support their families, prompted by some close family members (including parents), and in addition to sexual exploitation fall victim to pregnancy, early marriage and sexually transmitted infections including HIV/Aids. This has contributed to a decrease in the already notable smaller number of girls accessing and completing different levels of schooling in these regions.

The situation of girls' and boys' absentee and drop out in the coastal region has been exacerbated by the tourism industry which is the main attraction for 'easy' economic gains, prompting many girls and boys to abandon school altogether when faced with difficulties such as drought as experienced in the years 2008 to 2011. In the Central and the upper eastern regions, the drop-out rate among boys continues to grow as they pursue lucrative businesses in the selling of miraa (khat) as well as joining outlawed groups in search of means of survival. The rate of enrolment for boys in this region is also slowing and becoming a source of worry for education planners and the rest of the stakeholders.

Overall, in the coast region the number of boys enrolling and completing both primary and secondary school levels is higher than that of girls and this has remained consistent over the last ten years (2002 to 2011) including the years being assessed (2008 to 2011. The dropout rate of girls in the region therefore continues to pose a threat to the anticipated attainment of the MDGs Education for All (EFA) and pursuance of gender parity being experienced in other regions in the country.

## *Gender and early recovery – recommendations*

The UN Early Recovery Guidance Note (2008) outlines a number of key principles that must underpin all activities; these principles must be fully endorsed and integrated into the Kenya PDNA recovery framework. In specific relation to gender the guidance notes states;

| Sector | Short term/Longer term |
|---|---|
| Social Protection and Safety nets. | Short-term<br>• Any planned social safety-net measures (Cash transfer) that target vulnerable groups, should also be targeted at women and girls, in particular female-headed households. However, they must be linked to longer-term programs that provide life skills and build the confidence of women and girls, thereby reducing their dependence on sexually exploitative opportunities as alternative sources of livelihoods.<br>• Existing Social Protection Programmes for vulnerable children and the elderly must be expanded to ensure all vulnerable drought affected families receive support, thereby reducing family separation. |
| | • A gender analysis must be central to all early recovery programme design programme, to ensure the programme meets the needs of men women boys and girls, for better delivery of its planned initiatives.<br>• Efforts to diversify the livelihoods in pastoralist communities must take into account the needs of women and unequal social relations<br>• The participation of both men and women in the identification of priority early recovery programs is critical, so that programmes are cognisant to their individual capacities, coping mechanisms, thereby mitigating further risks and vulnerabilities.<br>• All programmes should take note of changing gender roles in the targeted communities and to put strategies in place to address these roles without further burdening men, women and boys and girls. Programmes should not be designed based on pre-existing judgements of women's roles, and should seek to empower women both economically and socially, within communities.<br>• Programmes that target women's livelihood, must also ensure that men are involved and aware of initiatives, to ensure programmes do not negatively impact on gender relations within the household, and increase risks to women.<br>• The Women's Enterprise Fund (Ministry of gender, Children and Social Development) should be targeted at disaster prone areas in Kenya (particularly at women in Arid and Semi Arid) areas.<br>• Women must play a central role in any disaster preparedness activities and programmes. In particular, the capacity of local women's organisations must be build so that women have to capacity to participate. |
| Agriculture and livestock | • Initiatives to support farm workers in drought affected areas, including the expansion of farmer's grants, must take into account the primary role of women farmers in agricultural production in Kenya, and ensure that women are targeted accordingly.<br>• Ensure that all agricultural training and extension services are given to communities (with equal participation of men and women) and do not just engage with land-owners who are predominantly men. Any initiatives to boost agricultural production must respond to women's limited role decision making and empower them (community focused recovery projects) Community driven programmes including men and women will mitigate discrimintation against women.<br>• Agricultural technologies and veterinary services for livestock need to also target women and girls.<br>• Cash for work should be used to encourage men and young men to return to the agricultural farm as work is created by the recovery initiatives. |
| | • There is rising need for protection programs in drought-affected areas (developed referral pathway -prevention, psychosocial, legal and medical) particularly for girls and women who fall victim to sexual exploitation and sexual violence as they seek for coping mechanisms during the drought period.<br>• The role of Government Gender Officers in drought affected services needs to be increased and training of police on how to deal with cases of SGBV is critical.<br>• Increased investments to life skills for young and adolescent girls affected by the crisis (school drop outs, victims if SEA and GBV).<br>• Sexual and reproductive health education, services and awareness to women and adolescent girls is essential, services are currently limited impacting on the health and development of women and girls. Access to these services must be urgently addressed.<br>• Targeted economic and livelihood options to vulnerable female headed households and survivors of violence. |
| Food Security | • The lack of participation of women in food distribution committees and discrimination against women in distribution needs to be urgently addressed.<br>• Measure to increase food security at household level should use strategies like voucher for food/food for work, as this tends to attract women and girls who are the main food providers. |
| | • Socio-cultural issues in the area have a greater bearing on the decisions made with regard to the girl and boy's education. It is therefore important that program design takes into account community cultural aspects to ensure that programs designed meet the needs of different socio-economic groups in targeted communities. |

# *Disaster* risk reduction[53]

## *Executive Summary*

- The regular and increasing of drought, coupled with the high vulnerability of the ASAL areas, argues for greater attention to Disaster Risk Reduction – and more specifically a hazard specific focus on Drought Risk Reduction.

- Repeated experience of drought triggered disasters has resulted in significant policy level attention to drought risk reduction related policies and strategies. However, several key policies remain in draft form. Key concerns are that drought management should be preventive rather than reactive, and should be holistic, rather than emergency oriented to ensure drought resilience and food security.

- There is a critical need to accelerate investment in the foundations for development. This will include climate-proofed infrastructure and human capital development. Priority must be given to roads, water and irrigation, energy, education and health if long term resilience is to be strengthened.

- The establishment of a National Drought Management Authority was Gazetted in November 2001 and represents a major step forward in the institutionalization of drought management. It will be the principal instrument of Government in the implementation of all policies relating to drought management. The Authority will undertake a number of drought management activities, including drought preparedness, mitigation, relief, reconstruction and coordination, as well as any other related activities.

- The NDMA will be supported by the creation of a National Drought Contingency Fund. This will allow contributions from both the Government and other stakeholders (a multi-donor basket fund) to respond quickly and flexibly to the initial warning signs of drought, thereby reducing overall costs in the long term.

- To complement sectoral specific DRR investments additional financing is proposed in the areas of (i) Humanitarian Relief (ii) Policy Development (iii) Emergency Preparedness and Mitigation, and (iv) Risk Financing.

## *Background*

### Risk Profile

The most significant source of risk in Kenya is recurring droughts. Other natural hazards include incidences of floods, epidemics, landslides. For example livestock disease outbreaks including Peste Des Petits Ruminants (PPR) and Rift Valley Fever (RVF) have been recurrent, and a major aflotoxin infestation occurred in 2010. Earthquakes and tsunamis have been rarely recorded[54]. However, in both frequency and numbers affected drought is clearly the predominant natural hazard.

The impact of drought has intensified over the years and is likely to worsen with climate change. Available records indicate that in the last 100 years the country has experienced over 29 droughts. In the past four decades droughts have become more frequent, more widespread, and more intense. Major recent droughts were in 1983/1984, 1991/1992, 1996/1997, 1999/2001, 2005/06, 2008/09 and 2011.

Cyclical droughts are commonly perceived to have become more severe and frequent as a consequence of climate change. Climate model simulations[55] under a range of possible greenhouse gas emission scenarios suggest that the median temperature increase for Africa is 3–4°C by the end of the 21st century, which is roughly 1.5 times the global mean response. Total annual precipitation projections for Kenya suggest increases by approximately 0.2 to 0.4 percent per year, however regional variations in precipitation are vast and in addition temperature increases will have a significant impact on water availability, thus

[53] "Drought risk reduction" is a hazard-specific element of the broader concept of "disaster risk reduction" which is defined by the United Nations Strategy for Disaster Reduction as "The concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events". As many Kenyan institutions use the term "disaster management" this has also been maintained.

[54] EM-DAT

[55] IFPRI & ILRI. Climate Variability and Climate Change Impacts on Kenyan Agriculture. Mario Herrero et al. September 2010

There are major inequalities in human well-being between the arid lands and the rest of Kenya which act as a brake on development

- Only in the arid lands was human poverty worse in 2009 than in 2005; in all other parts of Kenya poverty levels fell.
- Primary net enrolment in North Eastern Province in 2009 was 36 per cent, against a national average of 93 per cent. Fewer than 25 per cent of girls who enrol in NEP actually complete their primary education; girls' completion for Kenya as a whole is now above 75 per cent.
- A recent national learning assessment revealed a 56 percentage point difference between the highest and lowest performing districts (Kikuyu and Turkana Central).
- In 2008/09 31 per cent of under fives in North Eastern Province were underweight, compared with 20 per cent nationally.
- Only 48 per cent of children in Northern Kenya receive all their recommended vaccinations, against an average of 77 per cent for Kenya as a whole.
- Seven districts in the north of Kenya have a Human Development Index lower than that of Sierra Leone, the lowest-ranked country in the world . [57]

exacerbating drought conditions. Increases in rainfall variability and the frequency of extreme rainfall events are forecast to be more intense over much of northern East Africa. The impacts are forecast to be greater as a consequence of higher vulnerability and lower adaptive capacity.

Kenya's Arid and Semi-Arid Lands (ASALs) – which constitute more than 80 per cent of Kenya's land mass – are particularly prone to drought. The economy of the arid districts is dominated by mobile pastoralism, while in the better watered and better-serviced semi-arid areas a more mixed economy prevails, including rain-fed and irrigated agriculture, agro-pastoralism, small-scale businesses based on dryland products, and conservation or tourism-related activities.

In addition to drought other sources risk have been important during the study period. Insecurity is prevalent– particularly in the pastoral districts due to competition over declining grazing and water resources. The widespread consequences of the post election violence following the 2008 elections were evident through 2008 and 2009. Abnormally high food and fuel prices – heavily influenced by global market trends – reduced purchasing power from 2007 onwards.

The vulnerability of the ASALs is high and the adaptive capacity low. The area is characterized by under development with the lowest human development indicators and the highest incidence of poverty in Kenya. More than 60% of the population lives below the poverty line. Pastoral production systems depend on mobile herding which is increasingly constrained through changes in land tenure systems and demographic pressures. Mobility is considered the core of the pastoral livelihood system, and crucial to managing risk in these harsh and unpredictable environments (IOM et al. 2010). Safe mobility must therefore be entrenched and facilitated in pastoral system at local and cross-border levels.[56]

There are limited options for livelihood diversification, inadequate social and physical infrastructure, poor marketing systems, and low levels of investment.

The consequence of repeated droughts, low resilience and limited time for recovery, is a progressive erosion of livelihoods in the pastoral, agro-pastoral and agricultural livelihood zones. The high level of exposure to drought and other shocks, and inherent vulnerability of the ASAL areas, argue for greater attention to Disaster Risk Reduction – and more specifically Drought Risk Reduction.

## *Legal and Policy Framework*

The most specific policy guidance relating to Drought Risk Reduction (DRR) is contained in three sets of overlapping policies – the first related to the development of the ASAL areas, the second relating to DRR and climate change and the third on Social Protection Policy. In addition Kenya has made significant efforts towards developing drought management related policies within the main sectors of agriculture, livestock development, water, environment, land and infrastructure development. Furthermore national policy is augmented by a number of relevant regional policies, including trade.

### ASAL Development

The developmental challenges and opportunities in the ASALs is intimately aligned with the challenges and opportunities of pastoralism. The defining characteristics include remoteness (with rudimentary infrastructure), low density and dispersed population, and a mobile population with communal patterns of ownership and decision making.

In 2001 pastoralism was identified as one of the themes within the Poverty Reduction Strategy Paper. An ad hoc Pastoral Thematic Group facilitated a process of gathering pastoralists'

[56] IOM, 2010 "Pastoralism at the Edge"- Effects of drought, climate change and migration on livelihood systems of pastoralist and mobile communities in Kenya
[57] UNDP, 2006 'Kenya National Human Development Report 2006 Human Security and Human Development.

views on poverty. Their report was incorporated into the Poverty Reduction Strategy Paper (PRSP), which in turn informed the content of the NARC government's Economic Recovery Programme (ERP) for 2003-2007. The PRSP was the first major national initiative to consult with pastoralists, and the ERP the first national development plan to devote a chapter to the arid and semi-arid lands, which had previously been subsumed under agriculture or rural development.

Vision 2030 builds on the progress made by the ERP and sets out a broader and more ambitious agenda. Its target date shifts the planning perspective beyond the short-term horizons of individual governments, reflecting the time required to achieve sustainable change. The inclusion of the political pillar creates an opening to address the underlying causes of chronic poverty in the north, and to put in place the institutional mechanisms necessary for gains to be sustained. For the challenges facing the region are social and political in nature, and require more than technical solutions.

In 2001 the Arid Lands Resource Management Project (ALRMP), under the aegis of the Pastoralist Thematic Group, held a series of meetings with pastoralists across Kenya about ways to reduce poverty. The causes of poverty identified during those meetings are strikingly similar to the foundations for national transformation identified in Vision 2030. Infrastructure, security, land tenure, education, employment and drought management were all ranked highly as issues of concern.

Currently the development strategy for the arid and semi-arid lands is set out in two main documents a draft Sessional Paper on the National Policy for Sustainable Development of Northern Kenya and other Arid Lands[58], and the Vision 2030 Development Strategy for Northern Kenya and other Arid Lands[59]. Both documents draw from best practice in dryland development and emphasise the following

- Recognition not just of the challenges facing the arid lands but also of their potential –particularly in the livestock sector, in renewable energy, and in the region's strategic position as the gateway to markets in the Horn of Africa and beyond.
- Investment in the foundations for development, particularly the region's economic and social infrastructure (i.e. roads, energy, water, education, and health). This will facilitate private sector investment and civic engagement, reduce basic inequalities in access to infrastructure and services, and underpin the productivity of pastoralism and other dryland production systems.
- Alternative ways of working in arid lands which take account of the particular social and environmental characteristics of the region, including mobility, low population density, and the distinctive institutional arrangements which underpin pastoralism.



[58] Republic of Kenya, 2011 Draft Sessional Paper for the Sustainable Development of Northern Kenya and other Arid Lands.

[59] Republic of Kenya, 2011 Vision 2030 Development Strategy for Northern Kenya and other Arid Lands. This strategy intends to highlight and expand relevant commitments to pastoralists within the overall Vision 2030.

- Appropriate technical solutions to the challenges of ensuring food and nutrition security in dryland environments, particularly in a context of climate change.

### Disaster Risk Reduction

The National Disaster Management Policy (NDMP)[60] was prepared by the Ministry of State for Special Programmes. It builds on previous drafts in existence since 1999 and several consultation processes, and most recently has been revised to incorporate climate change adaptation issues. The current draft, dated September 2009, has not yet been presented to Cabinet for approval. Once approved, an Act of Parliament would need to be drafted and adopted to establish the core components of this policy into Kenyan law.

The draft reflects the Hyogo Framework for Action (HFA) priorities and takes a multi-hazard approach, including drought. The objectives are

- To establish a policy/legal and institutional framework for management of disasters, including promotion of a culture of disaster awareness and for building the capacity for disaster risk reduction, at all levels;
- To ensure that institutions and activities for disaster risk management are co-ordinated, focused to foster participatory partnerships between the Government and other stakeholders, at all levels, including international, regional, sub-regional Eastern African, national and sub-national bodies;
- To promote linkages between disaster risk management and sustainable development for reduction of vulnerability to hazards and disasters.
- To mobilise resources, including establishment of specific funds for disaster risk reduction strategies and programmes.

The NDMP recognizes that coordination across ministries, Civil Society Organizations (CSOs), international organisations and the private sector is critical for its effective implementation. It clearly states that it aims to "promote linkages between disaster risk management and development processes for the reduction of vulnerability to hazards ensure that mitigation activities are mainstreamed into national development planning.

The National Action Programme for Combating Drought and Desertification (NAPDD) proposes adaptation to climate change through the following strategies

- To mainstream climate change adaptation options into development planning processes by understanding the uncertainties associated with climate change.
- Development and local demonstrations that use climate change model outputs (future climate), climate forecast information (very near future climate and near real-time data) and climate analog products (past climate) for enhancing adaptive capacity to climate change.
- Training intermediary user institutions to translate forecasts into location-specific impact outlooks for use in preparing contingency plans for end users.

### Social Protection Policy

The country, through the Ministry of Gender, Children and Social Development, has facilitated formulation of a draft National Social Protection Policy document that is currently waiting cabinet approval. The policy provides the Government's intent of putting in place a National Social Protection Program focused on improving the lives of the poor and vulnerable. Based on the content of the policy a cabinet memorandum was prepared for discussion. A National Social Protection Strategy is currently being developed in-line with the policy document.

[60] Government of Kenya, Ministry of State for Special Programmes, Office of the President. Draft National Policy for Disaster Management in Kenya, February 2009.

The objective is to address poverty and reduce vulnerability in the country through creation of a framework that both provides and promotes immediate support to the poor and vulnerable; and build their productive capacity, thereby facilitating their movement out of poverty. This policy provides a framework for the potential establishment of national cash based social transfers. This could draw from the experiences of, and possibly scale-up, existing cash transfers programmes including the Hunger Safety Net Programme, Orphan and Vulnerable Children (OVC) cash transfers and Kazi kwa Vijana.

### Operational Strategy

The Kenya Country Programme Paper "Ending Drought Emergencies[61]" articulates a ten-year programme for ending recurrent drought emergencies in Kenya. The strategy begins from the premise that because droughts have a slow-onset nature and are predictable, better management of their impact on communities is possible and will eliminate their worst effects. The focus is on creating a more conducive environment for building drought resilience. Stronger foundations and institutions for development in drought-prone areas will increase the efficiency and impact of all activities across all sectors, whether led by Government, the private sector, or communities themselves. The principal strategies are;

- Investing in the foundations for development, as articulated in Kenya Vision 2030;
- Ensuring that a more effective institutional framework is in place to manage drought and ASAL development in a more coordinated and sustainable way;
- Enhancing the adaptive capacities of communities to the effects of climate variability and climate change through the application of an ecosystems management approach.

The Inter-Agency Working Group (IAWG) drought management strategy is articulated through the IAWG Plan of Action[62] and the Disaster Risk Reduction and Climate Change Position Paper. This was developed by FAO, Oxfam, and WFP with the support of UNDP and OCHA. This is aligned with national plans and advocates a three pronged strategy of (i) response to extreme food and nutrition insecurity of vulnerable people at risk, in the short term; (ii) promoting early recovery strategies, in the medium term; and (iii) promoting livelihood resilience, in the longer term.

## *Institutional Structures*

Although there has been no official policy and legal framework to guide disaster management in the country, the Government and relevant stakeholders, including the Kenyan population in general and disaster- affected populations in particular, has in the past managed disasters reasonably well, courtesy of the multi-sectoral and multi-agency approach and the

© PDNA 2011

[61] Republic of Kenya. Ending Drought Emergencies in Kenya A commitment to sustainable solutions. Country Programme Paper, Final. 7 September 2011

[62] Inter-Agency Plan of Action for the Horn of Africa. A Framework for Operationalization. Nairobi, 30th September 2011

collaboration and partnerships that have evolved among the different players in the country over the years. Institutions such as the Kenya Food Security Meeting and its technical arm, the Kenya Food Security Steering Group, UN-led Ending Drought Emergencies, Arid Lands Resource Management Project, the National Disaster Operations Centre, St. John's Ambulance, the Uniformed Forces and Sectoral Ministries, among others, have had a measure of success.

In 1980 an ASAL section was set up in the then Ministry of Economic Planning and Development. In 1989 it was replaced by a full Ministry – the Ministry of Reclamation and Development of Arid, Semi-Arid and Wastelands. The creation of both institutions demonstrated growing awareness of ASAL issues, but their focus was limited, with a bias towards cattle and conventional range management approaches in the easier-to-reach semiarid districts.

Since 1996 the Office of the President, supported by the World Bank (WB), has been implementing the Arid Lands Resource Management Project (ALRMP) under the Office of the President. The ALRMP objective is to enhance food security and reducing livelihood vulnerability in drought-prone and marginalized communities. Through the ALRMP the Government has made significant progress in managing drought and food security at both national and district levels. The ALRMP also re-balanced attention onto the more acute challenges facing the arid districts. The ALRMP, further supported by the European Union (EU) funded Drought Management Initiative (DMI), consolidated a national drought management system, with drought management structures at the national (Kenya Food Security Meeting (KFSM),Kenya Food Security Steering Group( KFSSG)), district (District Steering Groups (DSG's)) and community levels.



The Ministry of State for Development of Northern Kenya and other Arid Lands was created in April 2008 in recognition by the government that the region has not enjoyed the same level of development as the rest of the country. Responsibility for the coordination of drought disasters and drought management is currently apportioned between the Ministry of Development of Northern Kenya and Other arid Lands (MODNKAL) and Ministry of Special Programmes (MOSSP).

### National Drought Management Authority (NDMA)

In November 2011 the National Drought Management Authority (NDMA) was Gazetted. The NDMA is major step forward in the institutionalization of drought management. This is a permanent institution with a sound legal basis that will subsume the functions of the ALRMP – which was in effect a time-bound donor-funded project.

The draft NDMP initially foresaw the establishment of an integrated National Disaster Management Authority. However, given the significance of drought induced loses the decision was taken to establish a a unitary structure for drought management, within which preparation, EW, response and rehabilitation are closely linked to each other and under the same control.

The formation of the NDMA has been inspired by the desire to respond more efficiently and effectively to the frequent droughts experienced in the ASALs region of the country. It is envisaged that the Authority and its

complementary National Drought Contingency Fund will facilitate early response to drought crises preventing famine and will enhance the quality of existing drought management systems.

The creation of a specialized, permanent institution, with a legal basis, will ensure that the drought management system is not affected by ministerial restructuring. The Authority will be able to ensure continuity and carry out long-term planning for improved drought management, in a way that a time-bound project cannot. The Authority will provide a focus and foundation for solid coordination across Government and with development partners.

The Authority will exercise general supervision and coordination over all matters relating to drought management. It will be the principal instrument of Government in the implementation of all policies relating to drought management. An Act of Parliament shall provide for the establishment of an appropriate legal and institutional framework for the Authority (National Drought Management Authority Act).

The Authority will operate at national level, but will focus and concentrate its activities in areas which are drought-prone and drought-affected. Special attention will be given to arid and semi-arid areas, which are among the most vulnerable in the country, and whose ecosystems and livelihoods are drought-sensitive.

The Authority will undertake a number of drought management activities, including drought preparedness, mitigation, relief, reconstruction and coordination, as well as any other related activities. The nature and range of these activities will be determined by the onset and nature of the drought phenomenon, its span, intensity and level of impact. The National Drought Management Authority will receive funding from the Consolidated Fund for the execution of its non-emergency drought activities.

The NDMA will be supported by the creation of a National Drought Contingency Fund (NDCF). This will allow contributions from both the Government and other stakeholders (a multi-donor basket fund). The Fund will respond quickly and flexibly to the initial warning signs of drought, thereby reducing overall costs in the long term. The Fund will be built up slowly, until such time as it can finance most drought response. We anticipate that the start-up costs and seed money for both the National Drought Management Authority and the establishment of the proposed National Drought Contingency Fund will allow contributions from both the Government and other stakeholders (a multi-donor basket fund). The Fund will respond quickly and flexibly to the initial warning signs of drought, thereby reducing overall costs in the long term.

The Authority will have a level of autonomy which will allow it to disburse resources based on clearly benchmarked triggers and guidelines. NDCF will allow financial flows to drought-affected areas unimpeded by the year-end procedures of both the Government and its development partners.

### Coordination Structures

Coordination of humanitarian response is taking place at both national and district levels.

**National** the Government's Crisis Response Centre provides oversight to the Crisis Consultative Forum (CCF) organised at a sectoral level. The CCF, chaired by the Permanent Secretary in the Ministry of State for Special Programmes, meets twice monthly. It brings together technical personnel from line ministries and the humanitarian sector co-leads who are guided by the United Nations and NGO Humanitarian Partnership Team (KHPT, or an expanded Inter-Agency Standing Committee (IASC)). Individual sector meetings give strategic and technical guidance to the partners. In addition, the operation of the drought early warning and contingency planning systems, and the facilitation of seasonal drought

assessments, is led by the Kenya Food Security Meeting / Kenya Food Security Steering Group.

**District** the District Steering Groups (DSGs) are coordinating multi-sectoral humanitarian response and district technical forums on thematic issues (nutrition, health, water, agriculture and livestock). There are challenges at this level, especially in regard to the new districts where DSGs are not fully functional.

## *Challenges and lessons learnt*

While droughts may be an unavoidable natural phenomenon their impact can be mitigated by human action. Droughts need not, and should not, lead to famine and other disasters. The current crisis reflects long-term under investments in the drought prone areas. A new approach needs to reflect a fresh political priority to invest in the dry lands. And such investments, policies and programmes should have a primary objective of building resilience to future climatic and economic shocks

The persistence of drought emergencies results from a combination of factors, including

- Late response great strides have been made in Kenya's early warning and contingency planning systems, but early action remains a major challenge;
- Reactive, crisis management approach, rather than an anticipatory and preventive risk management approach;
- Under-investment in critical sectors, such as infrastructure, agriculture, health, and education, that weakens adaptive capacity to climate variability and climate change.

Appropriate action early in the drought cycle is critical. However, response at both national and global levels is still driven by hard evidence of actual suffering, rather than by indicators of an emerging problem. Kenya has made significant investment in systems of early warning, contingency planning, seasonal assessments, and coordination. Seasonal forecasts by the Kenya Meteorological Department are increasingly accurate. The key challenge is the weak link to response, the use of financing mechanisms which are insufficiently fast or flexible, and the fact that drought management systems are project-based rather than institutionalised.

Climate and drought early warning and assessment information must be actionable it must be processed, organised and delivered in a way that makes it usable by all levels of stakeholder, from the national to the local level. Communities should be a key target for climate-related communication and mitigation actions that build upon a full understanding of their indigenous coping capacities.

There is an imbalance in the resources allocated for emergency response and those allocated to risk reduction in arid lands, at both national and global levels. Moreover, significant Government resources for emergency response are made available when required, but these are channelled through regular procurement/ financial systems, which are insufficiently nimble to ensure rapid and flexible response.

There is still an over-reliance on food aid in drought response. Non-food sectors tend to receive lower pledges. Food aid accounts for 30 per cent of the 2011 EHRP financial requirements. A further 50 per cent of the 2011 appeal is for assistance to refugees – funds which are packaged as part of Kenya's country appeal but of which Kenya is not the principal beneficiary.

Tools such as vouchers, cash, and local procurement will be used strategically to encourage early recovery. Food aid should be a mechanism of last rather than first resort, with non-food interventions used earlier in the drought cycle to support the pastoral economy

One of the lessons from previous initiatives targeted at the arid lands is that they lacked a clear institutional framework to ensure delivery. Development strategies for a defined geographical area need a mechanism to

reconcile their implementation with the sector based structure of Government and of its development partners.

Kenya is cognizant of the fact that the arid lands of the Horn of Africa extends across national boundaries. When drought occurs, it affects most, if not all, of these countries concurrently. Thus, it is abundantly clear that close collaboration among the countries in the region will be of essence to succeed in effective drought management.

There needs to be greater synergy and cooperation between these various regional and global institutions in order to ensure a strategic, harmonised and forward-looking approach to dryland development.

**Key lessons learned include**

- Investing in preparedness activities reduces the impact of drought and saves resources for other development planning. Reactive crisis response is expensive and retards development through diversion of resources to save lives and livelihood assets.
- Timely sharing of early warning information is important for triggering early response before the crises worsen.
- Accurate contingency planning coupled with dedicated funding helps reduce response time and huge losses during droughts.
- Effective coordination of all sectors and leadership during humanitarian responses helps to increase efficiency of resource utilization and positive outcomes. It also fosters accountability through joint monitoring and evaluation.
- Lack of a legal operational framework to guide responses causes confusion, overlaps and uncoordinated activities in different sectors.

## *Recommendations*

The Nairobi Strategy[63] called for a new twin track approach to drought risk management. The new approach and focus should be preventive rather than reactive, and should be holistic, rather than emergency oriented. It should recognise existing frameworks and mechanisms for disaster risk reduction, namely the Hyogo Framework for Action and the Africa Strategy and Programme for Action 2006-2015. It should encompass the continuum of relief, recovery, reconstruction, innovation and long-term development towards sustainable development to ensure drought resilience and ensuring food security.

Attention is drawn to the need to accelerate investment in the foundations for development.



[63] The Nairobi Strategy. Enhanced partnership to eradicate drought emergencies adopted at the Summit on the Horn of Africa Crisis, 9 September 2011

This will include climate-proofed infrastructure and human capital development. Priority must be given to roads, water and irrigation, energy, education and health if long term resilience is to be strengthened. In addition Launch projects have been identified to address the underlying causes of vulnerability in drought-prone areas and to promote sustainable livelihood practices.

To complement these substantial investments, stand alone financing for drought risk reduction is called for under five main pillars – this is additional to the risk reduction actions already specified within the various sectoral plans;

- Humanitarian Relief
- Policy and Strategy Development
- Emergency Preparedness and Mitigation
- Risk Financing

### Humanitarian Relief

2012+ Kenya Emergency Humanitarian Response Plan (Consolidated Appeal) has requested US$ 763 million of which only US$ 77 million (10%) is currently funded NB this includes support to refugee programmes in Kenya). Short-term funding of this gap is required – with the recognition that in the long term the need for humanitarian relief will be reduced if investment is made in the other elements of this strategy.

Greater focus should be directed towards under-funded sectors of the EHRP, such as protection, education, health, and nutrition, and ensuring a harmonised and coordinated approach across sectors.

Where food is judged an appropriate response particular attention should be paid to the nutritional quality of the food provided to tackle high acute malnutrition rates and reduce mortality rates. In line with the recommendation from the Ministry of State for Special Programmes, the single pipeline for coordinating food from various sources will be reinforced, in order to ensure equitable and accountable distribution.

Humanitarian assistance must be reconciled with the ASAL community needs and integrated programming should take into account the provision of basic services and support to pastoral comprehensive security in mobility.

### Policy and Strategy Development

Considerable progress has been made in establishing the policy and legislative basis for effective drought management. However, priority will be given to a number of further actions on this level including policy development, dissemination and implementation.

There is a need for a quantitative evaluation of the availability and utilization of water resources, both surface and groundwater, on which to base future development. This is to ensure water availability to consumer demands, under both normal and abnormal climate conditions. One of the challenges identified during the assessment was the absence of sufficient quantitative information concerning the availability of water and its utilization.

The draft National Disaster Management Policy will be updated to incorporate new developments including the establishment of the NDMA, NDCF and reformed sub-national Governance structures. This will be presented to Cabinet for approval. Once approved, an Act of Parliament would need to be drafted and adopted to establish the core components of this policy into Kenyan law.

Drought management and climate change adaptation will be mainstreamed within mainstream development planning and resource allocation. Good development in arid lands should be about increasing drought resilience and adaptive capacity. Policy recognition in needed for, and institutional support for, the distinct needs of service delivery in arid lands. Therefore priority will be given to integrate drought risk reduction and climate change adaptation into development planning and resource allocation frameworks.

The full implementation of the National Climate Change Response Strategy and the National Climate Change Action Plan in areas of adaptation, mitigation, technology transfer, capacity development, and financing will be promoted.

Drought is a regional phenomenon which requires regional action, particularly to facilitate mobility and promote trade and security across borders. However, current regional approaches to sustainable pastoralism remain disjointed. Various regional mechanisms for inter-governmental collaboration in dryland development already exist, including through IGAD and through the Drylands Initiative Programme (initiated by COMESA and the MDG Centre). At the global level there are several international organisations promoting more effective management of climate variability and more sustainable development of drylands, such as the UN Convention to Combat Desertification (UNCCD), UNDP's Drylands Development Centre (UNDP-DDC), the Climate Change, Development and Adaptation (CCDA) Programme of UNEP and UNDP, the Earth Institute at Columbia University, and the International Institute for Environment and Development (IIED).

To comprehensively and systematically promote preparedness and adaptability among pastoralist communities, pastoral movements across borders in search of water and pasture for survival should be adequately facilitated and protected. There is a range of mechanisms to address various aspects of insecurity in the region (refugees, cattle rustling, disarmament) but there is no formal framework to address pastoralist migratory patterns to guarantee their security in mobility. Pastoralists' security is central to sustainable initiatives and the nexus between security, migration and climate change makes it all the more urgent for the governments to regulate and ensure security in the mobility of pastoralist communities, mostly living in ASAL areas.

Regionally an overall coordinating mechanism for dryland development in the Horn of Africa will be established, which at the moment is spread in various bodies. As committed to by the Nairobi Strategy and Joint Declaration[64], support will be given to priority regional policy and strategy initiatives.

In this context Kenya recognises and supports the dryland initiative that has been launched by six countries in the Horn of Africa i.e Ethiopia; Kenya; Uganda; South Sudan; Somalia and Djibouti, to promote integrated rural development in the region; and the creation of a Horn of Africa Regional Disaster Resilience and sustainability Strategy to reduce the impact of disasters in the region considering existing frameworks and programmes of action.

### Enhanced Emergency Preparedness and Mitigation

Additional capacity strengthening is required in a range of Kenyan institutions to plan for and respond to emergencies at the national level and the local authorities at the decentralized level. In order for the MoSSP and the District Disaster Committees to meet the expanding needs of DRR in Kenya and perform its function to coordinate DRR activities across government ministries, civil society, and the international community, substantial additional capacity is needed, including mechanisms to assist coordination and information management. Challenges include a limited number of personnel dedicated to emergency preparedness and response. At the local level further training on disaster preparedness and response is needed.

At the national level the National Drought Management Authority will be established to provide a permanent and specialised base from which to ensure timely and harmonised response to drought across Kenya, and mainstream drought management and climate change into national planning and budgeting

[64] Joint Declaration. The summit on the Horn of Africa crisis Ending drought emergencies A Commitment to Sustainable Solutions. 8th-9th September 2011. Nairobi, Kenya

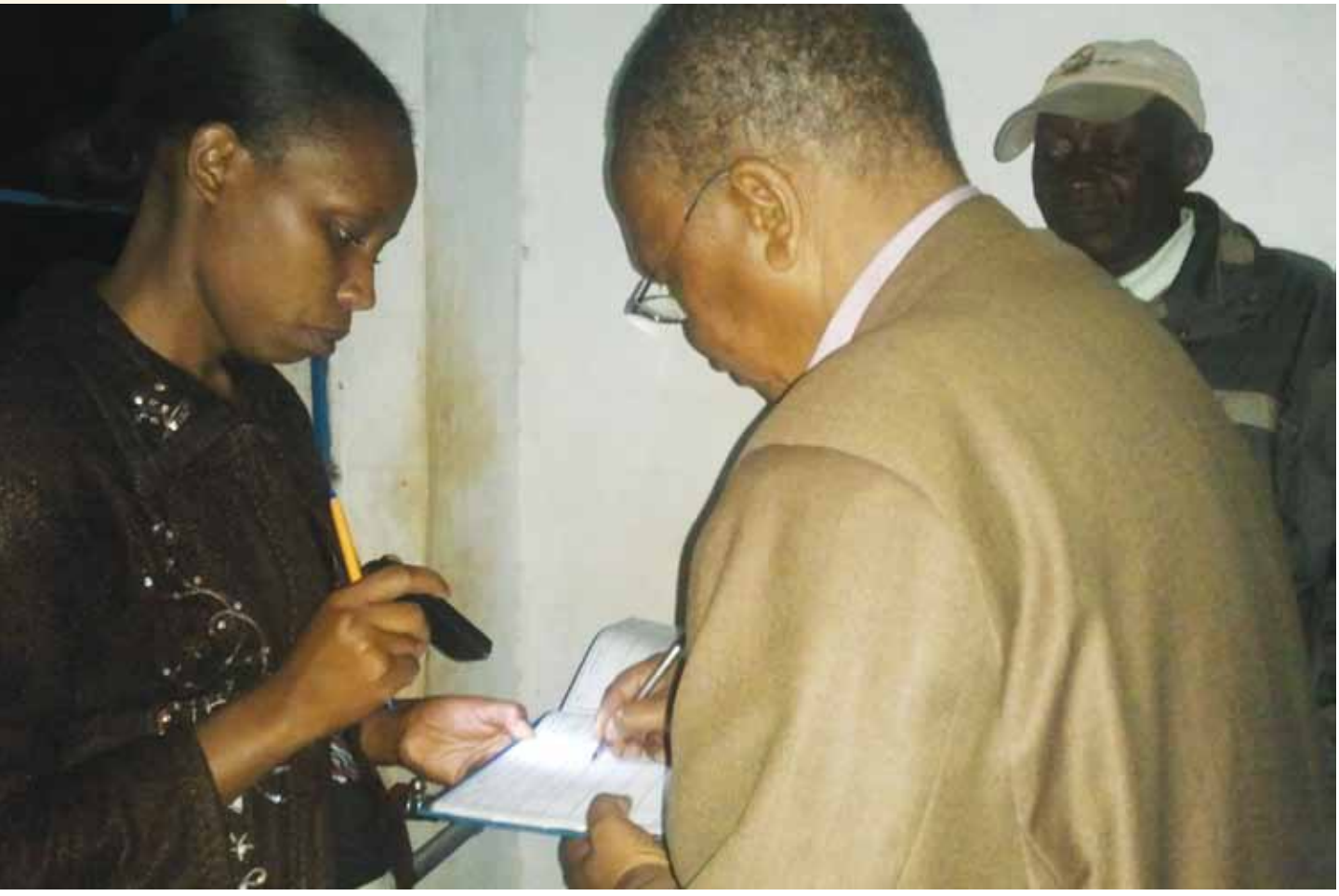
processes, in partnership with all stakeholders (including the private sector and NGOs). Priority will be given to the establishment and training of the various institutional arrangements foreseen under the NDMP and NDMA.

The NDMA will be supported by a financing mechanism which facilitates rapid and early response according to clear technical triggers that are objectively determined by drought conditions. One of the key responsibilities of the NDMA will be to refine the existing community-based early warning system for climate and drought-related risks, and ensure the timely provision of reliable, actionable information to all stakeholders, particularly communities. This will be supported by investments to strengthen the IGAD Climate Prediction and Applications Centre (ICPAC) and existing regional early warning systems.

In addition, we agreed that it is crucial to reform the emergency response system in favour of a more productive approach in order to promote self-sufficiency and discourage dependency. This includes expanding a social safety net, including cash transfer programmes to the poor, which will stimulate local economies and save on logistical costs. Expanding the use of time-bound conditional cash transfers and other tools will improve attainment of key education and health indicators. In addition the adapted HPSN provides a model for the rapid and timely implementation of cash based humanitarian relief.

Humanitarian stocks need to be positioned in advance in drought prone regions. The Government proposes to create a strategic food reserve of various commodities (beans, forage for animals, powdered milk, corned beef and other cereals), and increase the size of the strategic grain reserve to last six months.





Social protection is increasingly recognised as a mechanism for disaster risk reduction and drought mitigation. Social protection interventions including cash and in-kind transfers, sometimes linked to the creation of risk mitigating community assets, and other forms such as livestock insurance, can reduce the risk of drought becoming disaster. Regular cash transfer programmes can be scaled up and reduced as part of an emergency humanitarian response, linked to appropriate early warning systems, and aided by new technologies. All of these forms of social protection have already been employed in Kenya and many were scaled up in response to the 2011 drought. However, they are not sufficiently harmonised and co-ordinated to form an effective disaster risk or mitigation response.

Kenyan policy supports greater use of social protection for DRR and emergency response. The Nairobi strategy, adopted in September 2011 commits to "strengthen the adaptive capacity and livelihood choices of communities", including through social protection, and to reform the emergency response system specifically to "expanding a social safety net, including cash transfer programmes to the poor, which will stimulate local economies and save on logistical costs". The draft National Social Protection Policy states that social protection shall be "sensitive and adaptive to emergencies and shocks".

In order to establish a co-ordinated social protection mechanism for disaster mitigation, a roadmap is needed to establish and register potential beneficiaries, agree targeting criteria, agree other necessary assessments and triggers for response, establish payment systems in partnership with the private sector, and build institutional capacity.

### Risk Financing and Transfer

A well-designed risk financing program enables a disaster-prone country to avoid major economic disruptions following natural disasters by meeting its post-disaster funding needs without resorting to major budget reallocations, additional taxation, or external borrowing. Risk Financing instruments are becoming even more relevant given the increased vulnerabilities and uncertainties due to climate variability and change.

The budget of Kenya does not include adequate contingency arrangements for disaster response and recovery. The budget allocations have typically been insufficient requiring substantial supplemental donor assistance, and frequently operation and maintenance budgets suffer due to funds having been used up in disaster response.

The NDMA will be supported by the creation of a National Drought Contingency Fund (NDCF). This will allow contributions from both the Government and other stakeholders (a multi-donor basket fund). The Fund will respond quickly and flexibly to the initial warning signs of drought, thereby reducing overall costs in the long term. The Fund will be built up slowly, until such time as it can finance most drought response. We anticipate that the start-up costs and seed money for both the National Drought Management Authority and the establishment of the proposed National Drought Contingency Fund will allow contributions from both the Government and other stakeholders (a multi-donor basket fund). The Fund will respond quickly and flexibly to the initial warning signs of drought, thereby reducing overall costs in the long term.

The NDMA will implement measures that will maximize responsiveness and accountability within Government procurement and financial systems. Evidence of probity and due diligence will facilitate the flow of donor funds directly to Kenya rather than channelled through international agencies, thus reducing transaction costs.

The contingency fund will be supplemented by other risk transfer arrangements including the expansion of the pilot index based livestock insurance scheme.

| Pillar | Proposed Activities |
|---|---|
| Humanitarian Relief | Funding and implementation of 2012+ Emergency Humanitarian Action Plan |
| Policy Development | Quantitative evaluation of the availability and utilization of both surface and ground water resources to base future policy development<br>Finalization and adoption of the NDMP<br>Implementation of the National Climate Change Response Strategy and the National Climate Change Action Plan<br>Support to the establishment of the regional Drylands Initiative for Ethiopia; Kenya; Uganda; South Sudan; Somalia and Djibouti<br>A pastoral 'security in mobility' regional framework to address security imperatives focusing on the gaps in the cross-border protection of pastoralists; and to fast-track implementation of regional and sub-regional instruments on pastoralists' security, environmental and climate change.<br>Creation of a Horn of Africa Regional Disaster Resilience and sustainability Strategy. |
| Enhanced Emergency Preparedness and Mitigation | Establishment of the National Drought Management Authority<br>Capacity building in MOSSP and other Sectoral Ministries at national and district level<br>Support to IGAD Climate Prediction and Applications Centre<br>Establish a national cash transfer social protection scheme<br>Enhance emergency food reserves |
| Risk Financing | Establish a National Drought Contingency Fund<br>Implement a national index based livestock insurance scheme |