



COUNTY GOVERNMENT
OF WAJIR



MINISTRY OF ENVIRONMENT
AND NATURAL RESOURCES

WAJIR COUNTY

CLIMATE INFORMATION SERVICES PLAN



ACKNOWLEDGMENTS

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ACRONYMS

ADA	Adaptation Consortium
ALDEF-K	Arid Lands Development Focus-Kenya
ASAL	Arid and semi-arid land
CCCCF	County Climate Change Fund
CAP	Common Alert Protocol
C/FFA	Cash/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 Systems Network
GFCS	Global Framework for Climate Services
ITK	Indigenous Traditional Knowledge
IIED	International Institute for Environment and Development
KAVES	Kenya Agricultural Value Chains Enterprise Project
KMD	Kenya Meteorological Department
MAM	March, April, May rainy season
NCCAP	National Climate Change Adaptation Plan
NCCRS	National Climate Change Response Strategy
NDMA	National Drought Management Authority
OND	October, November, December rainy season
PBO	Public Benefit Organization
WCR	Wajir Community Radio
SACCOs	Savings and Credit Cooperatives Societies
StARCK+	Strengthening Adaptation and Resilience to Climate Change in Kenya (Plus)
TOT	Training of Trainers
UNDP	United Nations Development Programme
WCCISP	Wajir County Climate Information Service Plan
WIGOS	WMO Integrated Global Observing System
WMO	World Meteorological Organization
SMS	Short messaging service
SWFDP	Severe Weather Forecasting Demonstration Project

KEY TERMS GLOSSARY

Cessation	End of the rains
Climate Information Services	Provides relevant, usable climate information which can support decision-making across timescales and levels
Onset	Start of the rains
Probabilistic	Probability of occurrence of a number of different outcomes developed using statistical forecast methods

Foreword by the Director, Kenya Meteorological Department

The mandate of the Kenya Meteorological Department (KMD) is derived from the World Meteorological Organization (WMO) Convention, which is to provide accurate, timely weather and Climate Information Services (CIS) 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. KMD'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) Sustainable Development Goals, and the Johannesburg Plan of Implementation of the 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 sub-county (constituency) or community/grassroots levels. This opportunity, in turn, calls for a concerted effort by KMD to strengthen its infrastructure and services to reach and have the desired influence upon the community or grassroots 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 County Climate Information Centres (CCIC) and sub-county 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 for 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 more devastating and developing countries are more vulnerable. While climate change is a global phenomenon, its negative impacts are more severely felt by poor communities and poor countries, which are more vulnerable due to their high dependence on natural resources and limited capacity to cope with climate variability and extremes. Moving the information centres 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 providers and users to improve the process for decision-making and to realise social and economic benefits.

This CIS Plan therefore aims to develop a strategy or a framework for providing climate services at the county level with the user's needs in mind. The implementation of this framework will depend heavily on partnering with all those organisations and individuals whose activity will suffer due to extreme weather and climate impacts.

I, therefore, wish to call upon all stakeholders to support the efforts being made to develop relevant and reliable climate information services at county and even lower levels and disseminate these services in the most appropriate communication channels.



PETER G. AMBENJE
DIRECTOR, KENYA METEOROLOGICAL DEPARTMENT

Foreword by the Governor, Wajir County Government

Climate change is one of the most serious global challenges of our time. The scientific evidence on the effects of climate change is overwhelming, both at global and local levels. Given communities' dependency on environmental and natural resources, economic growth and livelihood incomes of both urban and rural populations are highly vulnerable to climatic variability and change (eaccpc, 2011).

Major indications of climate change effects in wajir county include 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 that is responsive to the needs of the county residents and their livelihoods.

The county climate information service will play a crucial role in development planning—both for managing development opportunities and risks and mitigation and adaptation. Efficient application of climate services requires proper and efficient gathering and processing of weather information. Climate services involve the dissemination of climate information to the public or a specific user.

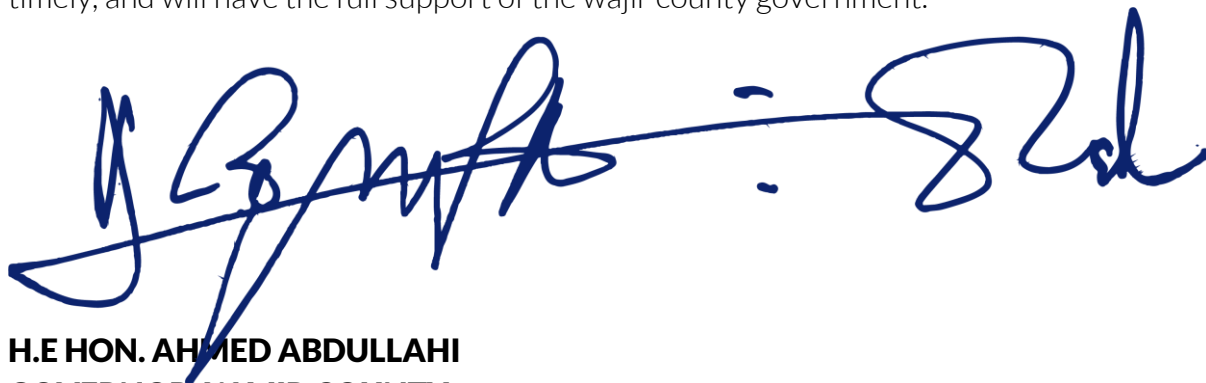
They also require strong partnerships among providers (e.g., governments, private sector, academic communities, stakeholders) for the purpose of interpreting and applying climate information for decision-making, sustainable development and improving climate information products, predictions and outlooks. 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) came to an end in 2015 with the mdg number seven (ensure environmental sustainability) extended. This extension deliberately enables nations and governments to institute various mechanisms and strategies to combat adverse effects of ever-worsening climate variability. County climate information services will be used to provide guidance in planning and sustainable development in the county.

the 2010 kenya constitution ushered in a new governance system, which recognized new environmental, development and human rights issues, effectively laying a firm foundation for the establishment and effective management of cis work. The system will be pivotal in providing a basis for strengthening and focusing countywide actions towards climate change adaptation and mitigation.

the county government of wajir has put into place various initiatives in support of climate change adaptation. One key initiative is the enactment of the county climate change fund

act 2016, which will support climate resilience and adaptation projects in the communities. These initiatives stand to benefit greatly from cis. This strategy is therefore timely, and will have the full support of the wajir county government.

A handwritten signature in blue ink, appearing to read 'Ahmed Abdullahi', written in a cursive style.

**H.E HON. AHMED ABDULLAHI
GOVERNOR, WAJIR COUNTY**

Executive summary

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

This initiative outlines a proposed framework for the wajir county climate information services plan (wccisp), which aims to develop and deliver weather and climate information to support local, sub-county and county-level decision-making at time frames of hours, days, weeks, months, seasons and years. This plan is in line with the county, national and international development frameworks, including the county integrated development plan (cidp), constitution of kenya 2010, kenya vision 2030, the national climate change response strategy (nccrs), and the national climate change action plan (nccap), as well as the global framework for climate services (gfcs).

The plan recognizes that the delivery of cis, which can effectively support decision-making, requires the engagement of a wide range of stakeholders. Stakeholders of the wajir county climate information service plan (wccisp) encompass: county government administration at county, sub-county, ward and village levels; county departments 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; national and international public benefit organisations (pbos); universities and research institutions.

The plan aims to support the development of an integrated cis framework, which enables decision-making across principal livelihood groups, as well as strategic and climate-sensitive sectoral county government planning. It is comprised of:

- Strengthening of kenya meteorological department (kmd) observational capacities within wajir county which will lead to improved quality of kmd products;
- Creating channels for the two-way exchange of learning between the providers and users of weather and climate information by employing a variety of new and existing channels, including a county sectoral planning forum, community-based intermediaries, short messaging services (sms) such as text messaging 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 are 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 kmd 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 kmd to provide cis that can support specific livelihood decision-making processes.

Target sites consist of settlement areas within institutions like police stations, schools and health centres along the roads with busy transport and economic activities and will be collected through global positioning system (gps garmin oregon 600). Data for the target sites figure 3.1 has already been collected. In collecting this data (figure 3.1), there were challenges of insecurity and conflicts, but by working closely with security agencies and local communities, some of the challenges were overcome.

The wccisp also includes a monitoring and evaluation framework, encompassing a regular review after each principal rainy 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 by creating a reliable, user-led service which supports local, sub-county and county government decision-making and explores 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 wajir county and supporting the development of a community that 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—particularly among populations whose livelihoods are directly dependent on natural resources. Reliable climate information, including warnings and alerts for severe weather and extreme climate events, is important to support decision-making for stakeholders, including households, communities, wards, sub-county and county-level. Information about longer-term trends in climate variability and change is also vital to supporting major investments in infrastructure, including dams and roads, as well as conservation of the natural environment.

The mandate of KMD 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 which is derived from the world meteorological organisation (WMO) convention, adopted on October 11, 1947 and revised in 2007.

KMD vision:

To become a leading, world-class operational forecasting centre and scientific institution that provides optimum contribution to improved quality of life

KMD mission:

To facilitate accessible meteorological information and services and infusion of scientific knowledge to spur socio-economic growth and development

County meteorological offices will be expected to implement the mission of kmd at county level.

This county information service plan (CISP) is a framework for development and delivery of cis in Wajir county. It was developed in consultation with stakeholders, including experts from across county departments and partner organizations, as well as community members in different livelihood zones. The CISP is a framework intended to support a range of measures for operationalization of KMD'S decentralisation strategic plan for cis provision in Wajir county.

1.2 roles and responsibilities of county meteorological office

In line with the process of devolution and decentralisation, the KMD regional meteorological offices were strengthened and increased with the inception of the new

constitution dispensation to county meteorological offices (CMOS) in each of Kenya's 47 counties. Each CMO is headed by a county director of meteorological services (CDM, who is charged with the responsibility of implementing national policies at the county level and delivering cis which can best inform and support both the development of CIDP and the decision-making needs of the counties' principal sectoral livelihood groups.

Strengthened in 2012, the Wajir county meteorological office is the sub-national weather service of KMD and is intended to be an information centre to provide the people of Wajir county with relevant weather and climate information.

Responsibilities of this office include but are not limited to:

- 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 and disseminating 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.

1.3 summary of relevant policies and plan

The WCCISP recognizes that delivering cis that can support decision-making effectively requires engagement among a wide range of stakeholders. Stakeholders of the WCCISP include: government administration at county, sub-county, ward and village levels;

decentralized national government agencies; religious leaders across different faith groups and denominations; local, community and livelihood associations; private sector bodies and national and international public benefit organisations (PBOS); higher-learning, community-based organisations and research institutions (among others). As such, the Wajir meteorological office will develop and deliver the WCCISP through linkage with and by supporting the activities of these stakeholder groups.

This CISP supports implementation of national and international climate change policies such as:

1. United nations framework convention for climate change (UNFCCC)
3. National climate change response strategy (NCCRS)
4. Global framework for climate services
5. Climate change act, 2016
6. National climate change adaptation plan (NCCAP)
7. Kenya's vision 2030
8. Kenya national adaptation plan (nap)
9. Wajir county climate change fund act, 2016

1.4 Context

1.4.1 natural resources

Wajir county is endowed with a diverse natural resource base, such as seasonal water, pasture, woodlands and wildlife, among other resources. These resources support the livelihoods of the populations, who are mainly pastoralists and agro-pastoralists. The main water sources include water pans, rock catchments, boreholes and Laggas (dry river beds) like Habaswein, Lagboghhol and Lagbor.

Ewaso Nyiro river sinks underground, forming a swamp when it enters Wajir county in Habaswein area. This area is prone to flooding during the rainy seasons and has a rich potential for small-scale irrigation. The flood plain is an important resource for pasture during dry seasons and serves as a refuge during drought conditions for pastoralists.

The county is classified into two ecological zones: semi-arid near the high ground and quickly becoming arid in the lower plains. Semi-arid zone covers part of Bute ward, Gurar and Buna ward. The semi-arid zone receives rainfall ranging from 400-650 mm annually. The relatively high rainfall is due to the influence of the Ethiopian highlands. The vegetation in this zone is mainly thorny bush with short grass. The arid lowlands receive rainfall ranging from 150-300 mm annually and support grassland and few shrubs. These are mainly around Habaswein, Arbajahan, Hadado and Wajir bor.

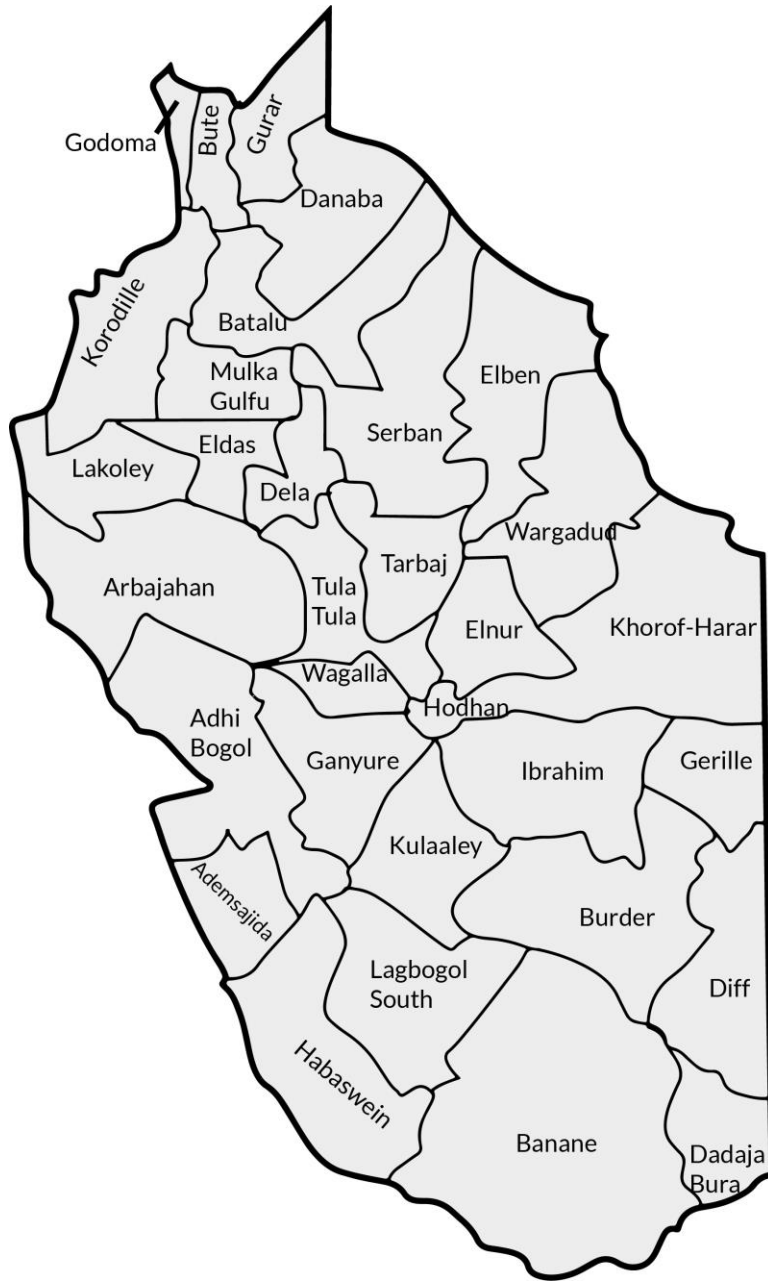
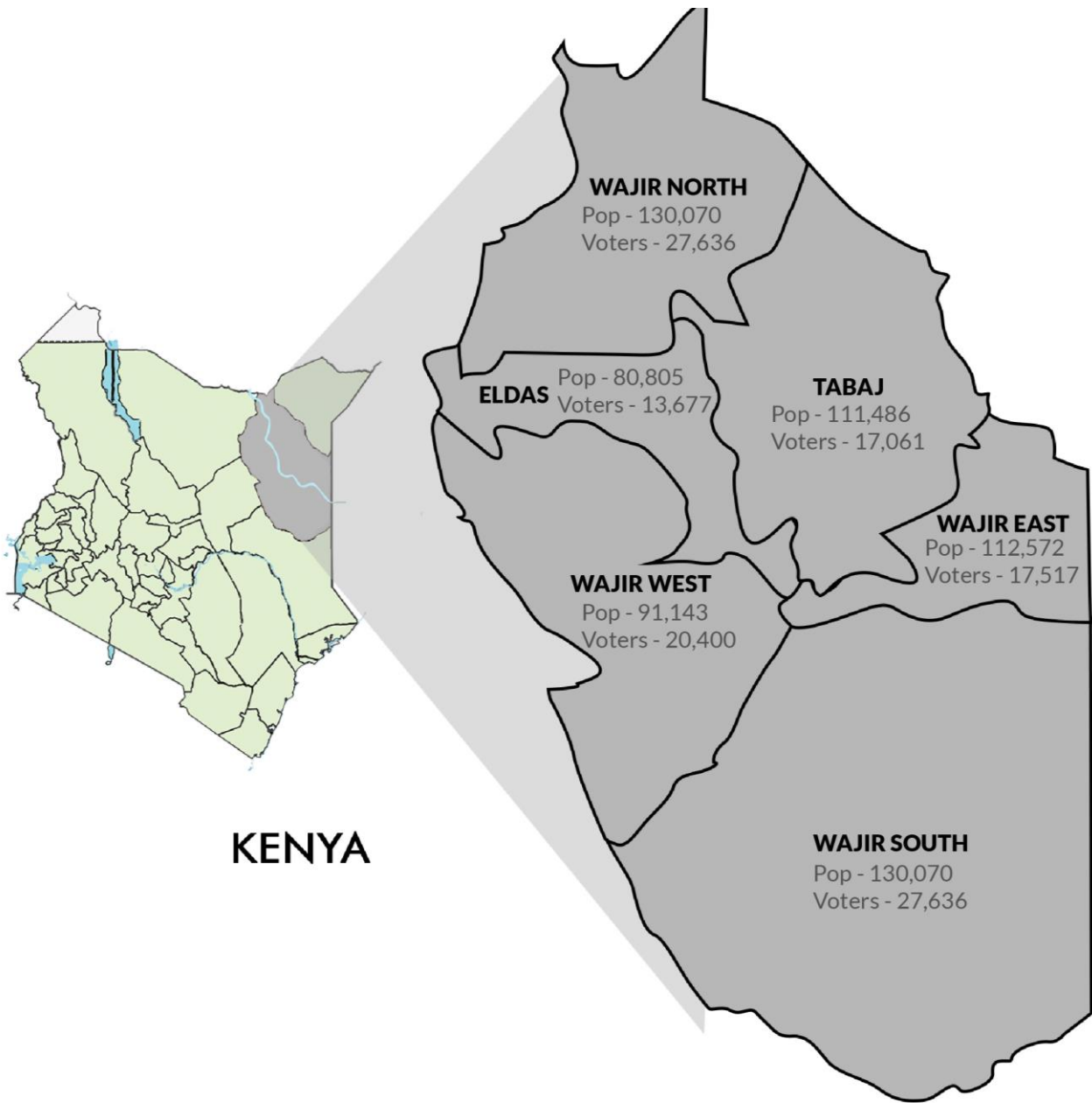


Figure 1.1: map of Wajir county



KENYA

Figure 1.2 population map of wajir

Table 1.1: Population Projections By Constituency/Sub-County

CONSTITUENCY	2009 (CENSUS)			2012 (PROJECTIONS)			2015 (PROJECTIONS)			2017 (PROJECTIONS)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Wajir South	71436	58634	130,070	78561	64482	143,044	86397	70914	157,311	92051	75555	167,605
Wajir North	73628	61877	135,505	80972	68049	149,021	89048	74836	163,885	94875	79733	174,609
Wajir East	59981	52591	112,572	65964	57837	123,800	72543	63605	136,149	79779	69950	149,729
Tarbaj	62102	49744	111,846	68296	54706	123,002	75108	60162	135,271	82600	66163	148,763
Wajir West	54210	36933	91,143	59617	40617	100,234	65564	44668	110,232	72103	49124	121,227
Eldas	44,975	35830	80,805	49461	39404	88,865	54394	43334	97,729	59820	47656	107,476
Total	363,766	298,175	661,941	400,049	327,916	727,966	439,952	360,624	800,576	468,741	384,222	852,963

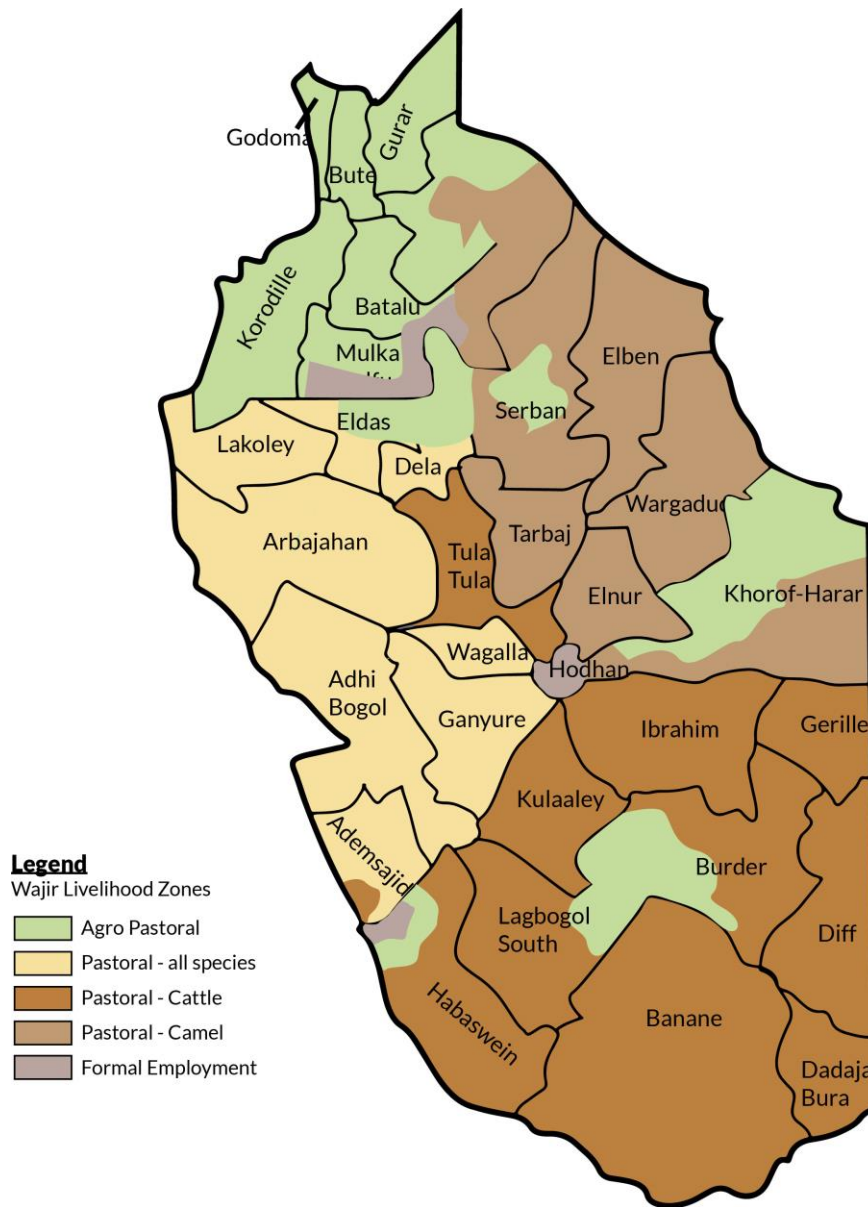


Figure 1.3 Wajir Livelihood Map

Table 1.2: Livestock Production

Sub-County	Ward	Cattle		Sheep		Goats		Camel	
		2013/ 14	2014/ 15	2013/ 14	2014/ 15	2013/ 14	2014/ 15	2013/ 14	2014/ 15
Wajir East	Barwaqo	186	195	919	979	1312	1400	2	2
	Khorof Harar	92459	97082	88656	94457	126632	135062	175700	180971
	Township	46	49	459	489	656	700	-	-
	Wagberi	279	293	1837	1958	2625	2799	9	9
Tarbaj	Elben	31188	32748	58540	62052	74678	79308	29391	30273
	Sarman	36178	37987	67906	71981	86626	91997	39188	40364
	Tarbaj	32436	34058	60881	64534	77665	82480	36389	37481
	Wargadud	24951	26198	46832	49642	59742	63446	34989	36039
Wajir North	Gurar	25348	26616	46927	50282	66580	70708	27444	28162
	Bute	21123	22180	39106	41902	55483	58923	20583	21121
	Korondile	28165	29573	52141	55869	73978	78565	24699	25345
	Malkangufu	19715	20701	36499	39109	51784	54995	16466	16897
	Batalu	16899	17744	31285	33522	44387	47139	19211	19713
	Danaba	18307	19222	33892	36315	48086	51067	15094	15489
	Godoma	11266	11829	20856	22348	29591	31426	13722	14081
Wajir South	Banane	28059	29461	28641	30360	21502	22835	14767	15210
	Burder	30063	31566	30687	32529	23038	24466	15822	16296

	Dadajabula	38079	39983	38871	41203	29181	30990	20041	20642
	Habaswein	26054	27357	26596	28191	19966	21204	13712	14123
	Lagboghoh South	24050	25253	24550	26023	18430	19573	12657	13037
	Ibrahim Ure	22046	23148	22504	23854	16894	17942	11602	11951
	Diff	32067	33670	32733	34697	24574	26097	16876	17383
Wajir West	Arbajahan	32631	34263	68155	72244	112177	119154	35207	44725
	Hadado/At hiboohol	29368	30836	61339	65020	100959	107239	31687	39890
	Adamsejida	25017	26268	52252	55387	86002	91351	26992	25385
	Ganyure/W agalla	21754	22842	45436	48163	74784	79436	23472	10879
Eldas	Eldas	4819	5060	15900	16854	17633	18726	4131	4255
	Dela	5783	6072	19080	20225	21159	22471	4957	2978
	Lakole south/Basir	30362	31881	100171	106181	111087	117974	26023	30633
	Elnur	7229	7591	23850	25281	26449	28089	6196	4680

Source: Livestock Department

1.4.2 Economic Activities and Food Security

Livestock production is the backbone of the county's economy with over 80 percent of the inhabitants directly or indirectly deriving their livelihoods from livestock. Nomadic pastoralism is more prominent in the county and defines the lifestyle of most inhabitants.



Watering Points



Ongoing Borehole Drilling

Camel dairy and meat production is a prominent economic activity in the county. The main livestock cattle breeds are Zebu and Boran, both of which are drought-tolerant and used for beef and milk production. Goats and sheep are also bred in Wajir County. Other activities include selling charcoal, firewood, herbs, resins and gum.



Hadado Fresh Produce Market



Ongoing Construction of First Tarmac Road in Wajir

1.5 Overview of County Climate

Wajir County is mainly arid to semi-arid with two main rainfall seasons. The long rains season occurs between March and May with the peak in April. Figure 1.4 shows March-April-May (MAM) rainfall season long-term mean (LTM). The short rains season, which is the most significant, occurs from October to December with the peak in November. Figure 1.5 shows the October-November-December (OND) rainfall season LTM.

This erratic and unreliable rainfall cannot support crop farming in the county. It is hot and dry most of the year, with temperatures ranging from 21°C to 42°C. High temperatures are recorded throughout the year. The mean annual temperature in the county is 31°C. The county records, on average, more than nine hours of sunshine per day and thus has a huge potential for utilizing solar energy. Throughout the year, monsoon winds blow across the county and peak from July to August, often developing dust storms, but also providing huge potential for the generation of wind power.

Climate change is likely manifesting significant increases in year-round temperatures, increased intensity of rainfall during rainfall seasons, a shift in rainfall onset and cessation dates, increases in frequency of extreme weather events from year to year and weather variation.

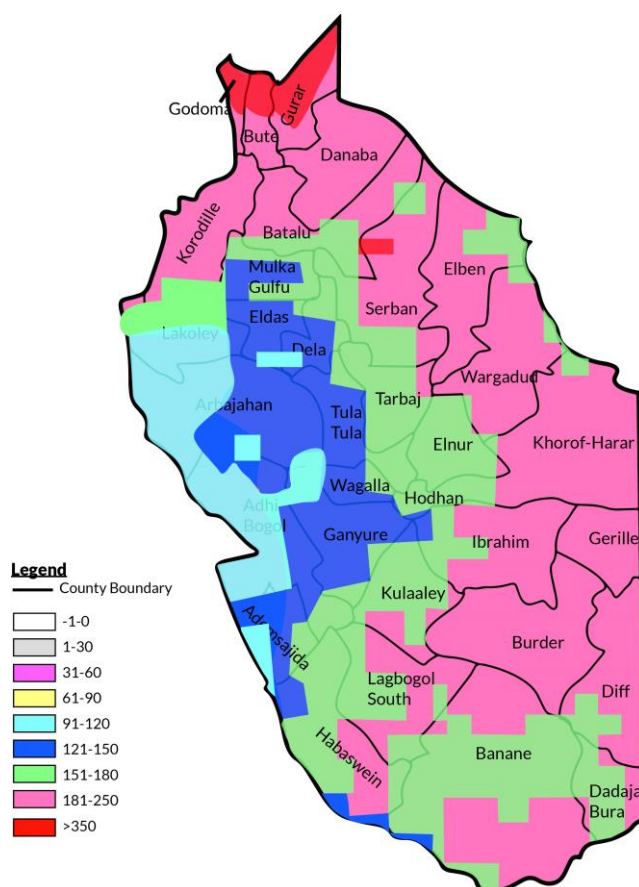


Figure 1.4: Long-term Mean for MAM Season

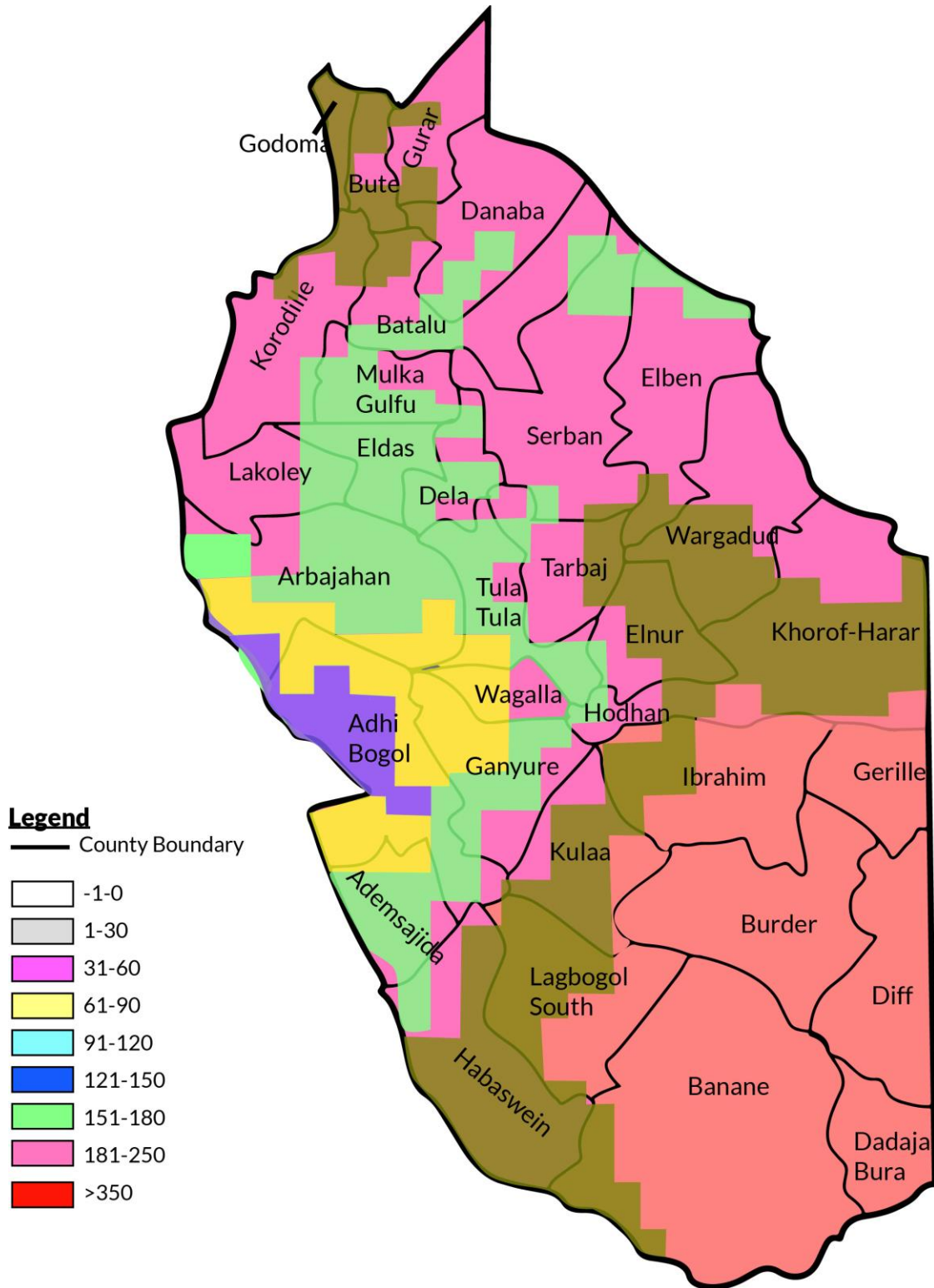


Figure 1.5: Long-term Mean for OND Season

2.0 FRAMEWORK FOR PROVISION OF CLIMATE SERVICES

2.1 Goals and Objectives

The WCCISP aims to develop and deliver accessible, timely, relevant climate information, which can support local, sub-county and county-level decision-making processes for the benefit of community livelihoods and key economic sectors in Wajir County.

The specific objectives are to provide:

- a. Relevant location-specific climate information (e.g., daily observed rainfall; weekly, monthly and seasonal rainfall forecasts) that supports community-level livelihoods at county- and sub-county-level decision-making processes;
- b. Early warning and alerts of extreme weather and climate events, such as droughts and floods, for safety of life and optimization of weather and climate-dependent natural resources;
- c. Sector-specific climate information (e.g., wind speed and direction, temperature, relative humidity, sunshine hours, radiation, normalised difference vegetation index (NDVI), climatological summaries of weather parameters) for county-level planning;
- d. Relevant climate information to contribute to the development of sector-specific advisories for short-term and long-term planning.

2.2 Principles

Wajir County's CIS commenced in 2012 and has been received differently among communities depending on their level of understanding (i.e., experience, literacy and perception).

This framework has been developed based on a set of guiding principles recognising that effective CIS needs 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, and
- Support increased understanding and communication of uncertainty in climate information and strengthen appropriate use of probabilistic climate information.

2.2.1 Provide Reliable and Probabilistic Climate Information

Based on discussions with community CIS users, many perceive KMD information to be unreliable. They are aware that the information currently is based only on meteorological records from the Wajir airport weather station, and Marsabit, Mandera and Garissa in neighbouring counties, and question its relevance to their own localities.

KMD must therefore strengthen the observational network within Wajir County and develop agreed-upon terminology that appropriately and systematically conveys the level of confidence and uncertainty within the weather and climate information provided.

2.2.2 Relevance of Climate Information to Users' Needs—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 KMD information to be too general and not relevant to their specific localities and livelihoods. Farmers and pastoralists have requested information on the onset, geographical and temporal distribution and cessation of the rains, including frequency of extended dry spells, as well as high and low temperatures, high winds, hail and cloud cover. They want to receive seasonal forecasts with monthly, weekly and daily updates, as well as alerts throughout the year.

Some livestock farmers have requested daily updates throughout the year to plan for resource management such as pasture and water 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 and cut off roads. Weather and climate can have particular impacts on women in their duties to meet household water requirements, as well as in their kitchen, farming and marketing roles. The specific climate information should address the needs of community members of all strata, including women and youth groups.

Representatives from PBOs, county and national government departments and agencies have welcomed weather and climate information about short (i.e., seasonal, monthly, weekly, daily and extreme weather events), long-term (beyond seasonal) timescales, climate change and variability, to support short- and long-term strategic and sectoral planning, create climate awareness and timely sharing with community members.

KMD 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 Accessibility of Climate Information

Community users currently receive information from regional and local radio stations. Agricultural extension services have information but only provide demand-led services, requiring farmers to seek out support from the extension services. Planners and policymakers across county line ministries, decentralized authorities and non-governmental organizations currently access weather and climate information via KMD.

The WCCISP proposes employing a range of communication channels to ensure that climate information can reach all users in comprehensible formats and through trustworthy channels. These channels will need to ensure reach and relevance for the most marginalized users.

2.2.4 Foster Increased Trust

Users have a key role in enabling KMD to develop and deliver CIS which best supports specific decision-making processes. Users understand the specific decisions which particular types of weather and climate information can influence. Technical experts from across line ministries can advise on key thresholds that 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 bolster support where historical datasets are sparse. Local observations of weather and climate and its impact will be of tremendous value in enabling KMD to deliver more locally accurate and relevant forecasts.

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

2.2.5 Support Increased Understanding

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 it. Failure to strengthen this understanding risks heightening mistrust where users perceive the information as wrong if the less likely event occurs, and risks increasing vulnerability where information is misapplied. Resilience can be increased through strengthening capacities to make decisions with uncertain information.

KMD has recognized the need to build the communication capacities of its staff. It has initiated risk communication training for KMD county directors and the current initiative encompasses further training both for KMD county offices and CIS intermediaries.

2.3 Existing and Planned CIS-related Initiatives and Projects

The planned Wajir CIS initiatives aim to develop and deliver weather and climate information which will 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, the National Climate Change Response Strategy (NCCRS), the Kenya National Adaptation Plan, the Global Framework for Climate Services (GFCS), and Kenya's Vision 2030, as well as the Wajir County Climate Change Fund Act 2016.

Wajir County major infrastructure projects and social and economic initiatives designed to strengthen resilience and development include:

- Rural electrification;
- Development of ICT infrastructure;
- Construction of rural roads;
- Modernization of the meteorological services programme;
- Modernization of the Advertent Weather Modification Programme;
- Major dams construction for water supply;
- Abattoir expansion and modernization; and
- Promotion of climate-smart agriculture and value chain development.

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

- Promotion of drought-tolerant crops;
- Up-scaling of outreach health services;
- Enhancing maintenance and servicing of key community water facilities such as boreholes;
- Enhancing sustainable environmental conservation to forestall environmental degradation;
- Promoting productivity of livestock in the county through provision of artificial insemination, curbing of livestock diseases, provision of water, market information systems, marketing infrastructure and extension services to the herders;
- Enterprise development, cooperative development to improve access to credit; and
- Value addition through creating light industries.

3.0 DATA OBSERVATION AND MONITORING

Because meteorological data is key in CIS development, weather and climate monitoring networks are paramount. It is important for Wajir county meteorological office to establish adequate and serviceable weather and climate monitoring networks in order to deliver effective and relevant CIS to inform decision-making in the county.

3.1 The Existing Observations Network

The earliest weather and climate record dates back to 1917 in Wajir town. Through the years a total of 15 rainfall stations have been installed in Wajir County and five additional rainfall stations need registration. Figure 3.1 shows a list of existing and some proposed stations. The data from these stations can be accessed at KMD headquarters.

The network has been shrinking with time, due to varied reasons ranging from conflict, abandonment, lack of inspection and maintenance and lack of community observers, among others.

To solve these problems, KMD has started automating its observatories by installing automatic weather stations. In Wajir County, the department intends to install at Bute, Habaswein, Wajir, Diff, Khorof Harar, Tarbaj, Eldas, and Arbajahan. Below are some of the intended locations for installation of manual rain gauges.

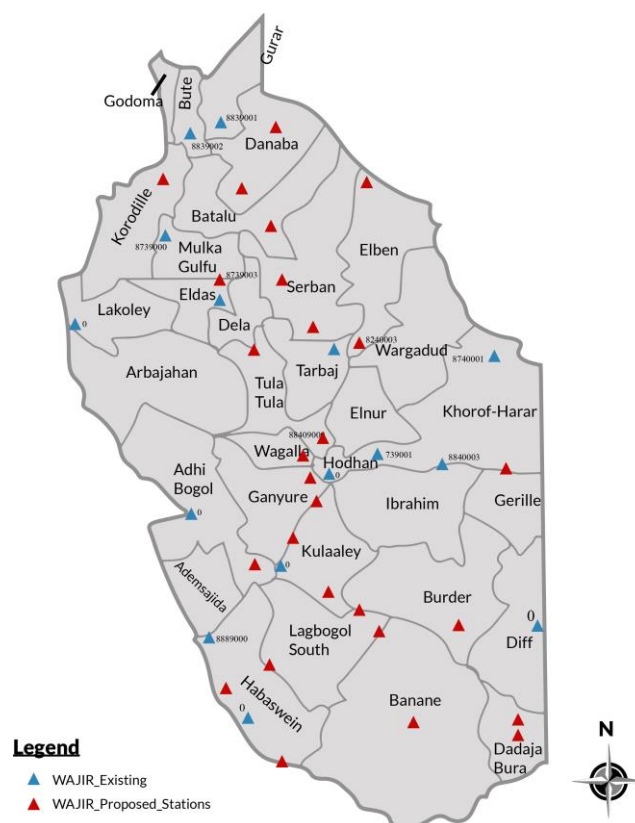


Figure 3.1: Map of Existing and Some Proposed Manual Rain Gauges

3.2 Future Plans for Observations Network

KMD plans to install instruments and the optimised 20 km X 20 km network for Wajir County is as indicated below.

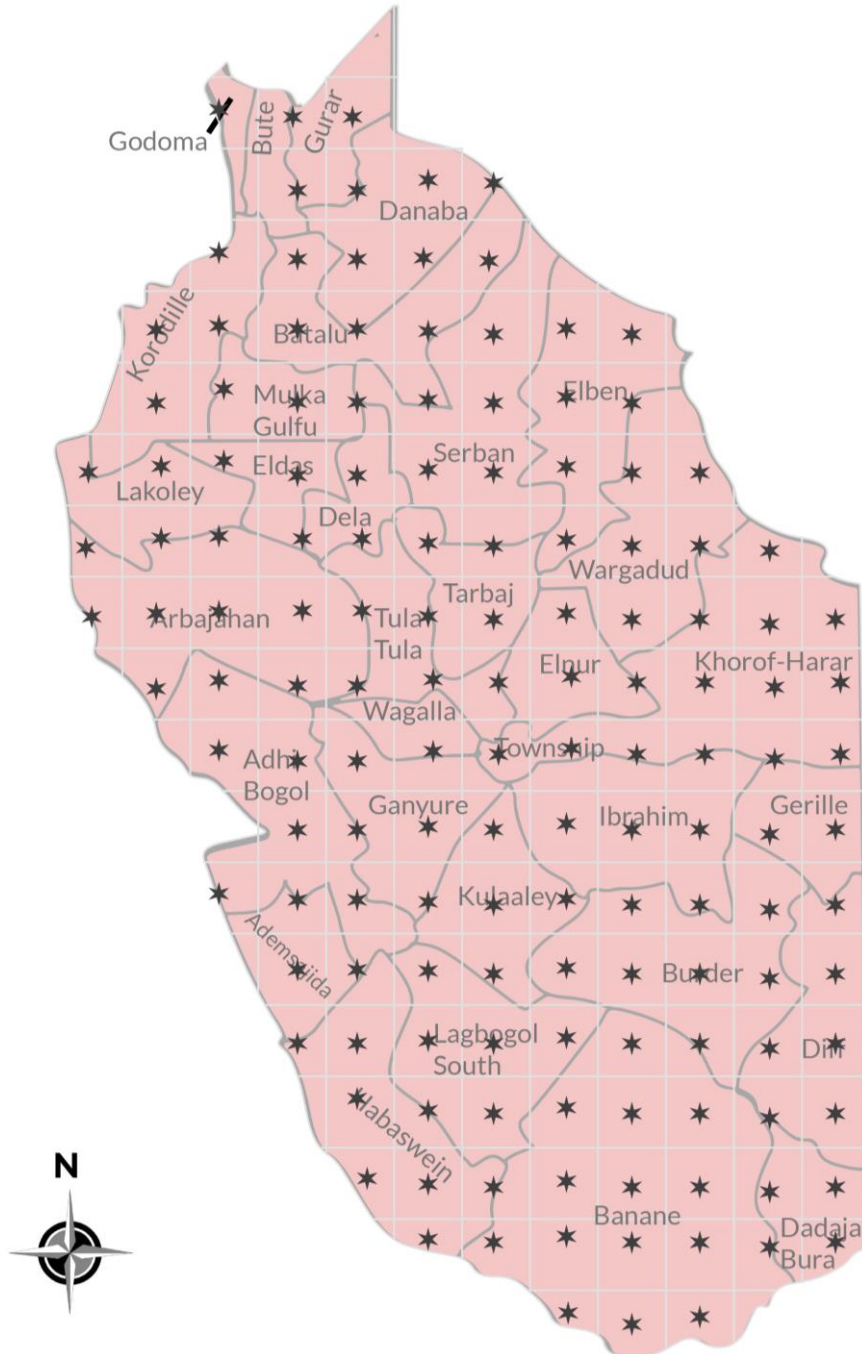


Figure 3.2: Future Proposed Manual Rain Gauges Network

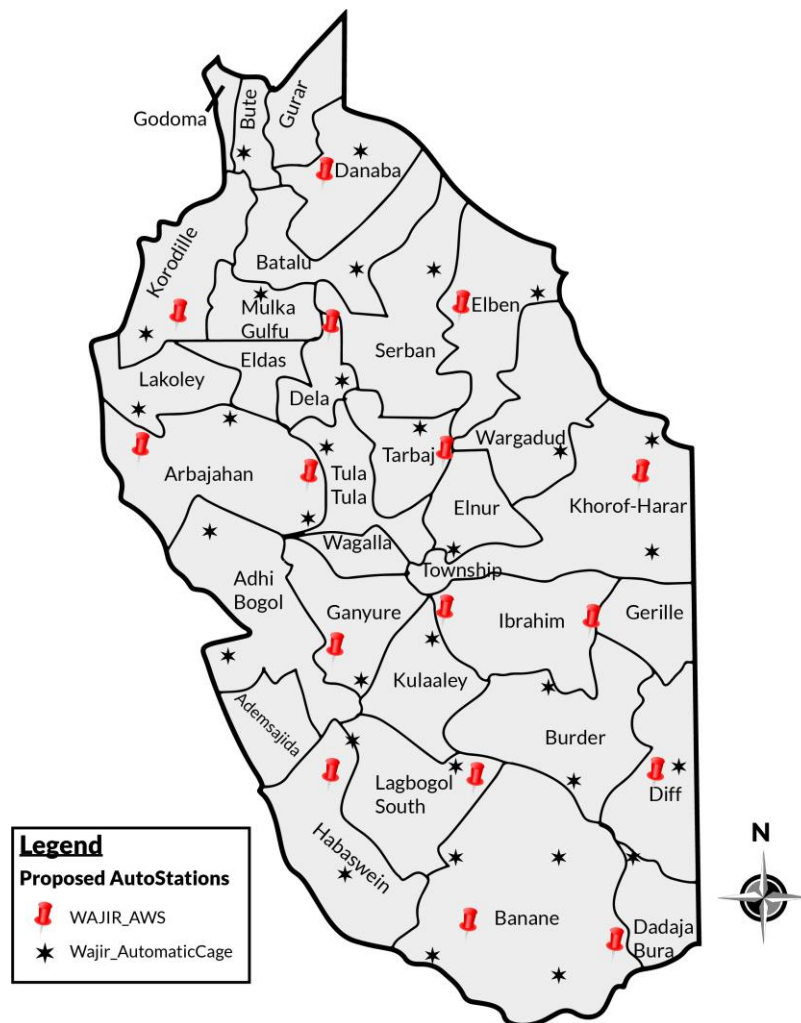


Figure 3.3: Wajir Proposed Automatic (Weather and Rain Gauge) Stations Network

3.3 Maintenance Plan for Observations Network

KMD prescribes to WMO's standards, processes and procedures for meteorological equipment installation and maintenance to ensure data quality. Calibration of meteorological instruments will be performed in order to ensure high-quality data.

3.4 Management of Non-KMD Observations

Kenya Meteorological Department (KMD) recognizes the fact that there are many organizations with observation stations that are unknowingly making erroneous observations, particularly erroneous rainfall observations. Therefore, there is need to assist such organizations to standardize their observations.

KMD will build partnerships with organisations, institutions and individuals for collaboration in weather and climate observations. Such collaboration will be done under the WMO-integrated Global Observing System (WIGOS) framework, to ensure improved quality and availability of data and metadata, improved developing capacity (observation—technical and maintenance), and improved access to data.

3.5 Role of Community Climate Observers

There is no national meteorological service which has adequate weather stations desired for delivery of service. Most of them rely on partners or community climate monitors for rainfall recording due to shortage of KMD staff.

KMD will continue to encourage more local institutions and the community at large to volunteer and manage observation networks in their respective areas. KMD will empower them through trainings and provision of equipment such as rain gauges. In turn, KMD will use the data to improve service delivery.

3.6 Data Discovery and Rescue

A large amount of data—still useful to CIS development—remains in databanks outside KMD. KMD will try to get this data through memoranda of understanding to ensure it is archived in an easily accessible format.

4.0 PROVISION OF CLIMATE INFORMATION SERVICES

The Wajir County Meteorological Office seeks to develop weather and climate information to support decision-making across the principal livelihood groups as well as strategic and sectoral county and national government planning.

4.1 Existing Weather and Climate Products

Development of weather and climate products is done at different levels, including global, regional, national and local scales. At the national level, KMD develops the products at its headquarters in Nairobi. These national-level products are released to County Meteorological Office (CMO) as needed for use at the county level. The CMO has the role of downscaling national-level products to address local needs. Weather and climate products at the Wajir CMO include: probabilistic weather forecasts, ranging from short-term (daily, weekly), medium-term (monthly) and long-term (seasonal and annual); rain onset, cessation and distribution; and climate summaries and normals. The CMO uses historical climate data and local knowledge of climate variability to downscale the national monthly and seasonal forecasts to develop a forecast for Wajir County.

4.2 Development of Weather and Climate Products

Wajir CMO will provide: seasonal, monthly, seven-day, five-day and daily forecasts, as well as summary versions for SMS transmission. The seasonal forecasts will be combined with sectoral expertise to provide livelihood advisories and other weather and climate products, including:

- Warnings of unusual or extreme weather events for transmission via national and county administration, departments and agencies and a full range of intermediary and media channels.
- Weather and climate data, summaries and normals (i.e., rainfall amount and distribution, maximum and minimum temperatures, wind speed and direction, sunshine hours and relative humidity). These products are useful to the specific county and national government agencies, PBOs and the community at large in planning climate-sensitive activities.
- Climate change projections and scenarios. These products are important to support medium- and long-term development planning.

4.3 Approaches to Making Information Locally Relevant

Making climate information relevant is important for the purpose of effective uptake among the society and communities. Relevance may be achieved by identifying local-scale climate variations with features or locally measured climate parameters.

4.3.1 Use of Locally Observed Information and Indigenous Forecasts

Locally measured weather and climate information will be gathered. Weather instruments will be installed in collaboration with local communities who will identify a community climate monitor (ccm).

In the absence of historical conventional records of climate, indigenous knowledge from among the communities will be integrated for the purpose of ensuring the relevance of climate information. These approaches are expected to improve knowledge of the local factors that affect the Wajir County's climate.

Consistent with the principle of building trust through developing two-way channels for communication and co-production of weather and climate knowledge, this initiative proposes to undertake a pilot study, in collaboration with the local community, to identify how local knowledge may support communication of KMD forecasts.

4.3.2 Presentation and Language

Wajir County Meteorological Office will be issuing weather and climate information in English and Kiswahili since they are the official languages of Kenya. However, it is necessary to translate the information into the local language (Somali and/or Borana), to increase understanding and uptake of information among communities. This information will be packaged according to the targeted audience. Interpretation of meteorological terms into local languages in form of a dictionary (English/Somali/Borana) will be done to further improve understanding of climate information. Locally known graphical representation of some phenomena or information will be explored.

4.4 Detailed Description of Products as Required

Reliable daily, weekly, monthly and seasonal information, as well as warnings and alerts on extreme weather events, will be developed to support decision-making at institutional level, by the county government and the community. Information about climate variability, trends and change—which is vital to support major investments in infrastructure, including dams and roads, as well as conservation of the natural environment—will be developed. Wajir CMO will produce posters and post them in their office and other public places for quick reference.

4.4.1 Forecast Products

Weather and climate forecast products are statements of future weather/climate conditions issued for different time scales ranging from hours, days, weeks and months to seasons. They are based on conditions that are known at present and assumptions about the physical processes that determine the future state of weather and climate. Several scales of weather/climate forecast are issued by the KMD and are also available at the Wajir CMO. These are seasonal, monthly, weekly and daily forecasts.

a) The seasonal forecast

The seasonal forecast is a three-month rainfall outlook, usually developed on a regular basis by KMD headquarters in Nairobi. The seasonal climate outlook depicts the amount and distribution of rainfall patterns for two major rainfall seasons in Wajir County (i.e., MAM and OND). The seasonal forecast also has indications of onset and cessation dates of the rain season, and gives the characteristics of the season, such as when the rain season is at its peak. The forecast is issued at least one month ahead of the start of the season. The forecast is issued based on tercile probabilities of occurrence of the normative rainfall. The seasonal forecast will be downscaled to capture local climate features for the purpose of ensuring relevance among the community.

b) Monthly Forecast

The monthly forecast is a climate outlook depicting the amount and distribution of rainfall patterns within the month. The forecast is issued at the end of every month to give an indication of a climate outlook for the coming month. The forecast is a normative indication of the expected rainfall performance of that month. The month is divided into two parts, with the first half a little more detailed and the last half more general. This product updates the seasonal forecast.

c) Weekly Forecast

The weekly forecast depicts the amount and distribution of rainfall patterns within the week. The forecast is issued every Monday to give an indication of weather conditions in the coming week. It is used to update the monthly forecast.

d) Daily Forecast

The daily forecast is an indication of weather conditions expected in the next 24 hours for a particular area. It is used to update the weekly forecast. Upon demand, a five-day forecast is issued on a running basis to give an indication of the next five days, updated daily.

e) Downscaled Forecasts

The CMO will downscale weather/climate forecasts, which involves reducing weather/climate information known on a large scale (regional/national), and will present the same for local scales.

These downscaled products indicate locally relevant variability and details which have an effect at the local level. The CMO has the responsibility to downscale all the nationally generated products to local scale.

Interpolated and gridded historical climate rainfall data retrieved from both KMD and private observatory archives, combined with satellite-based rainfall estimates and local knowledge of climate variability, will be used to downscale the national forecasts to develop a forecast for Wajir County. However, the downscaled weather forecasts for

the county will become more accurate as a result of the placement of new recording equipment in several other parts of the county.

The Wajir CMO will be employing the most current downscaling tools recommended by both KMD and WMO to produce downscaled monthly and seasonal predictions for the county. Both monthly and seasonal forecasts will be issued in discrete and tercile formats.

4.4.2 Early Warning and Alerts

Early warnings and alerts are statements issued by meteorological services on weather and climate hazards. These are issued for purposes of disaster risk reduction to enable prevention of loss of life and destruction of property as well as economic losses and environmental degradation from weather/climate hazards. KMD will follow standard operating procedures (SOPs) in indicating the level of danger from the hazard. The Wajir CMO will maintain a continued link to early warning and alert information from KMD headquarters for the purpose of advising on eminent weather/climate hazards in Wajir County. Specific severe weather and extreme climate events often experienced in Wajir include drought, high wind, dust storms, and flash floods, among others.

4.4.3 Climatological Normals and Trends

Climatological Normals are averages of climatological elements (e.g., temperature, rainfall, wind, sunshine, radiation, cloudiness,) over long-term periods (at least 30-plus years) and are location-specific. Climatological trends are temporal indications of long-term changes of the averages of the climatological elements.

Climatological normals and trends are useful for two major purposes:

- As a benchmark or reference against which climate conditions (especially current or recent conditions) can be assessed, and
- They are widely used (implicitly or explicitly) as an indicator of the conditions likely to be experienced in a given location

The CMO will generate climatological normals and trends for relevant climate elements for specific locations in Wajir County. These normals and trends will be used to inform the development programmes in the county, as stipulated in the CIDP.

4.5 Climate Change Projections

Climate change projections are scenarios of future climate conditions, based on a hierarchy of models ranging from Atmosphere-Ocean General Circulation Models (AOGCMs) and Earth System Models of Intermediate Complexity (EMICs) to Simple Climate Models (SCMs). These models are forced with storyline/pathways of emission concentrations of greenhouse gases and other constituents.

Climate change scenarios offer ways of identifying and examining challenges posed by climate change.

Selecting projections for Wajir County requires careful consideration of the natural resources of the county, and how they are sensitive to climate. Downscaling climate projections increases the spatial resolution of climate information and makes projections more relevant to natural resource managers by allowing decision makers to better visualize what these different scenarios imply to the county.

For Wajir, the CMO will develop downscaled scenario projections for relevant climate elements (mainly rainfall and temperature) at different timespans (decadal, quarter-century, half-century, century) to support medium and long-term visionary planning (e.g., CIDP, County Visions).

Table 4.1 below shows a range of products that will be generated for sectoral experts to support planning.

Table 4.1: Sectoral Products Channels

Products	Product Description	Communication Channels	Lead Organisation(s)
Unusual and extreme weather events	For example, very heavy rain likely to cause flash flood, mudslides, strong winds	All channels including county government administration, churches, police, schools, local alarm systems, SMS to CIS intermediaries, community, local and regional radio, social media	KMD 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	KMD to NDMA KMD to principal regional, local and community radio stations KMD to CIS intermediaries
Weekly	Forecast for next seven 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 KMD website	KMD to regional, local and community radios and CIS intermediaries on Saturday or Sunday

Products	Product Description	Communication Channels	Lead Organisation(s)
Monthly	<ul style="list-style-type: none"> Forecast for the next month on rainfall location and intensity, temperature, extreme weather events Potentially include local knowledge 	Radio and SMS, email and KMD website	KMD to regional, local and community radios and CIS intermediaries included in NDMA monthly bulletins
Seasonal	<ul style="list-style-type: none"> Onset, quality, distribution, cessation of rains, extended dry spells Livelihood advisories developed with ASDSP and Ministries of Agriculture and Livestock Potentially include local knowledge 	Participatory Scenario Planning (PSP) Workshop, KMD website and via email, <i>barazas</i> and discussions led by CIS intermediaries, phone-in radio shows, summary by SMS	<ul style="list-style-type: none"> KMD in collaboration with ASDSP and all key ministries and partners CIS intermediaries within ongoing activities KMD with technical experts from county ministries/research institutes KMD to CIS intermediaries
Climatological Normals and Trends	<ul style="list-style-type: none"> Climatological normals are averages of climatological elements (temperature, rainfall, wind, sunshine, radiation, cloudiness,) over specified long-term periods (30-plus years) and location Climatological trends are temporal indications of long-term changes of the averages of the climatological elements 	Policy document	County government planning offices
Climate Change Projections	<ul style="list-style-type: none"> Emission pathways projections scenarios Downscaled scenarios 	Policy document	Planning offices

5.0 COMMUNICATION AND DISSEMINATION OF CLIMATE INFORMATION SERVICES

Because climate information is an important factor in decision-making and needs to be communicated efficiently and effectively, this plan presents a communication strategy for sharing climate information and knowledge in the county. This strategy recognizes there are different levels of users who may require different communication platforms, in addition to emphasizing the two-way (feedback/feed-forward) communication approach. Several channels and platforms have been identified for use in this strategy. Electronic media, print media, ICT, intermediaries, county climate outlook fora/workshops (CCOF), (previously referred-to Participatory Scenario Planning workshops (PSPs)), concerts, dances, songs and *barazas*. In this strategy, efforts will be made to develop a weather/climate dictionary in the local languages for easy understanding of climate information among communities. Efforts will be made to improve capacity of communities to uptake CIS as opportunities arise.

5.1 Electronic Media

Kenyans listen to radio and watch TVs most of the time. Local FM radio stations have been identified among the local communities as having the widest reach (Powell, 2013). This is especially important for short- and medium-term forecasts. The communication strategy in the WCCISP will greatly depend on the use of traditional electronic media (e.g., radio, TV). Electronic media is best suited for summary CIS statements, which are intended to give guidance on general decision-making.

5.2 Print Media

Print media is comprised of newspapers, fliers, brochures, bulletins and magazines. This media has an advantage over all others because it does not limit the quantity of content to be communicated. This makes it better for communicating short- and medium-term CIS and advisories for decision-making. However, it can only be useful in highly literate societies.

5.3 Information and Communication Technology (ICT) Platforms

In the recent times, information and communication technology (ICT) platforms have become a prominent and important tool for development in Kenya. In this strategy, ICT includes communication through cellular phones, internet, email, websites, satellite systems and video conferencing, among others. In this WCCISP, ICT will be used to share climate information with both communities and governments in Wajir County. The channel will focus on youth who form the majority of the population and also have affinity for ICT. Email, internet (websites) and video conferencing will be used for official communication at county and sub-county levels. These platforms have the capacity to carry detailed analyses of climate information and are also favoured for their easy access and low cost.

Cellular phones have become prominent among communities in the recent days. They are widely accepted and used as a way of effectively communicating, often facilitating development at grass-root levels. Cellular phones have features that enable mass communication of climate information on different platforms, from bulk SMS to social media. These platforms will be used to communicate the following types of products:

- Highlights of the seasonal forecast;
- Monthly and weekly updates;
- Daily updates and forecast,
- Alerts and warnings of hazardous weather.

5.4 CIS Intermediaries

This communication strategy envisages collaboration with community opinion leaders for the purposes of disseminating climate information widely. KMD will identify from among the communities' intermediaries, who are persons prepared to receive weather and climate information and share it through their existing networks and partners. The process of identifying the intermediaries in Wajir County will take into account the distribution of the population, in order to have equitable representation of climate information among all communities. This approach can increase the likelihood that relevant, local-scale climate information reaches all type of users, even the most vulnerable.

5.5 County Climate Outlook Fora/Workshops (CCOF)

The use of expert information among the communities requires continued consultation and collaboration among diverse stakeholders representing all users of this information. This collaboration will be attained by creation of county climate outlook fora. The Wajir CMO will work with other government departments and key stakeholders to ensure effective representation. This forum will be used to discuss downscaling seasonal forecasts, related local impacts and the development of advisories to address those impacts. This forum will provide the opportunity for two-way learning (feedback/feed-forward) among users and providers of probabilistic climate information.

5.6 Improving Community Capacity

Effectively using CIS requires supporting a wide range of stakeholders in accessing, understanding and appropriately applying climate information within specific decision-making processes across timescales. Towards this objective, the Wajir CMO will organise awareness and sensitisation programmes for communities.

6.0 PLANNING AND BUDGETING

The operationalization of this CISP requires a financial plan to enable management of financial resources necessary for its effective implementation. Creating a budget is the most effective way to ensure availability of financial resources. This section outlines the financial planning and budgeting for Wajir CISP and explains how Kenya Meteorological Department envisages the implementation of the same. It suggests action points, which would ensure availability of finances more effectively and ensure that the CISP is practical.

Establishing a meteorological service is expensive because it involves procurement of many items not readily available locally. Even when these are available, they are still imported from abroad and are therefore expensive.

An effective CIS requires the following items:

- a. Meteorological infrastructure (observation, communication, data processing and product development, dissemination, office space, maintenance, etc.)
- b. Human resources (technical staff, capacity building)
- c. Research and development
- d. Office establishment (furniture, transport, mobility)

The estimated cost of meteorological infrastructure for Wajir County is given in the Table 6.1

Table 6.1: Thematic Budget

Thematic Area	WAJIR Financial Year (Ksh. In millions)					Total (Ksh. In millions)
	2017/18	2018/19	2019/20	2020/21	2021/22	
Establishing county-level weather and climate services infrastructure	14.4	16.4	16.3	76.01	41.33	164.44
Data collection and exchange infrastructure	4.01	0.26	0.36	0.76	0.26	5.65
Processing, product development and archival infrastructure	2.0	0.00	0.00	0.00	0.00	2.00
Uptake of product and services infrastructure	4.52	0.02	0.03	0.03	28.77	33.34
Total	24.93	16.68	16.69	76.8	70.33	205.43

Table 6.2: County Meteorological Office Staff

Human resource management and development	Human Resources to Implement County Climate Service Plan:	Quantity
	County Director for Meteorological Service	1
	Deputy County Director for Meteorological Service	1
	Office Assistant – (secretary)	1
	Clerical Officer	1
	Drivers	2
	Meteorologists	3
	Meteorological Technologist	8
	RANET FM Radio Station Staffs	18
	Community Climate Observers (5 per ward X 30 wards in Wajir)	150

Table 6.3 CMO Staff Gaps

Position	Optimum	In-position	Gap	Remarks
County Director for Meteorological Service	1	1	0	Filling these gaps is beyond the scope of the CMO and delay in undertaking the exercise can affect succession management and quality of service.
Deputy County Director for Meteorological Service	1	0	1	
Office Assistant (secretary)	1	0	1	
Clerical Officer	1	0	1	
Drivers -2	2	0	2	
Meteorologists	3	0	3	
Meteorological Technologist	8	0	8	
RANET FM Radio Station Staff	18			Serious consultation needed to transfer the function to county government
Community Climate Observers (5 per ward X 30 wards)	150	15	135	Allowance 500/= per month Airtime and MPesa transaction fee 250 as incentives to cco.

7.0 MONITORING, EVALUATION AND CONTINUOUS IMPROVEMENT

7.1 Monitoring and Evaluation Approach

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

This plan proposes that the CMO provide an annual report reviewing progress in implementing the WCCISP to KMD Head Office, as well as all County Ministries and decentralized national authorities, and that this report be taken to an existing county forum for discussion across key ministries and WCCISP stakeholders.

Those partnering in the development of the WCCISP will develop a baseline of current access to and relevance and use of existing CIS. This will serve as a basis from which to track progress toward strengthening CIS provision and supporting the development of a CIS communication plan which utilises 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 evaluating CIS provision is still under review, it will include coverage of the indicators, and consider progress in supporting climate-related decision-making at local, sub-county and county levels across immediate, seasonal and longer-term time frames.

Annexes

Annex 1: Wajir County CIS Plan Budget

WAJIR IMPLEMENTATION MATRIX:											
Strategic Objective 1:		Strengthen Wajir meteorological infrastructure (e.g., observation; data collection and exchange; processing, archival and product development; product dissemination) and capability to avail quality county and community-level weather and climate services									
Strategy	Activity	Output	Indicator	Target for five years	Time frame					Budget (Ksh. M)	Responsibility
					Yr1	Yr2	Yr3	Yr4	Yr5		
Establish county level weather and climate services infrastructure	<ul style="list-style-type: none"> Acquire and construct observatories at Habaswein and Bute. Acquire and install instruments 	Operational met station	No. of synoptic stations	2	0	0	0	1	1	40	Director & CDM
										0.00	Director & CDM
	Acquire and install AWS, at least 2 per sub-county	Weather data	No. of AWS	12	2	2	2	3	3	60.0	Director & CDM
	Acquire and install automatic rain gauges, at least 2 per ward	Rainfall data	No. of automatic rain gauges	60	6	12	12	18	12	18.00	CDM
	Acquire and install manual rain gauges, at least 5 per ward	Rainfall data	No. of manual rain gauges	150	20	30	30	40	30	5.25	CDM
	Acquire and install weather radars	Weather data	No. of weather radar receiver	1	0	0	0	0	1	1.00	Director & CDM

	receiver		terminals								
	Instrument inspections and calibration cost	Calibrated instruments	No. of instruments calibrated	222	28	72	116	177	222	10.00	CDM
			No. of inspection trips	20	4	4	4	4	4		
	Acquire and install satellite ground receivers	Satellite data received	No. of satellite ground receiving stations	1	0	0	0	1	0	34.26	Director & CDM
	Acquire and install database management system at the base station	Data processed and archived	No. of database management systems	1	1	0	0	0	0	1.00	Director & CDM
Data collection and exchange infrastructure	Acquire mobile data collection tools (mobile phones)	Data from community observers collected	No. of data collection tools	100	20	20	20	20	20	1.30	Director & CDM
	Communication software (frontline SMS, etc.)	Communication between mobile data collectors & county AMSS enabled	No. of software	1	1	0	0	0	0	1.00	Director & CDM
	Acquire data collection workstation (for a data exchange) to	Data from community observers received	No. of data collection workstations	1	1	0	0	0	0	1.0	Director & CDM

	collect and disseminate rainfall data from CCMs											
	Acquire high-speed internet connection for county offices	Access to data at national, regional and international centres	No. of high-speed internet connection	1	1	0	0	0	0	0.75	Director & CDM	
	Information telecommunication exchange system	Forward and feedback data between HQ and counties	No. of information telecommunication exchange systems	1	1	0	0	0	0	0.10	Director & CDM	
	Acquire video/Skype teleconferencing facilities for county offices	Enable simultaneous weather forecast conferencing and update from all regions of Kenya	No. of video teleconferencing facilities	1	0	0	1	0	0	0.10	Director & CDM	
	Acquire rapid-response telecom for county offices (hotlines)	Rapid response to warning of rapidly moving hazards (floods, etc.) before they cause harm	No. of hotlines	1	0	0	0	1	0	0.05	Director & CDM	

Processing, product development and archival infrastructure	Acquire forecast interpretation tools (software)	Downscale global, regional and national scale forecasts to county and community scale	No. of forecast interpretation tools	5	5	0	0	0	0	1.00	Director & CDM
	Acquire Forecaster Work Station to link with NMC Forecaster work station	Improved capacity for rapid development of county- and community-scale climate information	No. of Forecaster Work Station	1	1	0	0	0	0	1.00	Director & CDM
	Acquire Licensed Geographical Information Systems (GIS) software	Precision of positioning of county and community level information	No. of Geographical Information Systems (GIS)	1	0	0	0	0	0	0.01	Director & CDM
uptake of product and services infrastructure	Develop web pages hosted on KMS website	Enable online uptake of county-level information	No. of web pages	1	1	0	0	0	0	0.01	Director & CDM
	Develop information education communication materials	Awareness creation	No. IEC materials	10	1	2	3	3	1	0.10	Director & CDM

Maintenance cost for FM radio transmission stations	Disseminate widely sector/ livelihood information	No. of radios	1	0	0	0	0	0	1	25.00	CDM
Public display systems at Wajir town	Reach public with climate information	No. of public display systems	1	1	0	0	0	0	0	4.00	CDM
Exhibition display systems (LCD Beamer)	Effective outreach and demonstration of potentials in climate information (conference, video teleconference, boardrooms, etc.)	No. of exhibition display systems (LCD Beamer)	1	1	0	0	0	0	0	0.50	CDM
Total Budget in (Kshs. Millions)										<u>205.43</u>	

Annex 2: Levels of Decision-making

Level of decision-making	Principal planning and sectoral bodies and frameworks which WCCISP seeks to support
County-level	County Integrated Development Plan (Governor’s Office) County Steering Group (CSG) on Drought Emergency Ministry of Environment, Energy and Natural Resources Ministry of Agriculture, Water and Irrigation County Climate Adaptation Committee (CAPC) Executive Finance Committee and Budget and Economic Forum County’s Disaster Management Committee County Environment Committee
Ward-level	Ward Adaptation Committees (WAPCs) Council of elders WRUA

Annex 3: Automatic Weather Stations Inventory

No.	Name	Lat. (°N)	Long. (°E)	Status	Recommendation
1	Wajir Town	1.75	40.06	Not operational	Maintenance

Annex 4: Communication Plan

Time Frame	Forecast Content	Communication Channels	Lead Organization(s)
Unusual and extreme weather events	Heavy rain likely to cause flash flood, strong winds	All channels including via national/county governments administration, PBOs, mosques, churches, police, schools, local alarm systems, SMS to CIS intermediaries, via community, local and regional radio, social media and CAP	KMD direct to county/national governments, County Disaster Response committee, Red Cross, 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	KMD to NDMA, KMD to principal regional, local and community radio stations, KMD to CIS intermediaries
Five-day forecast	Forecast for next 5 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 KMD website	KMD 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 KMD website	KMD 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, KMD website and via email, <i>barazas</i> and discussions led by CIS intermediaries, phone-in radio shows, summary by SMS	KMD in collaboration with NDMA and all key ministries and partners, CIS intermediaries within ongoing activities, KMD with technical experts from county departments/research institutes, KMD 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 KMD website, via school environmental and weather clubs	KMD engagement within CIDP, County Steering Group on Drought Emergency, County and Ward Climate Adaptation Committees, County Ministries sectoral and financial planning and strategies, KMD with Ministry of Education to engage with school clubs

Annex5: Observations Inventory

No.	ID	Name	Begin Date	Lat. (°N)	Long. (°E)	Alt. (m) (AMSL)	Sub-County	Status	Remark
1	8639001	Gurar Police Post	1959	3.36	39.6	912	Wajir North	Operational	Replace, recruit and train observers, as some parts are missing
2	8739001	Griftu Police Post	1967	2.01	39.8	290	Wajir West	Operational	Train more observers
3	8739002	Ajao Primary School	1973	2.95	39.7	762	Wajir North	Not operational	To be revived, needs replacement, will recruit and train observers
4	8739003	Eldas Chief's Camp	1973	2.5	39.6	427	Eldas	Operational	Need relocation within the compound
5	8639004	Godoma Chief's Camp	1973	3.5	39.3	912	Wajir North	Not operational	To revive, replace, recruit and train more observers
6	8639002	Bute Chief's Camp	1973	3.41	39.5	1064	Wajir North	Operational	Need replace missing parts
7	8740001	Khorof Harar Police Post	1959	2.25	40.8	305	Wajir East	Operational	Train more observers
8	8740002	Tarbaj Chief's Camp	1973	2.21	40.8	381	Tarbaj	Not operational	To revive, replace, recruit and train more observers
9	8839000	Habaswein Police Post	1951	1.01	39.5	198	Wajir South	Operational	Recruit and train more observers
10	8839002	Wagalla Chief's Camp	1973	1.78	39.9	244	Wajir East	Not operational	To replace, recruit and train more observers
11	8840003	Wajir-bor Primary School	1973	1.73	40.5	207	Wajir East	Operational	Recruit and train more observers

12	8739000	Buna Police Post	1959	2.8	39.0	610	Wajir North	Not operational	To be shifted to another place, replace missing instruments, recruit and train observers
13	8840001	Guaaley Primary School	1973	1.6	40.1	229	Wajir East	Abandoned	To revive, recruit and train observers
14	8840000	Wajir Met. Station	1917	1.75	40.1	244	Wajir East	Abandoned	To revive, train and recruit observers
15	8840002	Leheley Primary School	1973	1.61	40.0	229	Wajir South	Abandoned	To revive, replace, recruit and train observers
16		Wajir Airport	2012	1.73	40.09	238	Wajir East	Operational	Retrain observers
17		Diff Police Station		0.99	40.97	111	Wajir south	Not operational	Revive, replace the instrument, recruit, train the observers and register the station
18		Sabuli AP Camp		0.35	40.1	161	Wajir south	Operational	Train the observers and register
19		Abakore Police Station		0.63	39.71	184	Wajir south	Not operational	Replace the rain gauge,, train the observers and register
20		Lagboghhol AP Camp		1.29	39.84	218	Wajir south	Operational	Train the observers and register
21		Hadado Police Station		1.526	39.4	263	Wajir west	Operational	Relocate and train the observers and register
22		Arbajahan AP Camp		2.06	39.02	343	Wajir west	Not operational	Replace, train observers and register

Annex6: Wajir M & E Log Frame for CIS Plan

RESULT	INDICATORS	HOW WILL THIS BE MEASURED	TIME FRAME	RESPONSIBILITY	BUDGET To be determined.
IMPACT					
What will show the increased use of weather and climate information and mainstreaming into development and sector policies, plans and programmes that support sustainable development in the Wajir County?	% of the households with improved resilience through use of CIS	Qualitative and quantitative assessments	Every 5 years	CG, development partners and other stakeholders— business community or private sector	
	No. of policies, plans and decisions at the county level informed by CIS	Review of county policies, plans and decisions	Every 5 years	CG, development partners and other stakeholders	
OUTCOME					
What is a good measure of increased use of reliable and accessible weather and CIS in Wajir County?	No. of projects or initiatives for development with CIS mainstreamed	Review of county-related interventions	Annually	CG and KMD	
	No. of households and institutions using CIS for planning and decision-making	Assessments	Annually	CG and KMD	

OUTPUT 1					
How do we know there is an accommodating environment for the generation, uptake and use of weather and climate services to support development?	No. of appropriate policies that support CIS at county level	Review of county-related policies	Annually	CG, development partners and other stakeholders	
	No. of functional met infrastructure in Wajir County supported by partners	Field reports from partners	Annually	KMD, CG and other development partners	
	No. of PSP meetings held	PSP reports and advisories	Seasonal	KMD, CG, media and other development partners	
	No. of functional and modern weather stations established	Inventory of weather stations	Annual	KMD	
OUTPUT 2					
What are some of the interdisciplinary activities that a) support the generation, uptake and use of weather and climate services and b) build sustained leadership in climate information services	No. of collaborative initiatives at the county and grassroots	County M&E visits	Quarterly	KMD, CG and other development partners	
	No. of participatory methodologies and approaches for CIS generation, uptake and dissemination	Workshop reports, Minutes	Annually	KMD, CG and partners	
	No. of CIS champions (exemplary learning points) in the county	Training reports	Annually	KMD, CG and partners	

in Wajir County?					
OUTPUT 3					
How do we measure improvement in data collection, processing and dissemination for climate information and services in Wajir County?	No. of functional and equitably distributed observatories that are remitting information on a regular basis	Met infrastructure inventory, Field M&E visits	Annually	KMD, CG and partners	
	No. of data-processing points, communication mechanisms and skill at the county level	Appropriate equipment, Capacity of personnel	Annually	KMD, CG and partners	
OUTPUT 4					
How do we measure strengthened county networks and partnership support for improved generation, uptake and use of climate information?	No. of participatory processes for CIS	Review	Annually	KMD, CG and partners	
	No. of established CIS linkages at different levels—community, ward, county, national	Review	Annually	KMD, CG and partners	
	No. of partners supporting dissemination of CIS	Review	Annually	KMD, CG and partners	
OUTPUT 5					
How do we measure improved access to weather and climate information at county, sub-county, ward and	No. of households, organizations, government departments using CIS for planning and decision-making	Surveys	Annually	KMD, CG and partners	
	No. of stakeholders providing feedback on CIS	M&E visits, Reviews	Annually	KMD, CG and partners	

communities in Wajir County?					
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OUTPUT 6

What evidence would suggest that there has been learning from effective use of CIS in Wajir County?	% increase in demand and use of CIS among communities, county government and other development partners for climate-resilient investments	Reviews	Annually	KMD, CG and partners	
	No. of learning sessions to reflect and document the progress of CIS implementation	Reviews	Annually	KMD, CG and partners	

