Livestock and Pastoralism Adaptation
(a) Invest in research and communication to improve understanding of the complex relationship between livestock, pastoralism and climate change.
(b) Protect ecosystems from degradation and pollution.
(c) End environmentally harmful subsidies made in the fisheries sector.
(d) Extend rights-based management systems.
(e) Build capacities and infrastructure for improved climate forecasting and warning and increase awareness of climate change and its consequences.

Cross cutting recommendations
(a) Build capacities and infrastructure for improved climate forecasting and warning and disseminate information widely on adaptation options.
(b) Strengthen human capital through basic education and public awareness and disseminate information widely on adaptation options.
(c) Treat climate change adaptation as a generic capacity rather than once specific only to climate change, and focus on building adaptive capacities among all stakeholders, deploying the preferred response measures and creating an enabling environment to implement these measures.
(d) Support research to investigate cultural practices such as changes in the dates of planting, length of growing seasons, sensitivity to increased droughts, flooding, periodic water logging, increased temperature, salinity, acidity and aluminium toxicity which negatively affect crop performance.

Fisheries Adaptation
(a) Strengthen regional governance of the fisheries industry to reduce over-harvest in the region.
(b) Protect ecosystems from degradation and pollution.
(c) End environmentally harmful subsidies made in the fisheries sector.
(d) Extend rights-based management systems.
(e) Restore and protect mangroves and coral reefs, which will contribute to carbon dioxide absorption, coastal protection, fisheries and livelihoods.

Recommended Reading
IDRC/DFID (2007) Increasing Expertise in Africa to Deal with the Challenges of Climate Change, Ottawa, Canada and London, UK: International Development Research Centre and Department for International Development
as the African root and tuber scale (Stictococcus vayssierei), African cassava mosaic disease, endemic in the region, has developed more virulent strains such as the Ugandan variant. At the same time, a minor cocoyam leaf spot (caused by Phytophthora colocasiae) has turned into a yield devastating blight for the crop. The severity of maize and sorghum Striga has made these crops less productive in the north, leading scientists to produce extra-early maize and sorghum varieties to curb hunger in that agro-ecological zone. In the forest region, plant- tain fungal diseases have increased in severity because of increasingly heavy precipitation in that ecozone. Maize has been seen to be the most vulner- able cereal, followed by rain-fed rice. Groundnut and common bean are the grain legumes most af- fected by a changing climate in the sub-region. All these have seen substantial losses to agricultural production.

The challenge in the Central African region is how to strike a balance between increasing food production to ensure food security and alleviate po- verty, and at the same time reduce GHG emissions and the resulting climate change. To adapt to climate change, choices will have to be made on intensifying agriculture on already exploited land (to avoid further deforestation) and rational use of fertilisers (mainly organic) to maintain productivity on existing exploited lands. It is therefore critical that Governments of Central African countries adopt policies which are informed by existing corpus knowledge on climate change, climate variability and climate change im- pact. Results generated by scientific research will enable the respective sectors to build resilience against climate change and climate variability through adequate adaptation strategies and con-tribute to mitigation of climate change impacts through the use of improved and innovative technologies and management practices. There is need to sup- port research in the region to enable farmers to adopt measures and strategies for adaptation of their agriculture to these climate-induced changes.

Regional Policies related to Climate Change Adaptation in Central Africa

At a meeting of the Assembly of the African Union in Addis Ababa (Ethiopia) (29-30 January 2007), all the governments in Central Africa were urged to integrate climate change considerations into development strategies and programmes at na- tional and regional levels and to implement the Plan of Action on Climate Change and Development in Africa. Many countries in the region are lagging behind in official climate change policies. The Con- ference of African Ministers of the Environment (ACMEN), in the second Assembly of the African Union at Maputo in July 2003, prepared and adopted a plan of action for the NEPAD environment initiative which included early warning systems for natural di- sasters, identification of climate-vulnerable ecosys- tems and regions and regional and sectoral development of adaptation strategies. The Lake Chad Basin Commission (LCBBC) which is made up of Cameroon, CAR, Chad, Niger and Nigeria, has as its main mission to provide policy in the manage- ment and exploitation of the Lake Chad Basin. It has developed strong policies to support better understand- ing of the contribution of fisheries to local, na- tional and regional economies, including the sector’s contributions to food, nutrition and livelihood secu- rity. There are national policies on climate change in the Central African countries but national govern- ments should make a greater commitment to priori- tize climate change adaptation in their political and economic agendas, to facilitate allocation of ade- quate funds for implementation of climate change adaptation strategies.

For example in Gabon’s agriculture and food security policies are geared toward enhancing food security and protecting coastal areas for increased fish production, and the country is well aware of the implications of climate change. However, there appears to be no specific climate change policies relat- ed to agriculture, nor agricultural sector policies with anything to say about climate change. Also in The Republic of Congo: No specific policies are available on agriculture and adaptation in the Republic of Congo. However, as a member of COMIFAC, Congo Republic will also benefit from the current project on Climate Change Scenarios for the Congo Basin. Existing policy texts are weakly applied and agricol- lar university institutions did not take into account issues of climate change. Human capacity develop- ment for research teams and basic infrastructure de- velopment, for climate forecasting and drought research, are weak and improvements are urgently required to guide work on agro-climatic data collec- tion on climate change, as well as plant resistance to climate-induced drought in some areas of the country.

Key research findings to be considered for informed decision making in Climate Change Adaptation in Central Africa

Research on climate change adaptation is scanty in Central Africa region, but hopefully many ongoing regional projects will generate valuable in- formation on climate change in agriculture and thus contribute towards adaptation to climate change in the region. A recent study (see Tingem et al. 2008), showed substantial yield increases for barbama groundnut, soybean and groundnut, and little or no changes in maize and sorghum yields, according to the climate scenario and the agricultural region in Cameroon. The yields of maize and sorghum are ex- pected to decrease by 14.6 and 39.9 percent, res- pectively, across the whole country. These results also show that the effect of temperature patterns on climate change is much more important than that of precipitation.

However, not all of the changes will be nega- tive. As sea levels rise, flooding of low lying areas and salinisation of groundwater and soil will create ideal conditions for aquaculture in many areas (MAB 2009), while simultaneously rendering them unsuitable for regular agriculture. Other benefits of rising water temperatures and sea levels include reduced cold water mortality of valuable fish and expansion of areas suitable for brackish or saltwater aquacul- ture such as shrimp and mudcrab (WorldFish Center 2007). Likewise, increasing investment in water storage infrastructure such as dams, on-farm ponds and irrigation systems to retain reduced levels of precipitation and buffer variability in supply will create many potential sites for aquaculture produc- tion (MAB 2009). In currently cooler areas, such as those at higher altitudes or in more northerly lati- tudes, rising temperatures may result in increased growth rates and food conversion efficiencies, lon- ger growing seasons, reduced cold water mortality and expansion of areas suitable for aquaculture (Brander 2007; IPCC 2007).

Examples of local adaptation are the N’Dama cattle in Central Africa, the West African dwarf goats and the Djallonke sheep and goats of Central Africa, which were bred in the tsetse-infested humid and subhumid zones of West and Central Africa. These breeds have demonstrated resistance in the tsetse infested zones of West and Central Africa where try- pansomiasis is prevalent (Bosso 2006). These breeds have a proven ability to survive, reproduce and remain productive without recourse to drugs. The raising of these indigenous, trypanotolerant li- vestock is one approach to control disease, reducing the risk of inducing drug resistance in trypanosome strains.

Scientists at the International Livestock Re- search Institute (ILRI) are conducting analytical and diagnostic studies; identifying hotspots of climate change and vulnerability; conducting vulnerability assessment to identify intervention options; exploi- ting climate change scenarios; and assessing ex- ante adaptive responses and impacts on livestock communities and ecosystems. They also test the feasibility of promising adaptation options; support the design and formulation of adaptation strategies; assess feasibility of index-based livestock insurance for large populations facing covariate risks linked to climate change; and identify institutional arrange- ments to deliver livestock insurance products to the poor, particularly women (Ayantunde et al. 2008).

Policy Options for consideration in the Central Africa Region

Central African countries are aware of climate change and that climate change impacts are impor- tant to sustainably improve agricultural production and productivity. Considerable research effort is needed in climate change adaptation in the Central African region. Central African countries have adop- ted national policies on climate change, but national governments should make a greater commitment to prioritize climate change adaptation in their political and economic agendas, to facilitate allocation of adequate funds for implementation of climate change adaptation strategies. Closing the gaps in research and policies will need the following consi- derations.

Crop farming adaptation

(a) Central African countries should allocate ade- quate resources and investments in genetic enhan- cement research to develop crop genotypes that are adapted to harsh climates.