NAROK COUNTY FLOOD EARLY WARNING COMMUNICATION STRATEGY
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Foreword

The increased frequency of flood occurrence call for development of an effective and reliable flood early warning communication systems in Narok County. As a county, we all need to appreciate the enormity of the flood impacts, the urgency of the threats that confront us and the need for rapid and comprehensive communication strategy to help arrest and reverse the situation. If we do not act in earnest and with steadfastness, our livelihood as a county is bound to fall into an abyss from the precipice on which it now hangs. This will be essential towards attaining the Narok County CIDP and the national Vision 2030.

The need to take action to reverse the current negative flood trends and establish a situation where present and future generations will have a better livelihood they need to sustain their well-being, live in peace and enjoy good health is now. Therefore, this strategy is premised on the hope that all stakeholders – and that includes everyone who resides in Narok County – will, based on the new understanding, take the necessary measures – at both individual and community level – to take early actions as well as work toward mitigating floods.

Going forward the Narok County government will come up with effective flood early actions as opposed to reactive actions during flood events. Therefore, in collaboration with other key stakeholders, Narok County government will ensure that the strategy is effectively implemented and this will focuses on the following:

- Improving knowledge on floods risk and impacts in Narok County
- Simplifying the language for early warning messages to be responsive to stakeholders’ needs
- Linking flood early warning messages to potential impacts
- Improving the communication of timely flood early warning messages
- Promoting the use of effective and reliable channels of communications
- Informing early actions on flood impact mitigation, preparedness and response
Acronyms and Abbreviations

CIDP  County Integrated Development Plan
DRR  Disaster Risk Reduction
ICHA  International Center for Humanitarian Affairs
KFS  Kenya Forest Service
KII  Key Informant Interviews
KMD  Kenya Meteorological Department
KRCS  Kenya Red Cross Society
KWS  Kenya Wildlife Service
MAM  March-April-May
NEMA  National Environment Management Authority
OND  October-November-December
RCAT  Red Cross Action Team
SDGs  Sustainable Development Goals
WRA  Water Resources Authority
WRUA  Water Resources Users Association
Acknowledgements

The development of the Flood Early Warning Communication Strategy has benefited from the support from World Bank through the Kenya Accountable Devolution project. Also, we acknowledge the contribution from Narok County Government officials from various ministries, other relevant stakeholders, KRCS Narok County Coordinator (Mr Benedicto Omondi) and County Director of Meteorological Services (Mr. Peter Runanu). More appreciation to Nancy Laboso for her contribution during the stakeholders’ workshops. In addition, we acknowledge the hard work from International Center for Humanitarian Affairs (ICHA) staffs – Kenya Red Cross Society.
Executive Summary

A fundamental precondition for flood disaster risk reduction at the county level is the availability of well-functioning early warning communication systems that deliver accurate, reliable and understandable warnings, in a timely manner, to authorities, operational disaster managers and populations at risk, to enable early actions to reduce the impacts of potential disasters. Such systems must rely on commitment, collaboration, coordination, and information sharing among different stakeholders, at different levels (international, regional, national, local). However, the ability to establish a well-functioning flood early warning system, there is need for the developments of proper early warning communication that will ensure that timely early warning information reach out to relevant authorities, stakeholders and communities at risk.

This Communication Strategy will offer the broad framework that guides communication on the flood early warning information and identifies the issues that need to be addressed to build understanding and generate support for the effective communication. The issues were discussed by stakeholders and led to development of tree problem on early warning communication. Therefore, the establishment of this flood early warning communication strategy for Narok County is to improve the dissemination of timely early warning messages to communities at risk and also to promote the use of effective and reliable channels of communications.
1.0 Introduction
1.1 Background and Context

A disaster is a serious disruption of the functioning of a community or society causing widespread human, material, economic or environmental loses which exceed the ability of the affected community/society to cope using its own resources. Natural disasters disrupt the lives of people through deaths, injuries, displacements and destruction of property and livelihoods. Consequently, disasters take back years of development thus posing a major challenge toward the achievement of Sustainable Development Goals (SDGs)\(^1\). The magnitude of a disaster is dependent on the characteristics, the intensity and probability of the hazard and the vulnerability of exposed elements based on the predominant physical, environment and social conditions.

Flood is one of the major disasters that is experienced in various parts of the Kenya during the rainy seasons. The flood impacts include deaths, destruction of properties, and displacement of people and also loss of livelihood. Other disasters being experienced in Kenya include droughts, fire, terrorism, technological accidents, diseases and epidemics and these leads to disruption of people’s livelihoods, destruction of the infrastructure, diversion of planned use of resources, interruption of economic activities and retarded development. However, it is important to note that in Kenya, flood causes major impacts e.g. economic losses as compared to other disasters as showed in the figure 1.

\[\text{Figure 1: Nationally reported economic losses from 1990-2014}\]

In line with the devolve services, there is need to improve the county disaster management services to the communities through developing a real-time early warning communication system for flood which one of the major disaster encountered in the county. However, it is important to note that

\(^1\) Kenya Natural Disaster Profile
https://meteorology.uonbi.ac.ke/sites/default/files/cbps/sps/meteorology/Project%20on%20Disasters.pdf
Narok County government has carried out a SWOT analysis on disaster management focusing on its strength, weaknesses, opportunities and threats (shown in table 1) and therefore, there is need to focus on the strengths and opportunities so as to develop an effective flood early warning communication system.

Table 1: SWOT Analysis for Disaster Management in Narok County

<table>
<thead>
<tr>
<th>Strength</th>
<th>Weaknesses</th>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existence of early warning system on disasters; Presence of Drought Management Officers</td>
<td>Weak/Few institutional structure in the county</td>
<td>Implementing the new national policy on DRR</td>
<td>Irregular occurrence of disasters</td>
</tr>
<tr>
<td>Knowledge on risk prone areas; Indigenous knowledge on disaster trends;</td>
<td>Lack of effective disaster preparedness</td>
<td>Opportunity for donor funding and county government funding;</td>
<td>Cross-border conflicts</td>
</tr>
<tr>
<td>Improved literacy levels;</td>
<td>Lack of DRR policy at the county level</td>
<td>Future budgetary allocation for DRR advocacy at county levels;</td>
<td>Changing weather patterns</td>
</tr>
<tr>
<td>Availability of radio stations in local dialects for information dissemination;</td>
<td>Inadequate and non-harmonized disaster data</td>
<td>Use of technology to report and record trends of potential disaster phenomenon</td>
<td>Lack of political goodwill</td>
</tr>
<tr>
<td>Presence of strong institutions KFS, NEMA, KWS.</td>
<td>Existence of cartels that propagate illegal harvesting of trees.</td>
<td>Use of modern farming techniques and technology e.g. drip irrigation; Putting more land under irrigation; Support from National government</td>
<td>Climate Change</td>
</tr>
<tr>
<td></td>
<td>Resistance from stakeholders</td>
<td></td>
<td>Rapid Population growth exerting pressure on scarce land resources.</td>
</tr>
</tbody>
</table>

Narok County is one of the counties in Kenya that is being affected by the flood. The impacts of floods causes disruption of the functioning of the society, loss of properties and lives and also environmental losses. According to the Narok County Integrated Development Plan (CIDP) 2013-2017 report, there has been an increased frequency in the occurrence of floods\(^2\). Major flood impacts in the county are experienced during the two rainy seasons March-April-May (MAM) and October-November-December (OND). Currently, flash floods are being encountered every rainy season.

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\(^2\) Narok County Integrated Development Plan 2013-2017
season as compared to the past when flood frequency was once every 5 years\(^3\). The frequency of flash flooding in the Narok town has increased and this has affected the normal operations or activities in the area such loss of properties and livelihood. Other flood hot spot zones in Narok County include; Nkoitoi, Talek, Ololulung’a, Lesuswa, Mai Mahiu and Suswa. Over the past one decade, major flood impacts in Narok County have been recorded based on their location of occurrence as shown in table 2.

**Table 2: Historical flood impacts in Narok County during MAM and OND rainfall seasons**

<table>
<thead>
<tr>
<th>Flood event date</th>
<th>Season</th>
<th>Location on Narok where flood occurred</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/1/2010</td>
<td>MAM</td>
<td>Oloipito</td>
<td>• 75 houses destroyed</td>
</tr>
<tr>
<td>7/4/2010</td>
<td>MAM</td>
<td>Olasit Trading Center - Suswa Bridge</td>
<td>• 5 deaths reported</td>
</tr>
</tbody>
</table>
| 1/4/2010         | MAM    | Oloipito                               | • 4 deaths experienced  
|                  |        |                                        | • 60 household displaced.  
|                  |        |                                        | • 75 households affected directly |
| 5/5/2013         | MAM    | Sintakara                              | • 2 death occurred     |
| 5/7/2013         | MAM    | Kikuyani village                      | • 23 deaths reported   |
| 2/4/2013         | MAM    | Doroboni River                         | • 4 deaths recorded and 2 injuries reported |
| 4/13/2013        | MAM    | Ololung’a                              | • 10 deaths reported  
|                  |        |                                        | • 2 injuries reported   |
| 4/29/2015        | MAM    | Ngare Narok River                     | • 3 deaths 1 house destroyed |
| 4/19/2016        | MAM    | Nasira Village Narok                  | • 11 people injured   |
| 3/13/2018        | MAM    | Governor Secondary School Near Mai-Mahiu | • 2 people injured and 2 missing |
| 3/13/2018        | MAM    | Mai Mahiu                              | • 2 people injured  
|                  |        |                                        | • 1 person missing     
|                  |        |                                        | • 2 households evacuated |
| 3/18/2018        | MAM    | Nkoitoi                                | • 4 deaths reported   |
| 12/28/2009       | OND    | Suswa                                  | • 3 deaths reported   |
| 5/12/2013        | OND    | Ndoroboni area                         | • 10 deaths reported  
|                  |        |                                        | • Massive losses for farmers due to crop damage in farm |
| 11/26/2014       | OND    | Oloipito                               | • 15 deaths and 8 injuries reported  
|                  |        |                                        | • Properties worth more 100 million destroyed  |
| 11/5/2015        | OND    | Talek                                  | • 15 deaths and several injuries reported  |

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\(^3\) Narok County Integrated Development Plan 2018-2023
11/15/2015
OND
Talek
• 3 deaths reported
• 316 cattle lost

11/19/2015
OND
Lesuswa
• 1 death reported
• 2 injuries reported

12/17/2015
OND
Ololunga and Mau Areas
• 1 death and 2 injuries reported

1.2 The Rationale of Communication Strategy
Communication is required to build understanding and support for improvements on disaster risk management because resistance to improvement is expensive. When there is resistance, reforms take much longer to implement or they may not proceed as planned. In the worst scenario they may not succeed at all. Communication in a reform period has to be strategic, intensive and consultative in nature to build understanding and minimize resistance, as technical solutions alone cannot build the consensus that is required for reforms to succeed.

Discussions from the stakeholder’s inception workshop and capacity building workshops show that there are some challenges contributing to lack of effective flood early warning communication system in Narok County. The challenges were key reasons for developing the strategy in order to fill the existing gaps on early warning communication in Narok County. The challenges include;

- Information from Kenya Meteorological Department do not get to the common people
- Language barrier
- Insecurity especially in land issues and people are reluctant to evacuate
- Lack of proper communication channels and poor action plan in terms of who receives the flood early warning information first
- Reliability of information released by the Kenya Meteorological Department
- Lack of resources or poor mobilization of funds
- Priority i.e. which disaster should come first
- Lack of effective disaster contingency plan

The situation analysis results based on stakeholders’ feedback shows that there lack of an effective existing flood early warning communication system in Narok County. This clearly indicate the need for the stakeholders to understand the importance of effective flood early warning communication system. The Communication Strategy addresses people’s concerns, perceptions and motivations. It suggests ways to communicate the reform vision and agenda, and sustain this throughout the reform process.

Lastly, it should be taken into consideration that communication is a process that requires sustained efforts by all the stakeholders, and that results take time to show. Expectations about the role of communication must be balanced, and based on the understanding that communication is a facilitator that is tied to management decisions and actions. The development of the communication strategy will ensure the early warning system is an end-to-end user oriented and
therefore, the strategy will be in line with the early Warning, Early Actions components as shown in figure 2.

![Figure 2: Early Warning-Early Action Components](image)

**Knowledge of flood risk:** This component helps in understanding who and what is most exposed and vulnerable to the impacts of flooding and where they are.

**Early warning services:** The warning services are critical in informing when to take early actions and also the kind of early actions to be taken. The timing of the early warning is also critical.

**Dissemination and Communication:** This component defines the types of information are most useful, timing of the information and also the channel for disseminating information. Besides, it also focuses on how to access, understand and use it to take action.

**Preparedness and Response Actions:** This component looks at the kind of early actions that will be taken based on flood early warning information and by who. The actions should be geared towards mitigating the impacts of a flood.

**2.0 Methodology Adopted for Development of Communication Strategy**

The development of communication strategy started by mapping of key stakeholders in Narok County was carried out and this later led to the organization of an inception workshop where stakeholders identified the lack of an effective flood early warning communication system as one of the hindrances to flood early warning early action. Some of the gaps to flood early warning communication system that arose during the inception works include; credibility of the forecast information, lack of proper communication channels, inadequate information and poor usability of forecast information as shown in annex 2. This informed the need for development of the communication strategy that will be a guidance towards attaining effective flood early warning communication system.
Key Informant Interviews (KIIs) were carried out with relevant stakeholders in order to have a deeper understanding of the existence of flood early warning communication systems and some of the available channels of communication. The KIIs responses were analyzed and the results used to address the situation analysis. The key informant interviews were conducted to better understand; if a communication system exists, flood early warning information available, sources of the early warning information and the channels used to communicate it. The stakeholders were further asked what types of flood early warning they wish to access in future, how long before the flood and the channels they wish to access the flood early warning information through.

Key stakeholders in flood risk management in Narok County were identified these include the following:

1. County Disaster Committee – Public and admin and devolution and disaster management - Chief Officer
2. Ewaso Nyiro South Development Authority
3. World Vision (Loita)
4. CARITAS (Ngong)
5. Ward Admin – Narok Town, Suswa, Melelo (South), Loita West
6. KRCS County Coordinator
7. Red Cross Action Team (RCAT) Team Leader
8. County Director of MALF, Health, Water, Environment, Education and Public Works
9. County Finance – Chief Officer
10. County Economic Planning – Chief Officer
11. Director NaroWASCO
12. Kenya Wildlife and Forestry
13. Chairperson Chamber of Commerce/ KRCS Narok Board member
14. Water Resources Authority
15. Media (Sidai, Mayian and Suswa Ranet oltoilo le maa)
16. WRUA – Narok Town, Mosiro, Suswa, Sekenani (West), Loita West, Emurua Dikirr

Flood risk mapping was also carried out to map areas that are prone to flooding. Flood risk maps were derived using the height above nearest drainage (HAND) model in conjunction with analysis of high resolution settlement layers and ground based validation. Digital elevation model (DEM) from the advanced land observation satellite (ALOS) was used to derive HAND. Spatial coverage of flood early warning information, flood impacts and buildings’ vulnerability to floods at household level was also captured on kobo toolbox during the flood risk mapping exercise. The analyses were done in quantum GIS (QGIS) software using the geographical resources analysis support system (GRASS) tool. The HAND was reclassified as high flood risk (0 to 1 meters), medium flood risk (1.1 to 3 meters) and low flood risk (3.1 to 5 meters). These 3 flood risk zones represented areas that are at risk of flooding as they are within a stream network and a river catchment area. Zonal statistics was used to extract high resolution settlement layers that are within flood risk areas based on HAND.
Look-up table was developed to help in understanding the flood impacts and accumulated amount of rainfall in various regions in Narok County. The rainfall data used were blended satellite data and stations data and all these were obtained from Kenya Meteorological Department and the information on flood impacts were obtained from newsletters, county reports and Kenya Red Cross Emergency Operation Centre (EOC). The rainfall data was accumulated for the past 5 days.

3.0 Situation Analysis: Key findings from stakeholders in Narok County

3.1 Knowledge of risk

The knowledge of flood risk within Narok County was attained through mapping of areas and building that are prone to flooding. For instance, figure 3 shows the flood prone areas in Narok County. The map shows that more flooding occurs in areas located on the southern, western and north-east part of the Narok County. From the map, it clearly indicates that bigger part of the Narok is being affected by floods and therefore, there is need to develop an effective early warning system so as to alleviate the increasing frequency of flood occurrence in the county. Figures 5, 6, 7 and 8 (Annex 1) also show some the buildings that are at flood risk in Narok town, Ewaso Ngiro town, Ololulung’a area and Suswa area respectively. The figures 5 to 8 also show some of the buildings at flood risk that were validated. Annex 3 shows flood look-up table that describes flood events and the associated impacts and also the amount of rainfall that can be linked to the flood impacts. The mapping of flood prone zones and building in Narok County clearly show that there are more regions that are prone to flood and therefore, there is need to come up with effective flood early actions to help in mitigating flood impacts.

Figure 3: Flood Prone Areas in Narok County
3.2 Early Warning Services
In Narok County, there are different sources and types of flood early warning information received by stakeholders. Based on results analysis from KIIs, the type of flood information received include forecast, flood risk maps, flood advisories and alerts and indigenous/forecast. ) Forecast information from the Kenya Meteorological Department is the major with about 50% followed by indigenous/local knowledge at 17% (Figure 9, Annex 1). The sources of flood early warning information include Kenya Meteorological Department, Water Resources Authority, National Disaster Operation Centre, County Commission’s office, County Government and Red Cross. Kenya Meteorological is the major source of flood early warning information followed by Water Resources Authority. Other sources of early warning information are from Kenya Red Cross Society (Figure 10; Annex 1).

Narok County has only one operational KMD weather stations that is useful in forecasting heavy rainfall that can cause flooding. Also, the Trans-African Hydro-Meteorological Observatory (TAHMO) has installed some automatic weather stations (AWS) in various locations in the county. In addition, the Water Resources Authority has also installed some telemetric stations within the river basin to help in monitoring flood as shown in figure 4.

![Figure 4: Weather stations and River Gauge coverage in Narok County](image_url)
3.3 Early Warning Communication

Based on the survey that was carried out in Narok with different Key Informants, the results show that the respondents indicated that there are existing systems in the county for communicating flood early warning information. Approximately, 65% of the respondents agreed that there are existing systems for communicating flood information as shown in figure 11 (Annex 1). For instance, there is use of WhatsApp to disseminate information to other county relevant government agencies about flood prior to its occurrence. The early warning information is also shared to the communities through the Kenya Red Cross, the county disaster management unit and other relevant county leaders. Another significant mechanism through which a flood information is passed to the communities in the Narok County is through community gatherings (Barazas) organized by chiefs and assistant chiefs. In the gathering the community members are informed about the chances of flood occurrence and therefore, they should be in a position to reach out to safer regions.

According to key informants interview results in Narok County, about 83% of institutions existing in Narok County shares flood early warning information and 17% do not share such information (figure 12; Annex 1). Out of 83% of institutions sharing flood early warning information, only 64% has ability to interpret early warning information and 36% share but do not have the ability to interpret flood early warning information (figure 13; Annex 1). This clearly indicates there is a gap in relation to dissemination of early warning information and hence, there is a need for developing effective flood early warning communication strategy for Narok County.

There are different channels through which information regarding early warning can be disseminated. However, it clear based on different responses received from key informants in Narok County that the channels for receiving early warning information for members of the communities is through radio (57%), TV (17%), social media (11%), friends (9%) and social gathering (6%) as shown in figure 14 (Annex 1). The members of the community indicated that the local radio stations are playing a significant role in relaying information on floods. On the other hand, different institutions receive early warning information mostly through Social media (22%), Newspaper/magazine (18%), Email (17%) and Radio (17%) with a small number of stakeholders’ receiving it through TV channels as indicated in figure 15 (Annex 1).

The current target audience for the flood early warning information include;

- County government
- Media
- Communities in flood prone areas
- Non-governmental organizations (e.g. world vision)
- Kenya Red Cross Society

Narok County has different communicators on flood early warning communication. Currently, the significant communicators include;
• County government (ministries and relevant departments),
• County commissioner’s office,
• National government departments
• Non-governmental organizations
• County disaster management department

**Radio:** Local radio stations within Narok County are significant communicators and they play significant role in relaying information on floods to the local communities using local languages. Two local radio stations were found to have a great coverage in the Narok County. The local radio station receives flood early warning communication like flood risk maps and forecasts and then relay as news flash or during normal radio programs. The sources of the communication by the local radio station include Kenya Meteorological Department and information shared by listeners. The communication of flood early warning information is always done as news flash and as a regular program.

**3.4 Preparedness and Response Actions**

The KII results show that only 67% of relevant institutions and department received flood early warning information for March-April-May (MAM) 2018 flood events while 33% did not receive (figure 16, Annex 1). There are different actions that were taken by institutions, such as Kenya Red Cross and Narok County government, that received the flood early warning information and some the actions include;

- Disseminating the flood early warning to the communities in flood prone areas such as Mosiro
- Stockpiling and prepositioning of commodities like food stuffs and medicines in readiness to assist communities that are likely to be affected such as those living in Suswa and Sogo
- Establishing places for offering temporary shelters to the affected communities
- Sensitization on suspected disease outbreak
- Medical support (intervention of Malaria)
- Psychosocial support for the affected families (loss of property)

All relevant stakeholders should take part in the flood preparedness and response in order to mitigate impacts of flood and hence, improving the resilience of the communities.

**4.0 The Flood Early Warning Strategy**

The findings from the situation analysis indicate the need for an effective and efficient communication strategy that aims on improving the knowledge and building support for flood early warning communication. The communication strategy will focus on improving the communication of flood early warning information to stakeholders in Narok County, and ensure the information reaches the last mile users. The Narok County government in collaboration with key stakeholders will ensure that the strategy is effectively implemented and therefore, the strategy will be geared towards providing guidance to;
• Improve knowledge on floods risk and impacts in Narok County
• Simplify the language for early warning messages to be responsive to stakeholders’ needs
• Link flood early warning messages to potential impacts
• Improve the communication of timely flood early warning messages
• Promote the use of effective and reliable channels of communications
• Inform early actions on flood impact mitigation, preparedness and response

Brief description on the specific objectives

**Improve knowledge on floods risk and impacts**

Knowledge on flood risk is essential towards coming up with effective measures on mitigating or managing flood impacts. The aspect of knowledge improvement could include having idea or areas which are prone to flooding in Narok County and also understanding factors that increases the vulnerability of the community to flooding. Having the knowledge of flood risk and impacts will influence the need to have a proper timing for flood early warning information and also a proper flood early action measures.

**Language simplification**

As part of improving flood early warning communication simplification of language for flood early warning information should be responsive to stakeholders’ needs. This implies that the language should be easily understandable by the local communities and other stakeholders. It is therefore, important to note that the strategy will enhance the use of simple and understandable whenever flood early warning information is being communicated.

**Linking flood early warning messages to potential impacts**

The strategy focuses on improving the effectiveness of the communication by linking the flood early warning messages to potential flood impacts. This will enhance the understanding of the stakeholders regarding the potential impacts are associated with the kind of early warning that has been given out and thereby improving the ability of the communities and other relevant stakeholders to take flood early actions.

**Improving the timely communication**

Based on the stakeholders’ needs, timely communication (more than 7 days before flood occurrence) of flood early warning information will help in mitigating flood impacts since more time will be available to take flood early actions such as relocation to higher grounds. Therefore, the strategy focuses on promoting timely communication of flood early warning information within the county.

**Effective and reliable communication channels**

For the purpose of ensuring the information reaches the last mile users, the channels of communicating flood early warning information should be effective and reliable. The strategy will
focus on ensuring communication is improved by promoting a reliable and effective channels of communication that responsive to the needs of stakeholders in the county.

**Inform early actions on flood impact mitigation, preparedness and response**

The strategy focuses on informing the relevant stakeholders on early actions that could be taken in line with improving flood preparedness, response and mitigation in Narok County. This will help in improving actions that the county disaster management unit can take in order to mitigate flood impacts in the county.

**4.1 Knowledge of Risk**

Going forward the Narok County government in collaboration with stakeholders will update the flood risk map and also to increase awareness and knowledge on flood risk. Also, another significant concern for the county government is the need for early warning information for specific locations that are prone to flood in Narok County. This will help in developing effective early actions and preventive measures by relevant agencies and county government departments as a way of mitigating flood impacts. An improvement in the accuracy of the flood early warning information is essential in improving the knowledge of flood risk and therefore, an accuracy of about 80-90% will help in the fastening the early action responses by the county and national government. The improvement of the accuracy will be looked into through a continuous collaborative work between the county government and the Kenya Meteorological Department.

**4.2 Early Warning Services**

The release of flood early warning information by the Kenya Meteorological Department should be link to potential flood impacts. The development of look-up table was critical in linking the flood impacts in a given region and the accumulated observed rainfall for the past few days. Therefore, going forward it was proposed that the communication of flood early warning forecast should be linked to potential impacts based on different flood prone regions and this information should be disseminated to various relevant stakeholders using a more reliable communication channels and language.

Flood early warning services will be increased through various means such the use of posters, and billboards in areas that more prone to floods. Also, the accuracy of forecasting heavy rainfall by Kenya Meteorological Department will be increased. Currently, the Water Resources Authority in collaboration with Kenya Meteorological Department is working to build the forecasting system for Narok town. This is important towards mitigating flash flood impacts in Narok town. Going forward the Narok County government should work close with Water Resources Authority and Kenya Meteorological Department to help in improving flood warning services and thereby mitigating flood impacts through possible flood early actions. Also, the coverage of weather stations should be improved in order to help in improving flood early warning services in the county.
4.3 Communication and Dissemination

Based on the KII results, about 88% of the stakeholders indicated that going forward they need flood early warning information to be communicated more than 7 days before the occurrence of flood event while 12% of the respondents indicated that flood early warning information should be communicated 2-3 days before the flood event (figure 17, Annex 1). This will be critical towards promoting effective and timely execution of early flood actions targeting communities that are prone to flooding. Timely dissemination of flood early warning information gives more room for evacuation of people and their properties.

There are other relevant flood early warning information that is needed by relevant departments and stakeholders working on disaster management in the county for early flood preparedness and response. Some of these information include;

- Elaborate and well-mapped information on flood prone areas with detailed information
- Fundamental flood signs due to the changes in climate around the globe

4.3.1 Target Audiences

The communication strategy will target the following audiences;

- Communities in flood prone areas
- County Government Officials (relevant ministries e.g. ministry of water, environment, agriculture e.t.c.)
- National government official
- Media (Broadcast, print, web)
- Intermediaries/local community leaders (chiefs and assistant chiefs)
- Non-Governmental organizations
- Learning institutions (colleges, high and primary schools) in flood areas

4.3.2 Communicators

Going forward, all relevant stakeholders will be part of the communicators of flood early warning information. The disaster management department in Narok County in collaboration with other departments and stakeholders will play a significant role as communicators. The Narok County disaster department in collaboration with other stakeholders will establish flood mitigations initiatives such as construction of dams to reduce flood impacts on the communities living in flood prone areas. This clearly make it an important communicator of flood early warning information in the county.

<table>
<thead>
<tr>
<th>Target Audience</th>
<th>Channels preferred</th>
</tr>
</thead>
</table>
| County Government Officials     | • Emails
|                                 | • SMS
|                                 | • Mobile Applications
|                                 | • Social media

Table 3: Target Audience and respective channels for receiving early warning information
Other proposed channels of communication is the use of billboards and brochures. Billboards should be mount in areas that are prone to floods such as along Mai Mahiu - Narok road which is prone to flooding. Also, announcement on flood early warning information should be made during market days since this will also help in reaching a large number of audience.

### 4.3.3 Timing for Early Warning Communication

Timing for flood early information is significant towards taking early action. This implies that early warning information directly leads to early action and this can be greatly achieved by developing an effective early warning communication strategy. According to key informants in Narok County, flood early warning information should be given out for a period of more than seven days before the occurrence of flood event.

The preferred timing for flood early warning information according to the media respondents in Narok County should be more than 7 seven days before the occurrence of flood events and the preferred source of communication is Kenya Meteorology Department.

### 4.4 Preparedness and Response Actions

From the stakeholders’ capacity building workshops and key informant interviews, different proposed actions were discussed as a way of improving mitigation of flood impacts. It was concluded that flood impacts mitigation requires effective and efficient communication strategy that strengthens and improves the timing of early warning communication. Attaining these, the Narok County government and other relevant stakeholders will require that the following are also taken into consideration;
• Improvement in the timing dissemination of weather forecast from Kenya Meteorological Department
• Awareness creation on the importance of flood early warning information uptake by ensuring the available early warning system is people-centered
• Collaboration among the relevant agencies and departments such as national government, county government and non-governmental organization with an aim in improving disaster risk management
• Development of effective, efficient and user friendly channels of flood early warning communication
• There is need to create awareness and build capacity of people in Narok County regarding the importance of flood early warning information and risks associated with floods
• Flood early warning information should be communicated 7 days before the occurrence of the flood event for the purpose of taking early action
• Incorporate Boda Boda group on dissemination of flood early warning information
• Incorporate local radio station on dissemination of flood early warning information
• County government and other stakeholders to work jointly together so as to improve the communication and dissemination of flood early warning information
• More youths should be engaged in dissemination of flood early warning information especially through social media (Facebook, Twitter and WhatsApp)
• Improvement of the coverage of meteorological weather station coverage in the county so as to improve flood monitoring
• Flood early warning message should disseminated in local language for easy understanding by local community
• More resource allocation by county government to improve flood mitigation initiatives in the county
• Timely relocation to safer ground upon receiving flood early warning information. This entails earlier establishment of relocation centers with necessary amenities
• Building gabions to prevent soil erosion and preventing land degradation
• Discouraging people from living in flood prone areas and also along riparian lands
• Renovating and clearing drainage systems especially in Narok Town
• Stockpiling and pre-positioning of relief items such as medicine, food and clean water
• Alert people in flood prone areas through posters, SMS, radio etc.

More work need to be done by the county government and key actors by defining flood early actions based on the forecast from Kenya Meteorological department. Also, a threshold should be defined to determine when an early warning will be released and the kind of actions that should be taken by relevant actors.

In addition, during the stakeholders’ capacity workshop, it was clearly indicated that that there is need to develop a more effective and modern early warning systems that can reach out to many
people especially those in flood prone areas. First, this can be effectively achieved through developing and adopting an effective communication strategy. The significance of the communication strategy is to create an effective framework through which the flood early warning communication can be disseminated in real-time. Besides, the need of a communication strategy is to create or promote proactive initiatives towards responding to flood cases within the county. Having an effective communication strategy will help the county government and other key relevant stakeholders in making valuable decisions to mitigate flood impacts through flood early actions.

5.0 Recommendation

The communication strategy for flood early warning system is essential towards improving the early actions services in response to flood impacts in Narok County and also important in building the resilience of the communities in flood prone areas. However, it is important to note that the strategy is incomplete and the following areas need to be effectively put in place:

- All county departments should be included in the list of communicators for flood early warning information
- The strategy should promote the development of effective contingency plan within the county
- The implementation plan for the Narok County flood early warning communication strategy
- Coordination structure for strategy implementation and this implies strengthening policies regarding disaster management in Narok County
- Plan for financing and sustaining the flood early warning communication strategy
- More collaboration work with Kenya Meteorology Department and Water Resources Authority should be promoted for the purpose of improving forecasts
Annexes

Annex 1: Figures

**Figure 5**: Building at flood risk in Narok town

**Figure 6**: Building at flood risk in Ewaso Ngiro town
Figure 7: Building at flood risk in Ololulung’a area

Figure 8: Building at flood risk in Suswa area
Figure 9: Types of early warning information

Figure 10: Sources of Early Warning Information in Narok County

Figure 11: Response rate on the existence systems for communicating early warning information
Figure 12: Percentage of institutions sharing flood early warning information in Narok County

Figure 13: Percentage of institutions with ability to interpret flood early warning information

Figure 14: Channels of communication for receiving early warning information for community members
Figure 15: Channels of communication for receiving early warning information for institutions

Figure 16: Institutions that received MAM 2018 flood early warning information
Figure 17: How long to access flood early warning information before flood event
Annex 2: Narok County Problem Tree

Why is Early Action not being taken based on flood early warning information in Narok county

Inadequate information
  - Doesn't reach the intended people
    - Language barrier
    - Mode of transmission
  - People do not know how to use the information released by KMD

Usability
  - Unreliable information on floods

Credibility of the information released

No proper communication channel in place
## Annex 3: Narok County Flood Look Up Table

**Table 4: Flood look up table for Narok County**

<table>
<thead>
<tr>
<th>Flood event date</th>
<th>Location on Narok where flood occurred</th>
<th>Impact</th>
<th>Time period over which data is required = date of flood event to 5 days before the flood event</th>
<th>Observed Daily Rainfall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>T-4 (mm)  T-3 (mm)  T-2 (mm)  T-1 (mm)  T-0 (mm)  Total (mm)</td>
<td></td>
</tr>
<tr>
<td>12/15/2008</td>
<td>Oloshapani, Narok South Sub-, Narok</td>
<td>• 1 person missing as a result of flood</td>
<td>11\textsuperscript{th} to 15\textsuperscript{th} Dec</td>
<td>0 0 0 0 0 0</td>
</tr>
<tr>
<td>12/28/2009</td>
<td>Suswa</td>
<td>• 3 deaths reported</td>
<td>24\textsuperscript{th} to 28\textsuperscript{th} Dec</td>
<td>9 13 4 17 16 59</td>
</tr>
<tr>
<td>12/28/2009</td>
<td>Narok Suswa</td>
<td>• 385 people affected indirectly</td>
<td>24\textsuperscript{th} to 28\textsuperscript{th} Dec</td>
<td>9 13 4 17 16 59</td>
</tr>
<tr>
<td>6/1/2010</td>
<td>Oloipito</td>
<td>• 75 houses destroyed</td>
<td>28\textsuperscript{th} May to 1\textsuperscript{st} Jun</td>
<td>0 0 0 0 0 0</td>
</tr>
<tr>
<td>7/4/2010</td>
<td>Olasit Trading Center - Suswa Bridge</td>
<td>• 5 deaths reported</td>
<td>30\textsuperscript{th} June to 4\textsuperscript{th} July</td>
<td>0 0 0 0 0 0</td>
</tr>
<tr>
<td>1/7/2010</td>
<td>Mau</td>
<td></td>
<td>3\textsuperscript{rd} January to 7\textsuperscript{th} January</td>
<td>4 1 0 0 0 5</td>
</tr>
<tr>
<td>1/4/2010</td>
<td>Oloipito</td>
<td>• 4 deaths experienced</td>
<td>31\textsuperscript{st} Dec 2009 to 4\textsuperscript{th} January 2010</td>
<td>0 7 0 2 3 12</td>
</tr>
<tr>
<td>5/5/2013</td>
<td>Sintakara</td>
<td>• 2 death occurred</td>
<td>1\textsuperscript{st} to 5\textsuperscript{th} May</td>
<td>0 2 0 0 1 3</td>
</tr>
<tr>
<td>Date</td>
<td>Location</td>
<td>Event Details</td>
<td>Dates</td>
<td>Victims</td>
</tr>
<tr>
<td>------------</td>
<td>-------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>5/7/2013</td>
<td>Kikuyani village</td>
<td>23 deaths reported</td>
<td>3rd to 7th May</td>
<td>0 0 1 0 0 0 1</td>
</tr>
<tr>
<td>5/12/2013</td>
<td>Ndoroboni area</td>
<td>10 deaths reported</td>
<td>8th to 12th May</td>
<td>0 0 0 0 0 0 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Massive losses for farmers due to crop damage in farm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2/4/2013</td>
<td>Doroboni River</td>
<td>4 deaths recorded and 2 injuries reported</td>
<td>31st Jan to 4th Feb 2013</td>
<td>4 29 0 0 0 0 33</td>
</tr>
<tr>
<td>2/23/2013</td>
<td>Oloi</td>
<td>1 death reported</td>
<td>19th Feb to 23rd Feb 2013</td>
<td>0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>3/4/2013</td>
<td>Naikara</td>
<td>1 death and 1 injury reported</td>
<td>1st March to 4th March 2013</td>
<td>0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>4/3/2013</td>
<td>Masurura (Transmara)</td>
<td>1 death and 1 injury reported</td>
<td>30th March to 3rd Apr 2013</td>
<td>26 17 9 15 2 8 69</td>
</tr>
<tr>
<td>4/4/2013</td>
<td>Masurura</td>
<td>1 death reported</td>
<td>31st Mar to 4th Apr 2013</td>
<td>17 9 15 2 8 51</td>
</tr>
<tr>
<td>4/13/2013</td>
<td>Oloolunga</td>
<td>10 deaths and 2 injuries reported</td>
<td>9th Apr to 13th Apr 2013</td>
<td>0 4 34 11 8 57</td>
</tr>
<tr>
<td>4/13/2013</td>
<td>Naikara</td>
<td>1 death reported</td>
<td>9th Apr to 13th Apr 2013</td>
<td>4 18 6 22 0 50</td>
</tr>
<tr>
<td>4/23/2013</td>
<td>Nkumari</td>
<td>1 death reported</td>
<td>19th Apr to 23rd Apr 2013</td>
<td>0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>4/23/2013</td>
<td>Oloii</td>
<td>1 death reported</td>
<td>19th Apr to 23rd Apr 2013</td>
<td>0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>4/23/2013</td>
<td>Enkare</td>
<td>1 death reported</td>
<td>19th Apr to 23rd Apr 2013</td>
<td>0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>Date</td>
<td>Location</td>
<td>Details</td>
<td>Dates</td>
<td>Deaths</td>
</tr>
<tr>
<td>------------</td>
<td>-------------------</td>
<td>-------------------------------------------------------------------------</td>
<td>------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>4/24/2013</td>
<td>Nairage Ngare</td>
<td>• 100 people affected indirectly</td>
<td>20th Apr to 24th Apr 2013</td>
<td>6</td>
</tr>
<tr>
<td>7/4/2013</td>
<td>Mulot</td>
<td>• 1 death reported</td>
<td>30th June to 4th July 2013</td>
<td>0</td>
</tr>
<tr>
<td>11/26/2014</td>
<td>Olopito</td>
<td>• 15 deaths and 8 injuries reported&lt;br&gt;• Properties worth more 100 million destroyed</td>
<td>22nd Nov to 26th Nov 2014</td>
<td>0</td>
</tr>
<tr>
<td>4/29/2015</td>
<td>Ngare Narok River</td>
<td>• 3 deaths and property worth thousands of shillings destroyed&lt;br&gt;• 1 house destroyed</td>
<td>25th Apr to 29th Apr 2015</td>
<td>1</td>
</tr>
<tr>
<td>11/5/2015</td>
<td>Talek</td>
<td>• 15 deaths and several injuries reported</td>
<td>1st Nov to 5th Nov 2015</td>
<td>0</td>
</tr>
<tr>
<td>11/15/2015</td>
<td>Talek</td>
<td>• 3 deaths reported&lt;br&gt;• 316 cattle lost</td>
<td>11th Nov to 15th Nov 2015</td>
<td>3</td>
</tr>
<tr>
<td>11/19/2015</td>
<td>Lesuswa</td>
<td>• 1 death and 2 injuries reported</td>
<td>15th Nov to 19th Nov 2015</td>
<td>9</td>
</tr>
<tr>
<td>12/14/2015</td>
<td>Olulunga</td>
<td>• 1 death deported</td>
<td>10th Dec to 14th Dec 2015</td>
<td>0</td>
</tr>
<tr>
<td>12/17/2015</td>
<td>Ololunga and Mau Areas</td>
<td>• 1 death and 2 injuries deported</td>
<td>13th Dec to 17th Dec 2015</td>
<td>37</td>
</tr>
<tr>
<td>Date</td>
<td>Location</td>
<td>Incident Details</td>
<td>Dates</td>
<td>Deaths</td>
</tr>
<tr>
<td>------------</td>
<td>-----------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
<td>--------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>12/19/2015</td>
<td>Majengo Area of Narok</td>
<td>• 1 death deported</td>
<td>15th Dec to 19th Dec 2015</td>
<td>20</td>
</tr>
<tr>
<td>4/19/2016</td>
<td>Nasira Village Narok</td>
<td>• 11 people injured</td>
<td>15th Apr to 19th Apr 2016</td>
<td>0</td>
</tr>
<tr>
<td>11/26/2017</td>
<td>Enkare</td>
<td></td>
<td>22nd Nov to 26th Nov 2017</td>
<td>9</td>
</tr>
<tr>
<td>1/5/2017</td>
<td>Suswa Narok</td>
<td></td>
<td>1st Jan to 5th Jan 2017</td>
<td>0</td>
</tr>
<tr>
<td>9/17/2017</td>
<td>Duka Moja Past Suswa</td>
<td></td>
<td>13th Sept to 17th Sept 2017</td>
<td>0</td>
</tr>
<tr>
<td>11/25/2017</td>
<td>Narok - Bus Stop, Jua Kali, Open Cloth Market, Hass Petrol Station And Kanga House</td>
<td></td>
<td>21st Nov to 25th Nov 2017</td>
<td>0</td>
</tr>
<tr>
<td>3/9/2018</td>
<td>Suswa</td>
<td></td>
<td>5th March to 9th March 2018</td>
<td>0</td>
</tr>
<tr>
<td>3/13/2018</td>
<td>Kumi Kumi River Near Majengo in Narok</td>
<td>• 1 death reported</td>
<td>9th March to 13th March 2018</td>
<td>8</td>
</tr>
<tr>
<td>3/13/2018</td>
<td>Governor Secondary School Near Mai-Mahiu</td>
<td>• 2 people injured • 2 people missing</td>
<td>9th March to 13th March 2018</td>
<td>8</td>
</tr>
<tr>
<td>3/13/2018</td>
<td>Majengo, Narok</td>
<td>• 1 death reported</td>
<td>9th March to 13th March 2018</td>
<td>8</td>
</tr>
<tr>
<td>3/13/2018</td>
<td>Mai Mahiu</td>
<td>• 2 people injured • 1 person missing</td>
<td>9th March to 13th March 2018</td>
<td>8</td>
</tr>
<tr>
<td>Date</td>
<td>Location</td>
<td>Description</td>
<td>1st March to 5th March 2018</td>
<td>6th March to 10th March 2018</td>
</tr>
<tr>
<td>------------</td>
<td>---------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-----------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>3/15/2018</td>
<td>Nkoitoi</td>
<td>2 households evacuated</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/18/2018</td>
<td>Nkoitoi</td>
<td>4 deaths reported</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/19/2018</td>
<td>Katakala Center in Narok</td>
<td>63 people were indirectly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4/15/2018</td>
<td>Suswa</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>