Kenya County Climate Risk Profile Annex: Meru County

Annex 1

Crop and Livestock Productivity Indicators in Meru County

The following graphs provide more detailed information about aspects of productivity and market value for some of the main value chain commodities considered in this profile.

Table 1: Main food crops produced in Meru County in 2015

Crop	**Area** (Ha)	**Production** (MT)	**Value** (Million KSh)	**Location where crop is grown** (Sub County)
Maize	65,244	65,740	1,730	All sub counties
Beans	77,409	35,855	2,099.7	All sub counties
Potato	14,795	124,420	3,884	Buuri, Imenti Central, Imenti North, Imenti South, Igembe Central, Igembe South,
Banana	9,715	382,390	3,700	Imenti South, Imenti Central, Imenti North, Tigania East, Tigania West, Igembe South
Wheat	8,150	13,011	424	Buuri

Source: Department of Agriculture, Livestock & Fisheries

Table 2: Main cash crops produced in Meru County in 2015

Crop	**Area** (Ha)	**Production** (MT)	**Value** (Million KSh)	**Location where crop is grown** (Sub County)
Tea	14,890	107,775	5,218.2	Imenti South, Imenti Central, Tigania East, Igembe South
Coffee	5,659	1,643	65.7	Imenti South, Imenti Central, Imenti North, Tigania East, Igembe South
Macadamia	616	2,732	170.5	Imenti Central, Imenti South, Tigania West, Tigania East, Igembe South Imenti North
Cotton	364	270	12.1	Buuri, Tigania West, Tigania East, Imenti Central, Imenti North
Miraa	20,168	11,000	7,150	Igembe North, Igembe South, Igembe Central, Tigania East

Source: Department of Agriculture, Livestock & Fisheries

Table 3: Livestock Products produced in Meru County in 2015

Livestock/ Animal Product *(units)*	**Production** (value)
Milk *(millions litres)*	120,200,000
Beef *(Kg)*	4,000,000
Mutton Production *(Kg)*	681,000
Eggs production *(trays)*	985,000
Poultry Meat Production *(Kg)*	103,700
Fish *(Ponds)*	2,000
Honey Production *(Kg)*	191,600
Pork Production *(Kg)*	83,500

Source: Economic Review of Agriculture, 2015

Annex 2

Crop and Livestock production indicators of main crops in Meru County

The following graph provides more detailed information about aspects of production and land use for some of the main value chain commodities considered in this profile.

Table 5: Acreage and production of the main crops

Dimension	**Indicators**	**Crop or Livestock**			
		Maize	**Potato**	**Banana**	**Cattle** (milk)
Economic and Productive Dimension	Harvested area (acres)	65,244	14,795	9,715	
	Production (kg or litres)	65,740	124,420	382,390	120,000,000
	Variation in production				
	Value of production (million KSh)	1,730	3,884	3,700	4,560
Food Security Dimension	Dietary energy consumption (Kcal)	76.14	49.15	26.17	163.00
	Protein content	9.42	2.05	1.09	3.28
	Iron content	2.71	0.81	0.26	0.05
	Zinc content	2.21	0.30	0.15	0.38
	Vitamin A content	214.00	2.00	64.00	138.00

Source:

Annex 3

Climate analysis

For the current study, past trends and future projections of precipitation- and temperature-related hazards, such as flooding events (including flash floods) and drought during the growing season were analyzed. The growing season was defined as follows: the first season (Season 1) is the 100-day wettest period during the months of January to June, while the second season (Season 2) is the 100-day wettest period during the months of July-December. In the case of floods, the focus was on heavy precipitation events during the first and second season, defined as the 95th percentile of daily precipitation. For each pixel, the 95th percentile of daily precipitation distribution conformed of 100 wettest days per season per year was calculated. Then we identified the 95 extreme percentile, value which was plotted in time series[1]. Fluctuations in heavy precipitation events can have important consequences on water availability for agriculture, by impacting drought and flood events.

To assess the degree of adequacy of rainfall and soil moisture to meet the potential water requirements for agriculture, the focus was on drought stress, represented by the maximum number of consecutive days in each season where the ratio of actual to potential evapotranspiration (ETa/ETp) is below 0.5. This was calculated for each pixel per season per year[2] by evaluating soil's water capacity and evapotranspiration in order to define the number of days that could undergo a level of stress.

Two Representative Concentration Pathways (RCPs) were used, also known as the four greenhouse gas concentration (not emissions) trajectories adopted by the IPCC for its fifth Assessment Report (AR5) in 2014. The two RCPs, RCP2.6 and RCP8.5, are named after a possible range of radiative forcing values in the year 2100 relative to pre-industrial values (+2.6 and +8.5 W/m2, respectively). The pathways are used for climate modelling and research. They describe two possible climate futures, considered possible depending on how much greenhouse gases are emitted in the years to come. RCP 2.6 assumes that global annual GHG emissions (measured in CO2-equivalents) peak between 2010 and 2020, with emissions declining substantially thereafter. In RCP 8.5, emissions continue to rise throughout the 21st century.

[1] In this case, we only used precipitation as input file.

[2] In this case, as input files we used maximum temperature, minimum temperature, precipitation, solar radiation, and water capacity of soil.

Annex 5

Adaptation options in Meru County, as identified in the ASDSP

Various adaptation strategies were identified by stakeholders and residents of Meru County in the Government of Kenya's "Agricultural Sector Development Support Programme (ASDSP)" of 2014. The table below compiles these results and disaggregates them by percentage of the population using each practice, as well as percentage based on the gender and age of the head of the household.

Table 6: Adaptation strategies

Adaptation strategy	Adoption Rate (%)	Value Chain	Value Chain Link	Inputs	Results	Challenges
Tree planting	60	All	Production	Seedlings	Improve microclimate. Reduce heat stress, deforestation	Lack of seeds and water; high demand of seedlings
Change of crop type	47	All	Production	Seeds, fertilisers	Increased yields	Cost of inputs
Increased soil & water conservation	56	All	Production	Labour, construction materials	Improve water retention, reduce soil erosion	Cost of soil conservation measures
Adopt or increase irrigation	30	All	Production	Irrigation equipment	Increased yields	Cost of equipment, inadequate water for irrigation
Change livestock type	30	Dairy	Production	Livestock breeds	Improved productivity, resilience	Cost of breeds
Water harvesting	27	All	Production	Water pans, water tanks	Increased: yields, Reduced: animal movements, conflicts, distances to water points, diseases	Some of the soils are very porous and cannot hold water; lack of funds to establish some of the adaptations
Value addition	27	All	Post-harvest		Increased incomes	Lack of funds to buy equipment
Seeking employment	13	All	Production		Alternative incomes	Lack of opportunities
Feed conservation	11	Dairy	Production	Inputs, animal feed	Increased productivity	Lack of information, lack of funds
Diversification	9	All	Production	Seeds, fertilisers	Increased yields	Cost of inputs
Buy insurance	1	Dairy	Production	Information, cash	Recoup losses	Lack of information, funds

Source: ASDSP (2014) and author compilation.