



Rainfall			
Definition	Abbr	mm	Description of impact
Light rain	lrain	<5 mm	Dust settles, moisture does not penetrate soil
Moderate rain	mod rain	5-20 mm	Moisture penetrates soil
Heavy rain	hrain	20-50 mm	Puddles form, surface runoff
Very heavy rain	v hrain	>50 mm	Flash floods, gully erosion

Kitui County Climate Information Services Strategic Plan

January 2015



Kenya Meteorological Department



REPUBLIC OF KENYA



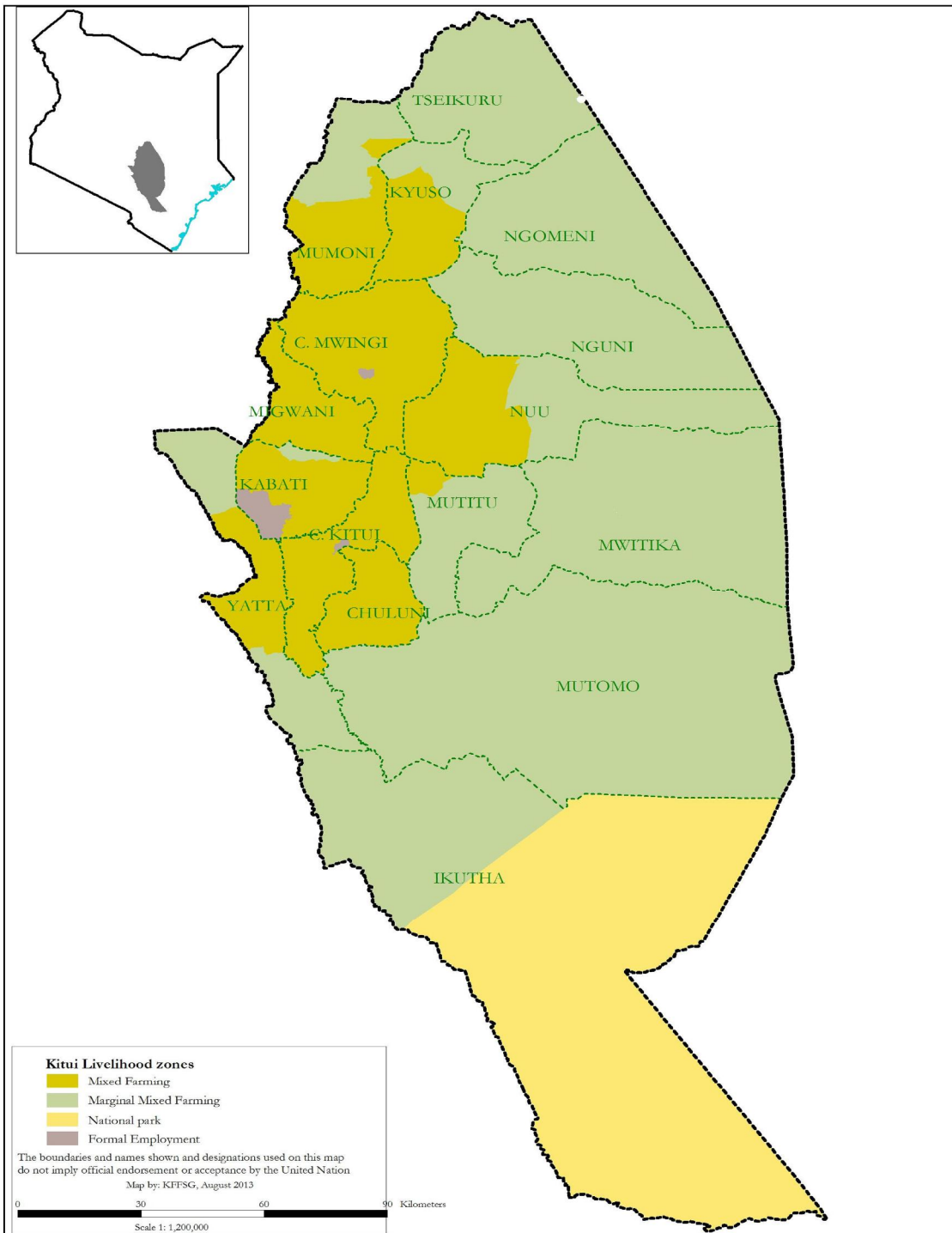
**THE MINISTRY OF ENVIRONMENT, WATER AND NATURAL RESOURCES
STATE DEPARTMENT OF ENVIRONMENT, AND NATURAL RESOURCES
KENYA METEOROLOGICAL SERVICE**

Kitui County Climate Information Services Strategic Plan

A Vision 2030 implementing Agency



December 2015



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Acronyms

Ada	Adaptation Consortium
ADS-E	Anglican Development Services - Eastern
ASAL	Arid and Semi Arid Lands
CAF	County Adaptation Funds
CAP	Common Alert Protocol
C/FFA	Cash and Food For Assets programme
CDM	County Director of Meteorological Services
CIDP	County Integrated Development Plan
CIS	Climate Information Services
CMO	County Meteorological Office
C/WACs	County and Ward Adaptation Committees
FEWSNET	Famine Early Warning System
GFCs	Global Framework for Climate Services
IIED	International Institute for Environment and Development
ILRI	International Livestock Research Institute
KAVES	Kenya Agricultural Value chains Enterprise project
KCCISP	Kitui County Climate Information Services Plan
KMS	Kenya Meteorological Services
MAM	March, April, May rainy season
NCCAP	National Climate Change Adaptation Plan
NCCRS	Climate Change Response Strategy
NDMA	National Drought Management Authority
OND	October, November, December rainy season
PBO	Public Based Organisation
RANET	Radio and Internet (for the communication of hydro-meteorological and climate information for development)
SACCO	Savings and Credit Cooperatives
STARK+	Strengthening Adaptation and Resilience to Climate Change in Kenya (Plus)
TOT	Training of Trainers
UNDP	United Nations Development Programme
WMO	World Meteorological Organisation

Glossary of key terms

Cessation	End of the rains
CIS	Climate Information Services (seeks to provide relevant, useable climate information which can support decision making across timescales and levels)
Onset	Start of the rains
Probabilistic forecast	Probability of occurrence of a number of different outcomes developed using statistical methods

Forward by Kenya Meteorological Service Director



The mandate of the Kenya Meteorological Service (KMS) is derived from the WMO Convention, which is to provide accurate and timely weather and climate information and services for the safety of life, protection of property and conservation of the natural environment. Education and Training including research and development are additional functions designated by WMO to KMD.

KMS's Vision is to be the leading world-class Operational Forecasting Centre and Scientific Institution contributing to high quality of life by the year 2030.

The application of weather, climate and water information and related services helps to improve the safety and well-being of people, reducing poverty, increasing prosperity and protecting the environment for future generations. Meteorological Services activities are fundamental contributions to meeting the targets of the country's strategies such as Kenya's Vision 2030, the United Nation (UN) Millennium Development Goals, and the Johannesburg Plan of Implementation of 2002 World Summit on Sustainable Development and relevant environment and climate-related conventions.

The new constitution of Kenya (CoK 2010) offers the opportunity for services to be moved closer to the citizens at the county and constituency or community/grass root levels. This opportunity, in turn, calls for a concerted effort by KMS to strengthen its infrastructure and services to reach and have the desired influence at the community or grass-root level of society; where the most severe impacts of climate variability and climate change are realized.

The Department needs to expand and decentralize its meteorological observation network as well as improve the dissemination of products and information. This includes setting up of county Climate Information Centers (CCIC) and sub-Counties offices to disseminate weather and climate information and advisories to the relevant agencies and communities, as these offices will be able to downscale the national forecasts for their areas of jurisdictions as part of the Disaster Risk Reduction strategy in line with Global Framework of Climate services (GFCS).

Climate change is a serious risk to poverty reduction and threatens to undo decades of development efforts. According to the Johannesburg Declaration on Sustainable Development, the adverse effects of climate change are already evident, natural disasters are more frequent and devastating, developing countries are more vulnerable. While climate change is a global phenomenon, its negative impacts are more severely felt by poor people and poor countries. They are more vulnerable because of their high dependence on natural resources, and their limited capacity to cope with climate variability and extremes. Moving the information centre closer will help in sensitizing the relevant communities in line with the Kenya Constitution 2010

The potential benefits from enhancing the quality and use of meteorological, climate, and hydrological information and products in decision-making are enormous, but realizing these benefits will require improvement in infrastructure, human resources development, and engagement between the providers and users to improve the process for decision-making and realization of social and economic benefits.

Mr. James Gerald Kongoti

Kenya Meteorological Service

Forward by Kitui County Government

Climate change is one of the most serious global challenges of our time. The scientific evidence on effects of climate change is overwhelming, both at the global and local levels. Given the dependency of the communities to environmental and natural resources, economic growth and livelihood incomes of both urban and rural populations are highly vulnerable to climatic variability and change (EACCCP, 2011). Major indications of climate change effects in Kitui County have been temperature increases, rainfall irregularity and intensification, reduced food production, disruption of natural ecosystems and subsequent change and loss of habitats and species. This calls for the need to establish a functional County Climate Information Service.

The County Climate Information Service will play a crucial role in the county development planning, for managing development opportunities and risks and for mitigation and adaptation. Efficient application of climate services requires that there should be proper and efficient gathering and processing of weather information. Climate services are the dissemination of climate information to the public or a specific user. They involve strong partnerships among providers, such as governments, private sector, academia, communities and stakeholders for the purpose of interpreting and applying climate information for decision making, sustainable development, and improving climate information products, predictions, and outlooks.

Timely communication of climate information helps prevent the economic setbacks and humanitarian disasters that can result from climate extremes and long term climate change.

Millennium Development Goals (MDGs) are coming to an end in 2015 with an exception of **MDG number 7 (Ensure Environmental Sustainability)** which has been extended. This extension deliberately enables nations and governments to be able to institute various mechanisms and strategies to combat adverse effects of the ever worsening climate variability. County Climate Information Services will be used to provide guidance in planning and sustainable development in the county.

Promulgation of Kenyan Constitution 2010 ushered in a new governance system which also elevated issues of environment and development as human rights which effectively lays a firm foundation for establishment and effective management of Climate Information Services work. The system will be pivotal in providing a basis for strengthening and focusing countywide actions towards Climate Change adaptation and mitigation.

Dr. Muusya Mwinzi

Chief Officer

County Ministry of Environment, Energy and Minerals Investments and Development
County Government of Kitui

Executive Summary

Easily accessible, timely and decision-relevant scientific information can help society to cope with current climate variability and change and limit the economic and social damage caused by climate-related disasters. Climate Information Services (CIS) can also support society to build resilience to future climate change and take advantage of opportunities provided by favourable climate conditions. Effective CIS require established technical capacities and active communication and exchange between information producers, translators, and user communities.

This initiative outlines a proposed framework for a Kitui County Climate Information Services Plan (KCCISP) which aims to develop and deliver weather and climate information which can support local, sub-county, county- and national-level decision making at time frames of hours, days, weeks, months, seasons and years in line with national and international development frameworks including the Constitution of Kenya 2010, Kenya Vision 2030 and the National Climate Change Response Strategy (NCCRS) as well as the Global Framework for Climate Services (GFCS).

The plan recognizes that the delivery of Climate Information Service which can effectively support decision making requires the engagement of a wide range of stakeholders. Stakeholders of the KCCISP encompass: County Government Administration at county, sub-county, ward and village levels, County Ministries across sectors together with their respective extension services, decentralized Government agencies, religious leaders across different faith groups and denominations, local, community and livelihood associations, private sector bodies and national and international Public Based Organisations (PBOs) and universities and research institutes.

The plan aims to support development of an integrated framework for CIS which supports decision making across the principal livelihood groups as well as strategic and climate-sensitive sectoral county government planning. It comprises:

- Strengthening of Kenya Meteorological Service (KMS) observational capacities within Kitui county which will lead to improved quality of KMS products;
- Creating channels for two-way exchange of learning between the providers and users of weather and climate information through employing a variety of new and existing channels, including: a County Sectoral Planning Forum, community-based intermediaries, SMS and regional and local radios;
- Developing a process for regular communication of daily, weekly, monthly and seasonal weather and climate information as well as extreme weather alerts and warnings which is accessible to the entire County population;
- Providing weather and climate information which can support county level decision making, including strategy development, budgeting and planning across sectors;
- Building the capacities of KMS and intermediaries to appropriately convey and employ weather and climate information within decision making processes at different levels and across time frames;

- Assessing how local knowledge of weather and climate can support KMS to provide CIS which are better able to support specific livelihood decision making processes.

The KCCISP also includes a monitoring and evaluation system, encompassing a regular review after each principal growing season to identify ongoing constraints and observed benefits and ensure that ongoing-learning leads to revision and improvement for the subsequent rainy season.

The plan also seeks to ensure long-term sustainability through creating a reliable, user-led service which supports local, sub-county and county government decision making and explore how this can be supported by the introduction of demand-led, cost-recovery services.

This initiative once implemented will go a long way towards realizing the Kenya Vision 2030 in Kitui County and supporting the development of a community which is resilient to the adverse impacts of climate change, as envisioned in the National Climate Change Action Plan (NCCAP).

1.0 Background and context

1.1 Background

Weather and climate has significant impacts on many aspects of people's lives and particularly amongst populations whose livelihoods are directly dependent on natural resources. Reliable daily, weekly, monthly and seasonal information, as well as warnings and alerts on extreme weather events, can support decision making at many levels, within households and communities as well as at sub-county, county and national government levels. Information about longer term trends in climate variability and change is also vital to support major investments in infrastructure, including dams and roads, as well as conservation of the natural environment.

Anchored on the World Meteorological Organisation (WMO) Convention adopted on 11 October 1947 and revised in 2007, the mandate of Kenya Meteorological Services (KMS) is to provide meteorological, hydrological and related services in support of relevant national needs, including safety of life and protection of property, safeguarding the environment and contributing to sustainable development, as well as to meeting international commitments and contributing to international cooperation.

KMS Vision:

To Become a Leading, World Class Operational Forecasting Centre and Scientific Institution that Provides Optimum Contribution to Improved Quality of Life

KMS Mission:

To Facilitate Accessible Meteorological Information and Services and Infusion of Scientific Knowledge to Spur Socio-economic Growth and Development

Kenya's 2012 National Climate Change Adaptation Plan (NCCAP) recognizes the key role of improving climate information and services to strengthen the adaptive capacity of communities through 'providing farmers and pastoralists with climate change-related information, and mainstreaming climate change into agricultural extension services.'¹ The NCCAP equally recognizes the vital importance of climate information services (CIS) to reduce 'vulnerability to disasters by using climate risk information in development planning and policy making; taking into consideration that more than 70 per cent of natural disasters in Kenya are related to extreme climate events'.²

This strategy proposes a framework for the development of a Kitui County Climate Information Services Plan (KCCISP) to support and complement existing local, county, national and global development plans and strategies.

In line with the process of devolution and decentralization, the KMS has established County Meteorological Offices in each County. Each County Meteorological Office is headed by a County Director of Meteorological Services (CDM). The CDM is responsible for delivering national policies on meteorology at County level and developing CIS which can best support both the development of the County Integrated Development Plan (CIDP) and county sectoral, spatial and city and urban plans, as well as the decision making needs of the County's principal livelihood groups.

The KCCISP was drafted through interviews with Heads of Departments and experts from across County Ministries and partner organizations as well as a series of Focus Group Discussions with community members in different livelihood zones. It is a pilot document which is intended to form part of a range of measures to support operationalisation of KMS' national strategic plan for provision of CIS at the county

¹ Government of Kenya, Kenya's National Climate Change Adaptation Plan, 2012, p32.

² Government of Kenya, Kenya's NCCAP, Executive Summary, 2012, p6

level. The draft plan was discussed in February 2014 with senior representatives of County Government Ministries and other key stakeholders in order to jointly agree a working draft KCCISP which can be initiated with the forecast for the 2014 March April May (MAM) season rains³.

1.2 Context

1.2.1 Natural Resources

According to the 2009 national census, the population of Kitui was 1,013,000. With Kenya's annual national population growth rate estimated at over 2%, this is likely to have increased the 2014 population to over 1,125,000 people. The county has 8 sub-counties (Kitui Central, Kitui West, Kitui South, Kitui East, Kitui Rural, Mwingi North, Mwingi East and Mwingi West) and 40 wards. It covers over 30,570 square kilometers, of which 6,369 square kilometres are occupied by Tsavo East National park.

Kitui has a low-lying topography and the climate of the county is arid and semi arid with very erratic and unreliable rainfall. The highlands, namely Migwani, Mumoni, Endau, and Kitui Central receive more rainfall compared to the lowlands of Nguni, Kyuso and Tseikuru, Ngomeni, Nuu and Mwingi to the north, Mutito and Mwitika to the east, Mutomo and Ikutha to the south and the Yatta Plateau to the west. In the last three decades, like many parts of arid and semi arid parts of Kenya, Kitui County experienced severe droughts, which have led to livestock deaths and food shortages.

Surface water sources are very scarce due to the limited rainfall received. The major sources are seasonal rivers that form during the rainy seasons and dry up immediately after the rains. The Tana and Athi rivers are the only perennial rivers in the county. Athi river flows along the border with Machakos county to the west and with Makueni County to the south west, while Tana river to the north marks the border with Embu and Tharaka Nithi counties. The county has no lake, but has several dams and water pans that play a significant role in providing water. Most of the dams dry up during the dry season due to the high evaporation rates of between 1800 – 2000mm/year. Spring water is generally found in the hilly areas of the county such as Mutitu Hills, Endau hills and Mutha hills. The springs vary in their flow regimes and some dry up during extended drought periods. Underground water sources supplement the scarce surface water sources through drilling boreholes.

1.2.2 Economic activities and Food Security

The population is heavily reliant on agro-pastoralism and there are two principle livelihood groups: Marginal Mixed Farming and Mixed Farming with the main livestock reared across both groups including goats, sheep, cattle, poultry and bees. Very low and unreliable rainfall, a high reliance on rainfed-agriculture together with poor soils, makes farming difficult in more than 90% of the area in the two districts.

Mixed farming areas grow maize, beans, pigeon peas and cowpeas for household consumption and fruits, cotton and vegetables for income.

³ The current initiative is being implemented as part of the Adaptation Consortium (Ada), which aims to support the devolution and decentralization process in Kenya through the introduction of County Adaptation Funds (CAFs) and provision of improved Climate Information Services (CIS) (See Annex 3 for further details). Working across five Arid and Semi Arid counties (Kitui, Makueni, Isiolo, Wajir and Garissa), Ada's principal activities include: establishing County and Ward Adaptation Committees (C/WACs); supporting the integration of weather and climate information and resilience assessment tools into county and community planning; and establishing a robust monitoring, evaluation and learning framework.

Marginal Mixed Farming areas, where rainfall is more erratic, grow millet, cow peas, cassava and sweet potatoes for household consumption, and green grams, sorghum and vegetables to sell.

In 2013 just over 171,000 people in the county were benefitting from the Cash and Food For Assets (C/FFA) programme, with more than 6,000 people enrolled in the Supplementary Feeding Programme and children also benefitting from a School Meals Programme.

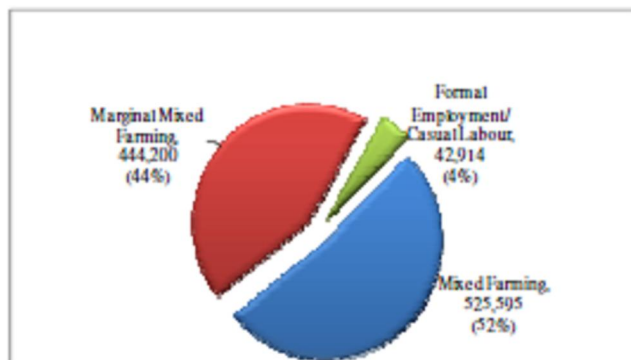


Figure 1: Population in Kitui County by Principal Livelihood groups⁴

Amongst the principal factors affecting food security include poor temporal distribution of rainfall, conflict along the border with Tana River County, over reliance on maize as the main staple and low use of fertilizers and certified seeds. A series of successive droughts had in 2013 caused a reduction in the livestock holding per household compared to long term averages. Distances to and waiting time at water sources, together with the cost of water, significantly impact on the health of households and livestock.

1.2.3 Kenya's Vision 2030 for Kitui County

Kenya's Vision 2030 for Kitui encompasses a number of major infrastructure projects and social and economic initiatives designed to strengthen resilience and development. These include:

- ASAL irrigation development projects;
- Electricity generation, including through the construction of the Umaa Dam, and rural electrification;
- Development of ICT infrastructure;
- Construction of rural roads;
- Modernization of the meteorological services programme, and
- The Adventent Weather Modification Programme⁵.

Interventions to enhance the resilience of the County's population being undertaken across a wide range of governmental and governmental partners include:

- Micro irrigation;
- Promotion of drought resistant crops;
- Introduction of school kitchen gardens;
- Upscaling of outreach health services;
- Enhancing maintenance and servicing of key community water facilities such as boreholes; and

⁴ Long Rains Food Security Assessment Report, August 2013, P1

⁵ The Adventent Weather Modification Programme (AWMP) is one of the KMS Vision 2030 Flagship projects, whose primary aims include, obtaining more water, reducing hail and lightning strikes damages as well as elimination of fog or associated hazards. Kenya Vision 2030, Performance Contracting Guidelines on the Vision 2030 Project Indicator 2013-14, p39.

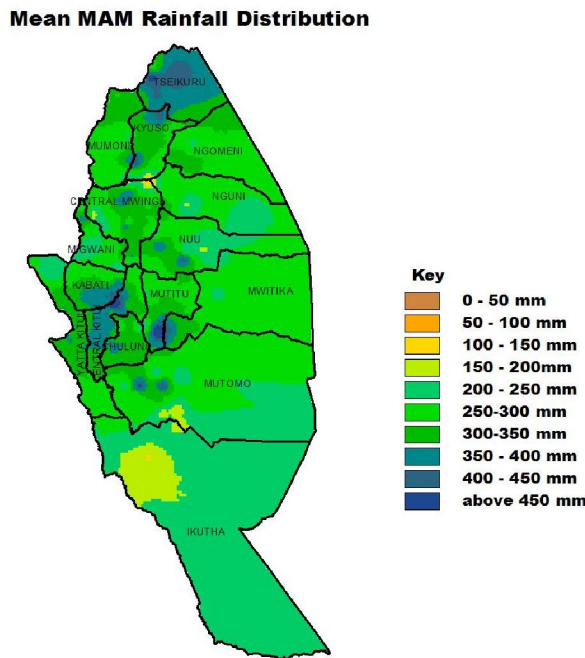
- Enhancing sustainable environmental conservation to forestall environmental degradation especially due to excess charcoal burning⁶.

1.3 Climate in Kitui County

The County receives rains twice a year, with a high variability in annual rainfall, ranging between 500-1050mm. The topography of the landscape influences the amount of rainfall received. The highland areas of Mumoni Hills to the north, Kitui Central, Mutitu and Endau hills receive 500-1050mm per year, Migwani and Mutha hills receive between 500-760mm of rainfall per yer, while the drier lowlands stretching from the north(Tseikuru, Kyuso, Mwingi, Ngomeni, Nguni and Nuu), through the Yatta plateau, the eastern areas (Mutito and Mwitika), and southern areas (Mutomo and Ikutha), receive less than 500mm.

The ‘short’ October November December rains are more reliable and are the county’s principal productive season. The ‘long’ March, April, May rains usually provide about 30 percent of crop production and is the major season for the production of pulses, including green grams and pigeon peas.

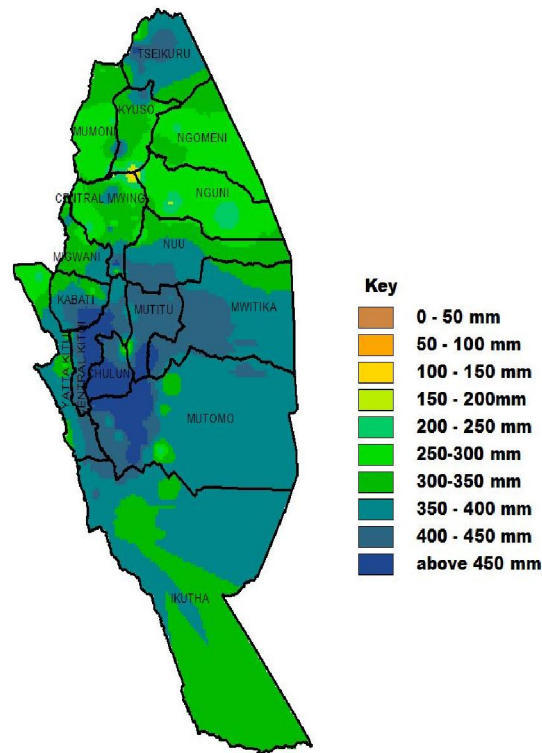
Figure 2: Average rainfall distribution in Kitui over March April May (MAM) and October November December(OND) rainy seasons⁷



⁶ Report cited in footnote 4 and interviews with key stakeholders in 2013-4

⁷ County Meteorological Director Kitui

Mean OND Rainfall Distribution



Since the early 1960s both minimum (night) and maximum (day) temperatures have been on a warming trend throughout Kenya⁸. Current projections indicate increases in temperature⁹, and recent trends show a marked increase in interannual variability and distribution of rains, with an increase in the number of consecutive dry days and shorter, more intense periods of rainfall.¹⁰

Recent extreme flood and drought events are estimated to have reduced long-term growth in Kenya by about 2.4% of GDP per annum.¹¹ Future climate change may lead to a change in the frequency or severity of such extreme weather events, potentially worsening impacts. Increased average temperatures and changes in annual and seasonal rainfall will be felt across key economic sectors, such as agricultural production, health status, water availability, energy use, infrastructure, biodiversity and ecosystem services (including forestry and tourism). Impacts are likely to have disproportionately strong effects on the poor as such vulnerable groups have fewer resources to adapt to climatic change.

⁸ NEMA 2013 Kitui County Environmental Action Plan

⁹ GoK 2013 Kitui County Environmental Plan

¹⁰ GoK 2010 National Climate Change Response Strategy

¹¹ GoK 2013 National Climate Change Action Plan

Several stakeholders from Kitui County participated in the development of the National Climate Change Action Plan (Source GoK 2012). The climate-related concerns and impacts which they noted included:

- Increased temperatures
- Water shortages for both domestic consumption and watering of animals, with dry river beds, springs, and earth dams
- Changes in rainfall patterns marked by extended droughts and extreme rainfall events/flash floods. Erratic and unreliable rainfall with delayed onset of the short rains
- Poorly performing crops, low yields and livestock deaths, resulting in rising poverty levels and widespread malnutrition, increased dependency on relief foods and increase in rural-urban migration
- Erratic and strong winds, probably also due to reduced cover
- Severe soil erosion and water siltation during flash floods
- Inter-clan and inter-community conflicts over diminishing resources
- Human wildlife conflicts in Kora and Tsavo areas
- Outbreak of pests and parasites associated with changes in climatic conditions, including caterpillars and army worms
- Increase in dust-related diseases such as pneumonia and TB

2.0 Proposed framework for developing the Kitui County Climate Information Services Plan (KCCISP)

2.1 Aims

The KCCISP aims to develop and deliver accessible, timely, relevant information which can support local, sub-county and county-level decision making at time frames of hours, days, weeks, months, seasons and years for improved livelihoods and resilience building towards the impacts of climate change.

2.2 Principles

The inception of this initiative¹² included the development of a set of guiding principles which recognize that effective CIS need to:

- provide reliable probabilistic climate information
- be relevant to users' needs and gender-sensitive
- be accessible
- foster increased trust through developing two-way channels of communication for co-production of weather and climate knowledge
- support increased understanding, strengthening appropriate communication and use of probabilistic and uncertain information

2.2.1 Provide reliable probabilistic climate information:

From discussions with community users, it is clear that many perceive KMS information to be unreliable. They are aware that the information currently is based on meteorological records from the KMS weather station in Makindu in neighbouring Makueni County and question its relevance to their own localities. *KMS is strengthening the observational network within Kitui (see Section 2.5 below) and developing a set of agreed terminology which appropriately and systematically conveys the level of confidence and uncertainty within the weather and climate information provided.*

2.2.2 Be relevant to users' needs and gender-sensitive:

There are two principal groups of CIS users, those with climate-sensitive livelihoods and government planners and decision makers:

Community users: Community users find current KMS information to be too general and not relevant to their specific localities and livelihoods. Farmers and pastoralists have requested information on the onset, quality, geographic and temporal distribution and cessation of the rains, including frequency of extended dry spells, as well as high and low temperatures, high winds, hail, fog and cloud cover. They want to receive seasonal forecasts with monthly and weekly updates, as well as daily updates during the run up and over the wet seasons. Some farmers and those engaged in activities related to agriculture and livestock have requested daily updates throughout the year to support harvesting, drying, storage and marketing, particularly given increased variability in rainfall. Community users have also asked for information about extreme weather events, including heavy rains which may cause flash floods cutting off roads and trigger landslides. Weather and climate can have particular impacts on women including in their roles as principal

¹² See footnote 3 and Annex 3.

providers of care for vulnerable household members and duties to meet household water requirements, as well as in their farming and marketing roles. The specific climate information needs of women require address to strengthen more gender-equitable and effective systems of environmental governance.

Representatives from County Government Ministries and NDMA and other decentralized national agencies have welcomed weather and climate information about both short (seasonal, monthly, weekly and extreme weather events) and long-term (beyond seasonal) timescales to support five-year strategic and sectoral planning.

KMS has undertaken consultations with a wide range of users and is strengthening its data, observational, processing, analysis and communication capacities to best meet the range of user needs identified.

2.2.3 Be accessible

Community users currently receive information from regional and local radio stations. Agricultural extension services have information but only provide demand-led services, requiring that farmers themselves take the initiative to seek support from the extension services. Amongst planners and policymakers across county line ministries, decentralized authorities and non-governmental organizations access to weather and climate information is currently patchy, with some obtaining information from KMS, and others from NDMA monthly updates and FEWSNET website.

The KCCISP proposes employing a range of channels of communication to ensure that climate information can reach the range of users in understandable formats and through trusted channels. The channels established will need to ensure reach and relevance for the most marginalized.

2.2.4 Foster increased trust through developing two-way channels of communication for co-production of weather and climate knowledge

Users have a key role in enabling KMS to develop and deliver CIS which best support specific decision making processes. Users understand the specific decisions which particular types of weather and climate information can support. Technical experts from across line ministries can advise on key thresholds which significantly impact the County's principal livelihood groups, including climate parameters for crop development, livestock and crop diseases and pests. Local communities have historical knowledge about past weather events which can be of support where past historical datasets are sparse. Local observations of weather and climate and its impact will be of tremendous value in enabling KMS to deliver more locally accurate and relevant forecasts.

KCCISP provides a framework to support ongoing exchange of information between the providers and users of weather and climate information. KMS is also proposing to undertake a pilot study to systematically collate and assess local weather and climate knowledge to see how this can support improved CIS.

2.2.5 Support increased understanding, strengthening appropriate communication and use of probabilistic and uncertain information

Many users do not fully appreciate the probabilistic nature of weather and climate information. It is essential to build users' understanding of the levels of confidence and uncertainty within weather and climate information if they are to make appropriate use of this. Failure to strengthen this understanding risks heightening mistrust where users perceive the information as wrong when the less likely event occurs and increasing vulnerability where information is misapplied. Resilience can be increased through strengthening capacities to make decisions with uncertain information.

KMS has recognized the need to build the communication capacities of its staff. It has initiated risk communication training for KMS County Directors and the current initiative encompasses further training both for KMS County Offices and CIS intermediaries.

2.3 Roles and Responsibilities of the County Director of Meteorological Services

As identified in Section 1.1 above, KMS is mandated to provide meteorological, hydrological and related services to support safety of life and protection of property, safeguard the environment and contribute to sustainable development. Established in 2012, the Kitui County Meteorological Office is the sub-national weather service branch of KMS and is planned to be an information centre to reach the people of Kitui County up to the grassroots with relevant weather and climate information.

The Office is headed by the County Director of Meteorological Services (CDM) for Kitui County, who is, amongst other areas, responsible for:

- Monitoring weather, climate, water, air and noise pollution and related environmental information within the County;
- Expansion and management of the meteorological observational network within the County;
- Interpreting and implementing national policies on meteorology and climate change adaptation at the County level;
- Downscaling of national weather forecasts and climate outlooks to the County level;
- Issuing public warnings on hazards and extremes related to weather, climate and air pollution;
- Generating essential weather and climate information to support climate-sensitive sectors such as agriculture and food security, water resources, energy, transport, public health and sanitation, environmental conservation, disaster risk reduction, insurance, mining and tourism;
- Building public awareness of the use of meteorological data;
- Producing weather and climate information which can support the County's social and economic development;
- Mainstreaming meteorological services in the development agenda of the County;
- Promoting the use of local knowledge to build the resilience of communities in dealing with climate change extremes within the County; and
- Mainstreaming gender in weather, climate and environmental governance in line with the Constitution.

The KCCISP recognizes that the delivery of Climate Information Service which can effectively support decision making requires the engagement of a wide range of stakeholders. Stakeholders of the KCCISP encompass: County Government Administration at county, sub-county, ward and village levels, County Ministries across sectors together with their respective extension services, decentralized Government agencies, religious leaders across different faith groups and denominations, local, community and livelihood associations, private sector bodies and national and international Public Based Organisations (PBOs) and universities and research institutes. As such, the Kitui Meteorological Office will develop and deliver the KCCISP through linkage with and supporting the activities of these stakeholder groups.

Effective adaptation to climate variability and change requires relevant information at various planning levels (national, county, sub-county and local scales) and for lead-times of hours, days, weeks, months, seasons and years ahead. The majority of County level policies and activities are sensitive to climate risk. To support the development of the County Integrated Development Plan (CIDP) currently in progress, the County Director of Meteorology participated and gave input on proposed CIS activities to the CIDP consultation forum. The Kitui County Meteorological Office will also seek to provide relevant support to the County Steering Group on Drought and Emergency and other sectoral and contingency planning as required.

Table 1: Levels of decision making in the County

Level of decision making	Principal planning and sectoral bodies and frameworks which KCCISP seeks to support
County level	County Steering Group on Drought Emergency Ministry of Environment, Energy and Natural Resources Ministry of Agriculture, Water and Irrigation County Climate Adaptation Committee ¹³ and the County Integrated Development Plan Executive Finance Committee and Budget and Economic Forum County Adaptation Committee ¹⁴
Ward level	Ward Adaptation Committees

2.4 Linkages with related CIS initiatives

The KCCISP will integrate initiatives to strengthen CIS across a number of complementary projects underway at national level and within Kitui County. Provision of CIS will link with the national Agricultural Sector Development and Support Programme (ASDP). Together with the NDMA, WMO and Red Cross. KMS is considering national adoption of the Common Alert Protocol (CAP), an international standard format for emergency alert and public warning designed for ‘all-hazards’ and ‘all media’.¹⁵ UNDP are financing the NDMA and KMS to develop a RANET Community Radio in Kyuso, Kitui County, to disseminate weather and climate information in the Akamba language. UNDP are also supporting NDMA and KMS to develop climate information in formats better tailored to support decision making levels and sectors. NDMA, ILRI and KMS have a project seeking to collate historical observation data. KMS and WMO are undertaking a series of roving seminars intended to raise farmers’ awareness about available climate information and effective weather and climate risk management.

¹³ The County Climate Adaptation Committee, comprising elected Ward Leaders, County Ministry heads and decentralized national governmental bodies, is responsible for informing climate adaptation related aspects of the CIDP and Sectoral Plans. The County Adaptation Committee decides on proposals for the County Adaptation Fund (CAF).

¹⁴ Alongside the strengthening of CIS, the Adaptation Consortium (see footnote 3 and Annex 3) also includes the development of a County Adaptation Fund (CAF), a county-level planning and funding mechanism to support locally prioritized ‘public good type’ adaptation measures. Committees to manage funding allocation and prioritization have been established at County and Ward levels. The Kitui Meteorological Office will provide CIS training and support to ensure that climate information appropriately informs allocation of CAF resources.

¹⁵ CAP provides public alerts for all kind of hazards, including weather events, power cuts and other emergencies, and works through all media, including cell phones, radio, and other internet based networks.

2.5 Situational analysis of the County’s Observational Network

Kitui County currently has one (as yet not operational) Automated Weather Station, two weather stations and approximately 30 rain gauges with long-term records. Currently the nearest KMS observation stations are in Makindu and Embu.

The County currently lacks an effective network of observational stations, with the existing distribution too focused around the County’s capital town and not representative of the County’s rainfall patterns. There are a number of rainfall stations, installed by individuals or PBOs, which are not registered with KMS and therefore do not contribute to the much needed data for understanding the climate of Kitui. Some rain gauges are currently sited in inappropriate places (such as too close to building, or under trees) with inappropriate or unsystematic collation of rainfall data.

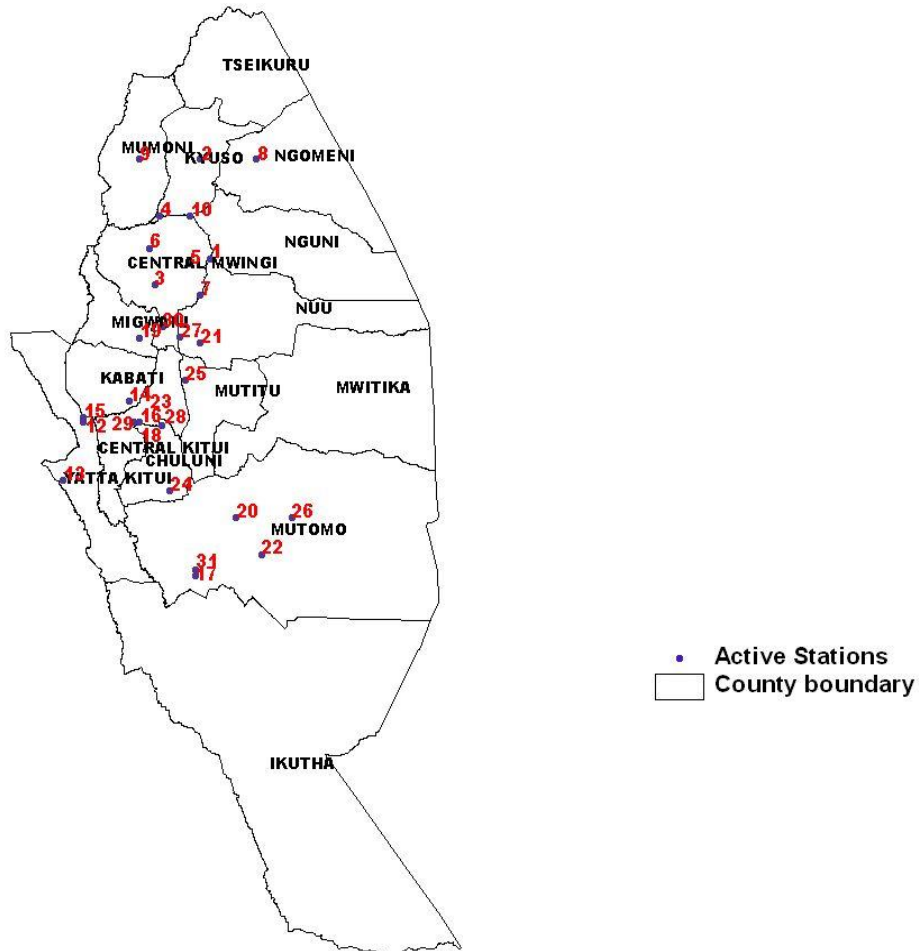


Figure 3: Existing Rain gauges in Kitui County as of September 2012¹⁶

¹⁶ Kitui County Meteorological Office, Draft CIS Plan for Kitui, January 2013

2.6 Proposed strengthening the County's Observational Network

In 2014 KMS is conducting an assessment of meteorological infrastructure to develop an inventory of equipment and its status. KMS plans to install the following weather observatories for Kitui County with equitable distribution, as indicated in Figure 4 below, across strategic and remote locations to enable real-time measurement of specific weather phenomena, such as heavy rainfall and strong winds:

1. 8 Automatic Weather Station, one in each sub-County.
2. 5 Temperature stations situated in Mwingi, Yatta, Mwitika, Mutomo/Ikutha and Kitui Central.
3. 7 Automatic Rain Gauges, strategically placed to capture flash flood events.
4. 83 rain gauges, to provide 20 x 20 km network coverage. The County Meteorological Office is undertaking an inventory to review and equip existing rain gauges and, where necessary, establish new gauges. It is envisaged that a number of community-managed rain gauges will be installed, with training to ensure a standard way of collating information (see further Annex 2). Efforts will be made to locate rain gauges accessible to Ward Administrators and Adaptation committees, and, where relevant, with water and electricity facilities.

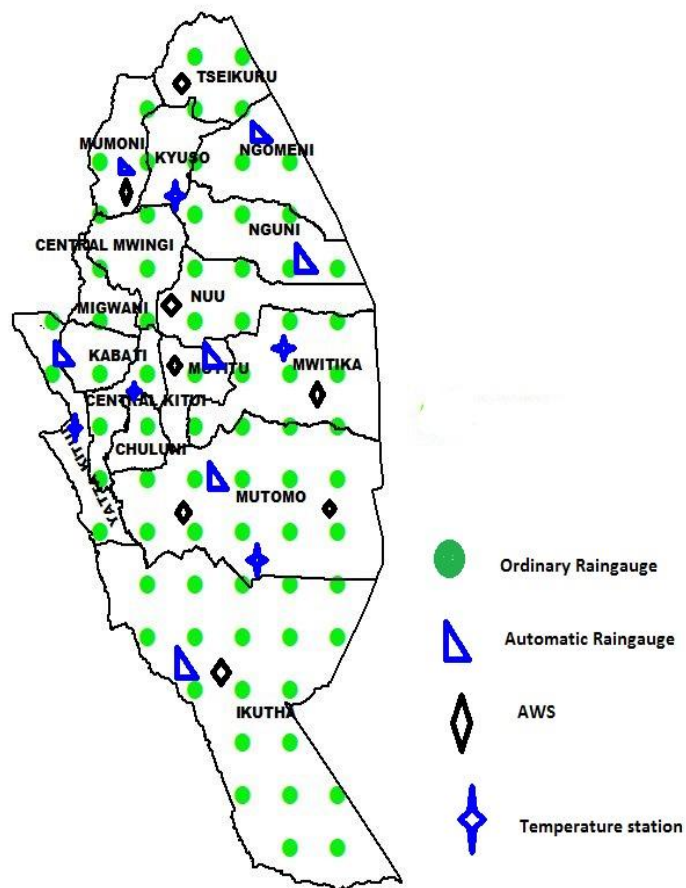


Figure 4: Planned Distribution of weather observatories for Kitui County

In tandem with the assessment of current meteorological infrastructure within Kitui County, KMS is undertaking efforts on data discovery, rescue and digitalization. Where possible KMS will seek to employ the existing observation data of stakeholders to strengthen KMS’ historical data.

2.7 Process of providing climate information services

The Kitui Meteorological Office will develop weather and climate information which supports decision making across the principal livelihood groups as well as strategic and sectoral county government planning.

2.7.1 CIS products

The office will provide:

- Seasonal, monthly, weekly and daily forecasts, as well as summary versions for SMS transmission.
- The seasonal forecasts will be combined with sectoral expertise to provide livelihood advisories.
- Warnings of unusual or extreme weather events for transmission via County Administration and a full range of intermediary and media channels.
- Climate information to support medium and long term planning and input to the development of information tailored to support specific sectoral and livelihood planning.

The timeframe and content of CIS products are outlined in Table 1.

2.7.2 The seasonal forecast

KMS Nairobi Headquarters sends to the County Meteorological Office (CMO) probabilistic forecast information on seasonal rainfall totals and rain onset, cessation and distribution and temperature. The CMO uses historical climate data and local knowledge of climate variability to downscale the national forecasts to develop a forecast for Kitui County.

Figure 5: Proposed two-way flow of seasonal information

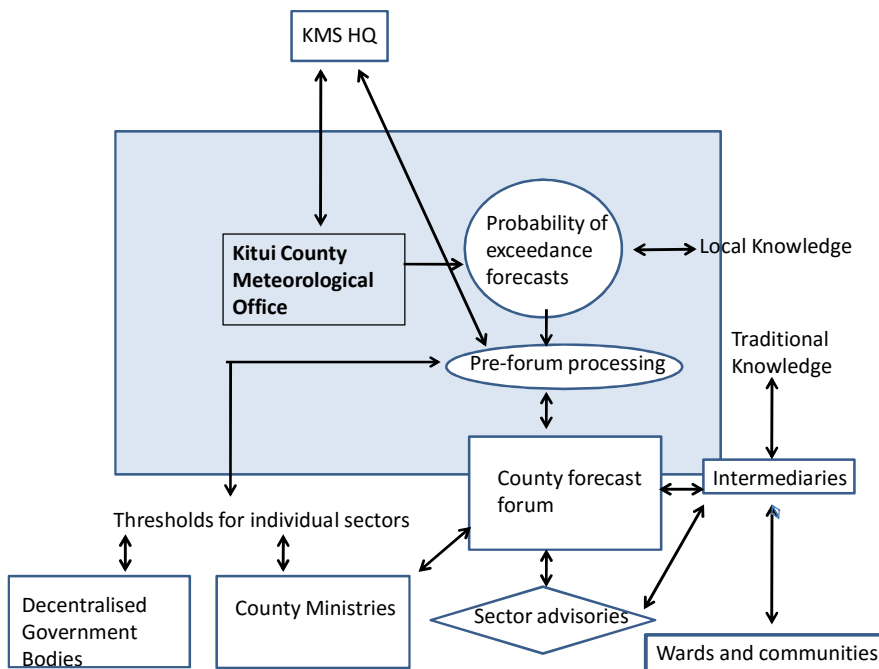


Table 2: Summary overview of proposed products and channels for the KCCISP			
Timeframe	Forecast Content	Channels for communication	Lead organization(s)
Unusual and extreme weather events	For example very heavy rain likely to cause flash flood, landslide/mudslides, strong winds	All channels including via County Government Administration, churches, police, schools, local alarm systems, SMS to CIS intermediaries, via community, local and regional radio, social media and CAP	KMS direct to County Government and NDMA, police, CIS intermediaries and radio stations
Daily	Forecast of rainfall intensity, humidity and geographic location(s), Reported Rainfall Amount, Unusual weather-related events	Radio SMS	KMS to NDMA KMS to principal regional, local and community radio stations KMS to CIS intermediaries
Weekly	Forecast for next 7 days including rainfall location and intensity, temperature, cloud cover, fog, strong winds, advice on daily rate for irrigation	Radio SMS (including via schools) Email and KMS website	KMS to regional, local and community radios and CIS intermediaries on Saturday or Sunday
Monthly	Forecast for the next month on rainfall location and intensity, temperature, extreme weather events. Potentially include local knowledge	Radio and SMS Email and KMS website	KMS to regional, local and community radios and CIS intermediaries Included in NDMA monthly bulletins
Seasonal	Onset, quality, distribution, cessation of rains, extended dry spells Livelihood advisories developed with NDMA and Ministries of Agriculture and Livestock Potentially include local knowledge	County Sectoral Planning Forum KMS website and via email Barazas and discussions led by CIS intermediaries Phone-in radio shows Summary by SMS	KMS in collaboration with NDMA and all key ministries and partners CIS intermediaries within ongoing activities KMS with technical experts from County Ministries/research institutes KMS to CIS intermediaries
Longer-term	Longer-term trends in climate variability and change employing historical data and climate models, combining parameters relevant to specific sectoral decision making	Presentation and production of tailored information, training of Ward Adaptation Fund committees, user and policy workshops, seminars, conferences, on KMS website, via school environmental and weather clubs	KMS engagement within CIDP, County Steering Group on Drought Emergency, County and Ward Climate Adaptation Committees, County Ministries sectoral and financial planning and strategies KMS with Ministry of Education to engage with school clubs

In a County Sectoral Planning meeting, the CMO will work with other government departments and key stakeholders from across relevant line ministries and decentralized authorities and research institutions to assess the implications of the forecasts information for specific thresholds across principal livelihood decisions e.g. the implications of the forecast for crop and seed selection and livestock management, discuss the skill and identify coping strategies for communities across the population of Kitui County. Technical experts from these institutions will together with the CMO develop advisories informed by the seasonal forecast for each of the two rainfall seasons in the county

The County forecast and advisories will then be presented and discussed at a County Forecast Forum¹⁷, bringing together a wider range of CIS users and intermediaries including County Government Administration and Ministries, together with their respective extension services, as well as religious groups, PBOs, media groups and agricultural and livestock suppliers.

The CIS users and intermediaries – including County Government Administration at county, sub-county, ward and village levels, the NDMA, extension service provides from across relevant ministries including agriculture, livestock, water and forestry, religious leaders, partnering PBOs and Ward Adaptation Fund Committees (as further detailed in Section 2.7 and Annex 2) – will each present and discuss the forecast and advisories with their respective stakeholders.

At the same time the forecast will be presented and discussed on one or more popular regional and local radio channels.

The process will also include regular post-seasonal review, to enable feedback from across the range of CIS users, including different livelihood groups, extension services and other intermediaries, local and County administration. Users' feedback on the forecast, its communication, use and impact is essential to support further improvement of CIS and assess how it can better support different types and levels of decision making.

2.7.3 Weather and climate information by SMS

A communication strategy is under development to enable regular provision of weather information by SMS to up to 2,500 identified CIS intermediaries. This process is due to be piloted in Kitui County and initiated in time for the 2014 OND rains. It is proposed that this system will disseminate:

- Highlights of the seasonal forecast
- Monthly and weekly updates
- Daily updates
- SMS messages whenever threats highlighted by the weather forecast indicate the need

¹⁷ For the MAM 2014 season, there is will be a County Sectoral Planning meeting. For future seasons, it is proposed that there will be both a County Sectoral Planning meeting and a subsequent County Forecast Forum. The Forum would be intended to share the forecast and present the advisories developed within the County Sectoral Planning with a much wide range of users. See further Annex 3.

There are also proposals to develop a ‘demand led’ SMS service, so that individuals can directly request weather information and seasonal advisories for a small fee.

2.7.4 Local knowledge

Consistent with the principle of building trust through developing two-way channels for communication and co-production of weather and climate knowledge, this initiative is proposing to undertake a pilot to identify how local knowledge may support communication of KMS forecasts.

2.7.5 Climate information at longer time scales

The Kitui County Meteorological Office will also develop climate information to support medium and long planning of County Ministries across sectors, including the CIDP. The Office will make available historical records and information from the expanded observational network to technical experts and the general public. The Office will also provide input to the development of tailored climate information products requiring a combination of climate and environmental observations, such as seasonal rainfall forecasting, water satisfaction index for specific plants and suitable crop varieties.

2.7.6 Common Alert Protocol (CAP)

The Common Alerting Protocol (CAP) was developed by WMO to address the challenge of alerting—to enable better approaches than this crazy patchwork. The idea of CAP is to standardize the content of alerting messages. CAP provides a format designed for **any and all media**, to communicate information **about any kind of hazard** situation. A message formatted with the CAP standard can be carried over: television, radio, telephone, fax, highway signs, e-mail, the Web ...

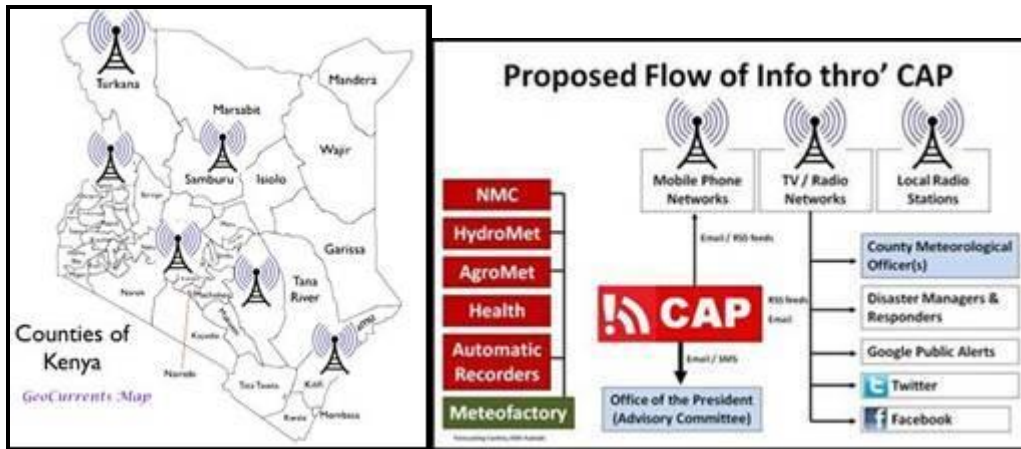
The message can communicate about: Weather, Fires, Earthquakes, Volcanoes, Landslides, Child Abductions, Disease Outbreaks, Air Quality Warnings, Transportation Problems, Power Outages ...

And, the message can be targeted to: the public at large; certain designated groups such as civic authorities or responders; or to specific individuals as needed.

KMS has been working on an integrated solution of Alerts/Warning production & dissemination. This integrated solution will target CAP and all those who will subscribe to it;

- SWFDP
- Tsunami & Seismic
- Flood
- EW in the Health Sector
- EW in Agriculture & Food Security

Figure 6: Proposed Early Warning Information from local CAP



Who are the Potential CAP Message Users & Aggregators in Kenya

- Disaster Management Org. 15
- Media (Radio) 116
- Media (RANET Radio) 4
- Media (TV) 20
- County Meteorologists 47
- Mobile Phone Networks 5
- Internet-Data Networks 2??

2.8 CIS intermediaries

KMS plans to work with respected and influential focal points for the community who are prepared to receive weather information and share this through their existing networks and partners. Those identified as key intermediaries include:

- County Government Officials, including in Ministries and within Sub-County, Ward and Village Administrations
- Chiefs and Assistant Chiefs
- Agricultural , Livestock, Forestry and Fisheries extension workers
- NDMA field staff
- PBO field staff
- Community leaders linked to PBO projects
- Members of the Ward Adaptation Committees
- Religious leaders
- Village elders (Atui)
- Learning and research institutions
- Red Cross Volunteers
- Leaders of specialist groups, such as Farmers', Women's and Financial Services Associations
- Water Users Associations
- Suppliers of Agricultural and Livestock products

KMS is seeking to ensure that its weather and climate information is accessible to the entire County population. Taking into account population increases since the 2009 census, it has been estimated that it will be necessary to send SMS weather information to approximately 2,500 CIS intermediaries in order to ensure at least one SMS message per 500 people (or approximately 100 households). A list of proposed CIS intermediaries is included in Annex 2 and these will be mapped to ensure County wide coverage.

Those partnering in the development of the KCCISP are currently proposing to undertake an initial 4-day training of trainers (TOT) for 35 CIS intermediaries between June-August 2014. The CIS trainers will then share their training with colleagues within their respective organizations. The TOT will be extended to additional CIS trainers and intermediary partners in successive seasons, with refresher courses to share emerging learning as the process is rolled out in other counties (see further Annex 2).

CIS training is also being provided to the newly established WardAdaptation Committees which will be selecting potential projects for the County Adaptation Fund.

2.9 Awareness raising and promoting uptake of CIS

It is recognized that effective use of CIS is a process which requires supporting the wide range of stakeholders to access, understand and appropriately apply climate information within specific decision making processes across timescales. In addition to the community climate observers and climate information intermediaries noted above, the KCCISP aims to promote uptake of CIS through engaging with educational services, religious bodies and networks and demonstration farms.

The Kitui County Meteorological Office will engage with the County Ministry of Education to identify the most effective channels through which to promote engagement with CIS within primary and secondary schools, polytechnics, universities and research institutes. Potential avenues include engaging with established environmental clubs and/or initiating school weather clubs¹⁸ and initiating competitions and events around relevant international thematic days, such as World Environment, Water or Food Days.

2.10 Monitoring and Evaluation

With partners, KMS will undertake regular post-seasonal reviews to assess progress and make the revisions required to develop accessible, timely decision-relevant CIS for Kitui County.

It is proposed that the CMO provide an annual report reviewing progress in implementing the KCCISP to KMS Head Office, as well as all County Ministries and decentralized national authorities, and that this

¹⁸ It is understood that materials to support such public awareness activities in schools can be sourced from UNESCO.

report be taken to an existing County forum for discussion across key Ministries and KCCISP stakeholders.

Those partnering in the development of the KCCISP have developed a baseline (see Annex 4) of current access to and relevance and use of existing climate information services. This serves as a basis from which to track progress in efforts to strengthen CIS provision and support the development of a CIS communication plan which can work through established systems of trust, ongoing related activities of relevant ministries and NGO partners, and existing coverage of regional and local radio stations and mobile phone networks.

While the framework for monitoring and evaluation of CIS provision is still under review, it will include coverage of the indicators included in Table 3 below, and consider progress in supporting climate-related decision making at local, sub-county and county levels across immediate, seasonal and longer-term time frames.

Table 3: Draft Monitoring and evaluation framework for KCCISP¹⁹

Decision makers	Indicators			
	Access	Quality of Forecast products	Use	Benefits
County Government Ministries and Decentralised Government bodies Ward Adaptation Committees General population, particularly amongst farmers and those with climate-sensitive livelihoods	Number of County Ministries and decentralized government agencies at both County and sub-County levels, Ward Committees and households/individuals able to access relevant, timely CIS. Ensuring that CIS are accessible and relevant to the most marginalized.	Accuracy of downscaled forecasts Relevance Timeliness	Use of CIS across relevant decision making timeframes and levels by County ministries/decentralized government agencies, Ward Committees and at risk households (eg to support both seasonal and short-term decision making as well as longer term strategic and sectoral planning)	Benefits for County Ministries and decentralized government agencies at both County and sub-County levels, Ward Committees and at risk households from accessing and using timely, user-led CIS.

2.11 Planning and Budget

¹⁹ The Monitoring and Evaluation framework for CIS element is currently being finalized. While there may be changes to the indicators, the table includes the principal issues to be covered.

In the period 2014-5 KMS with partners are investing US\$78,700 million to strengthen weather and early warning services for Kitui County. Further details on the ongoing initiatives and amounts are provided in the Table below.

Table 4: Ongoing initiatives to strengthen weather and climate information services in Kitui County

Initiative	Funder	Amount
Roving Seminars on Weather, Climate and Farmers – farmer awareness raising and installation of rain gauges	WMO	\$60,000 – being implemented across 10 counties
Kenya Adaptation to climate change in Arid Lands – RANET Ngura FM in Kyuso, Kitui with weather station and rain gauges across the county	UNDP	\$40,000
STARCK+ - developing County Adaptation Funds and Climate Information Services across 5 counties	DFID	Pds Sterling 6.5 million across 5 counties and for period to 2013-2016. This includes Pds 40,000 towards the establishment of County Meteorological Offices.

Annex 1 CIS Intermediary key contacts – Draft list to be completed

Name	Organisation	Mobile	Email
William Ndegwa Githungo	KMS County Director for Kitui	0722324161	william_ndegwa@yahoo.com
Samwel Musili	KMS Deputy County Director for Kitui	0724468182	musili@meteo.go.ke beasam03@yahoo.com
Lydia Muithya	Anglican Development Services Eastern/ County lead for Ada activities	0722286950	lydianmuithya@yahoo.com
	NDMA		
	Lead within Ministry of Agriculture, Water and Irrigation		
	Lead within Ministry of Livestock		
	Lead within Ministry of Environment, Energy and Natural Resources		
	Lead within Ministry of Planning and Finance		
	Lead within Ministry of Forestry		
	Lead within Ministry of Education		
Grace Wambui	Catholic Diocese of Kitui		Gracew.mativo@yahoo.com
Dominic Mbindyo	Action Aid, based in Mwingi	07277811444	Dominic.Mbindyo@actionaid.org
	Red Cross		
	Kitui Development Centre		
	Compassion International		

Annex 2 Proposed CIS intermediaries, and Training – both Training of Trainers (TOT) for CIS intermediaries and a roving seminar for community climate monitors

Table 4: CIS intermediaries for SMS climate information messages

Partner organization	Approximate number of message recipients
County Ministries	Level and number need to be clarified
County Administration officers:	
- Sub-county	8
- Ward	42
- Village	200
Chiefs	80
Assistant Chiefs	231
Ward CAF Committees	100
Agriculture and Livestock Extension Officers	100
NDMA field staff	20?
Water Ministry field staff	15?
NEMA field-based contacts	10?
Ministry of Forestry extension services	?
Fisheries extension officers	?
Anglican Development Services Eastern	200
Caritas and Catholic Diocese of Kitui	150
Muslim leaders	20
Africa Inland Church	100
African Brotherhood Church	100
SACCOs (farmers' cooperatives)	20?
Kenya Red Cross Society volunteers	300
Actionaid	100
Educational establishments:	
- Primary school teachers	606
- Secondary school teachers	?
- Polytechnics	?
- Universities and research institutes	4
Compassion International	?
AMREF	?
Kitui Development Centre	100
Farm Africa	?
Water resource users associations (WRUA)	?
World Vision	?
KAVES	7
Suppliers of Livestock/Agricultural products	?
Total	Approximately 2,506

KMS will map coverage of CIS intermediaries across Kitui to identify gaps in coverage.

ADA-E is working in 10 wards, developing Climate Adaptation Fund committees. It is the lead agency for Ada activities in Kitui.

The Catholic Diocese of Kitui is working in Kitui South, Kitui East and Kitui Rural.

Action Aid is working in Mwingi Central and Mwingi North on C/FFAs and Protracted Relief and Recovery (PRRO) programme reaching 12,017 households or 72,000 people.

Red Cross has its main office in Kitui and sub-offices in Mutomo and Mwingi with 300 community-based volunteers.

Compassion International is working with 5 different churches in 12 Centres in Kitui West, Kitui Central and Kitui South in support of Orphans and Vulnerable Children as well as their guardians.

There is potential to increase the number of CIS intermediaries through linkages with ongoing and proposed complementary initiatives, including the 'digital villages' which the County Government propose establishing.

Training of Trainers (TOT) for CIS intermediaries

Ada partners are currently proposing to undertake an initial 4-day training of trainers (TOT) for 35 intermediaries between June-August 2014, to comprise:

- 16 Colleagues from across the Ministries of Agriculture, Livestock, Water, Planning
- 6 NDMA County Office and Field offices
- 10 NGO partners, including Caritas, Red Cross, Kitui Development Centre, Action Aid, ADS-E
- 3 Key suppliers of agricultural and livestock products

Training for community climate monitors

There is also a recognised need to conduct a roving training seminar for community climate monitors to ensure a standard way of collating information from all rain gauges.

CDM Kitui is conducting an assessment of meteorological infrastructure to develop an inventory of equipment and its status and it is envisaged that a number of community-managed rain gauges will then be installed.

Training for community climate monitors is proposed for May/June 2014 and will include training in how to use Frontline Forms to submit readings daily to the KMS County Director.

Annex 3 Timetable of activities for Ada CIS and CAF project activities in Kitui

The Adaptation Consortium (Ada) is one of three components of the Strengthening Adaptation and Resilience to Climate Change in Kenya (Plus) (STARK+) financially supported by the UK Department for International Development. Working across five Arid and Semi Arid counties (Kitui, Makueni, Isiolo, Wajir and Garissa), Ada aims to improve access to CIS for at least 2.4 million people in Kenya and develop approaches for adaptation replicable in other counties and potentially elsewhere.

The Ada Consortium is led by the International Institute of Environment and Development (IIED) and consists of PBO partners CARE and Christian Aid, the UK Met Office (with King's College London and University of Sussex) and Kenya Meteorological Services (KMS). The Met Office leads the Climate Information Services (CIS) elements of the initiative, working closely with KMS. The project Secretariat is based within and works closely with the National Drought Management Authority (NDMA).

Ada seeks to develop a 'combined approach' to adaptation in Northern Kenya, with principal activities including: establishing County and Ward Adaptation Committees (C/WACs); supporting the integration of weather and climate information and resilience assessment tools into county and community planning; and establishing a robust monitoring, evaluation and learning framework. In addition, it will support the devolution and decentralization process in Kenya through the introduction of County Adaptation Funds and supporting the provision of better CIS.

2014	
Feb	<p>Discuss draft county CIS plan</p> <p>Integrate basic training on CIS within development of Ward Adaptation Committees</p> <p>Undertake inventory of county rain gauges and identify possible community climate monitors</p> <p>Develop pilot on collating and assessing local/scientific knowledge</p>
Mar	<p>County Sectoral Planning Forum to present and discuss forecast and develop advisories</p> <p>Communication of forecast and advisories by CIS intermediaries and via regional and local radios</p> <p>Install observation network to ensure 30 fully functional rain gauges being appropriately monitored (March-June)</p>
Mar-May	<p>Daily forecasts, weekly and monthly updates via regional and local radio and CIS intermediaries where feasible</p> <p>Undertake a pilot to assess how local knowledge can strengthen KMS CIS</p>
June-Aug	TOT for CIS intermediaries

	<p>CIS Trainers train respective CIS intermediary colleagues</p> <p>Conduct a roving training seminar for community climate monitors</p> <p>Establish and test SMS system and review and revise pilot methodology ready for OND 'short' rains</p>
Sep	<p>County Sectoral Planning Forum: Review 'long' March April May season, seasonal forecast, observations and impact, discuss OND forecast and co-produce livelihood advisories</p> <p>County Forecast Forum</p> <p>Roll out of proposed full CIS communication, including via SMS, radio, CIS intermediaries</p>
Oct-Dec	<p>Delivery of daily, weekly, monthly updates by SMS and radio</p>
2015	
Jan	<p>Review and revise communication channels in time for next season</p> <p>Report on findings from pilot to collate and assess local/scientific knowledge</p> <p>Identify potential areas for extension and upscaling</p>
Mar-May	<p>County Sectoral Planning meeting: Review past season, seasonal forecast, observations, impact; Revisit baseline to assess progress against CIS objectives</p> <p>County Forecast Forum</p> <p>Provide seasonal information via CIS intermediaries and radio</p> <p>Provide monthly, weekly and daily updates by SMS and via radio</p> <p>Potential launch of demand-led channel of weather forecasts by SMS</p>
Jun-Jul	<p>TOT for CIS intermediaries, refreshers and additional intermediaries</p>
Aug-Sep	<p>County Sectoral Planning meeting: Review past season's forecast, observations, impacts and assess further development required of CIS channels, products</p> <p>County Forecast Forum</p>

Annex 4: Summary baseline of current use of CIS in Kitui County

Decision makers	Indicators			
	Access	Quality of Forecast products – Reliability, Relevance, Timeliness	Use	Benefits
County Government Ministries and Development Government bodies	Access to weather and climate information is patchy amongst county decision makers. Some obtain KMS forecasts, more receive information via NDMA monthly updates and FEWSNET/other internet sources	Welcomed access to strengthened CIS for county planning at both short and longer timescales.	Use existing KMS products within NDMA monthly updates. Appears to be limited current use of KMS CIS within sectoral planning.	To be completed through regular post-seasonal review
Ward Adaptation Committees	Newly formed body – will be receiving CIS training within establishment process	Not applicable - Ward committees newly formed bodies.	Not applicable - Ward committees newly formed bodies.	
General population, particularly amongst farmers and those with climate-sensitive livelihoods	Community users receive information from regional and local radios. Access of information via Agricultural and Livestock extension services is demand- rather than user-led.	Most community users perceive KMS information as unreliable and do not appear to appreciate the probabilistic nature of the information. They requested information on the onset, quality, geographic and temporal distribution and cessation of rains, as well as on extended dry spells, extreme weather events, high and low temperatures, high winds, hail, fog, cloud cover. They requested seasonal forecasts, with monthly and weekly updates, and daily updates in the run up to and over the rainy seasons. Information was also required to support crop harvesting, drying, storage and water harvesting.	Limited use of existing forecasts received by radio as seen as not locally relevant. Some community users also employ local weather and climate information.	

Annex 5: Summary KMS Forecasts Skill Scores (to be confirmed by the Director)

Time Scale	Forecast	Percent Skill Score	Remarks
Nowcasting	Hourly To 6 Hours	>90%	<i>confirmed by KMS Director</i>
Short Range	Daily	85-95%	<i>confirmed by KMS Director</i>
Medium Range	Weekly	>85%	<i>confirmed by KMS Director</i>
Long Range	Monthly	70-80%	<i>confirmed by KMS Director</i>
	Seasonal	70-80%	<i>confirmed by KMS Director</i>
Longer Term	Years (Climate Trends)	Scenerious	<i>confirmed by KMS Director</i>

Annex 6 References

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Materials from Ada Consortium partners

8. Barrett, S, The Political Economy of Integrating Climate Information into County Government Planning and Decision-Making, Draft, 2013
9. Githungo, W, KMS presentation to stakeholders’ meeting with the Kitui CIDP Committee, January 2013 and various materials from the Kitui County Meteorological Office
10. Powell, R, Draft reports from consultancy on developing communications for climate information services for the Adaptation Consortium, January 2013

Required information

Map of Kitui – with sub-counties and wards, key towns and roads

Map of Mobile phone coverage (from County Integrated Development Plan)

Plans/strategies of Ministries of Water, Agriculture, Livestock, Environment, NDMA

The Adaptation (ADA) consortium is a core component of the National Drought Management Authority strategy and funded within the Strengthening Resilience and Adaptation to Climate Change in Kenya plus (STARCK+) programme. The aim of the Adaptation Consortium is to pilot climate change adaptation planning approaches to enhance climate resilience in five Arid and Semi-Arid Lands (ASALs) counties (Garissa, Isiolo, Kitui, Makueni and Wajir) that, if successful, will be replicated in other ASAL counties and beyond. The consortium consist of Christian Aid working with ADS-Eastern in Kitui and Makueni, International Institute of Environment and Development (IIED) working with Resource Advocacy Programme (RAP) in Isiolo, WomanKind Kenya in Garissa, and Arid Lands Development Focus (ALDEF) in Wajiir, Met Office (UK) and the Kenya Meteorological Services (KMS).



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