AFRICAN UNION
INTERAFRICAN BUREAU
FOR ANIMAL RESOURCES

EUROPEAN UNION

REGIONAL TRAINING WORKSHOP ON SUPPORTING THE IMPLEMENTATION AND PRACTICES OF THE AFRICA REGIONAL STRATEGY FOR- DISASTER RISK REDUCTION (ARS-DRR) (PROMOTING EARLY WARNING AND DISASTER RISK REDUCTION IN ECCAS,ECOWAS, IGAD, SADC AND UMA)

NAIVASHA, KENYA 4-8 JULY 2022.

WORKSHOP REPORT

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Acronyms

UMA	Arab Maghreb Union
AFBS	Animal Feed Balance Sheet
ARIS	Animal Resources Information System
ARS-DRR	The Africa Regional Strategy for Disaster Risk Reduction
DAD-IS	Domestic Animal Diversity Information System
DRM	Draught Risk Management
DRR	Disaster Risk Reduction
EAW	East Africa Hazard Watch
ECCAS,	Economic Community of Central African States
ECOWAS	Economic Community of West African States
EWS	Early Warning System
EWT	Early Warning Tools
FEWS NET	The Famine Early Warning Systems Network
ICPAC	IGAD Climate Prediction and Application Centre
IDDRISI	Drought Disaster Resilience and Sustainability Initiative
IGAD	Intergovernmental Authority on Development
ILRI	International Livestock Research Institute
ITK	Indigenous Traditional Knowledge
KFSSG	Kenya Food Security Steering Group
LandPKS	Land Potential Knowledge System
NDMA	National Drought Management Authority
PET	Pictorial Evaluation Tool
PLEWS	Predictive Livestock Early Warning Systems
PHYGROW	Phytomass Growth Model.
PVS	Performance Veterinary Services
RVF	Rift Valley Fever
SADC	Southern African Development Community
TLU	Tropical Livestock Unit

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Introduction

Within the framework of Live2Africa Project, The African Union Inter-African Bureau for Animal Resources (AU-IBAR) a technical arm of the African Union Commission (AUC) with a mandate to enhance the technical capacity of Member States (MS) and Regional Economic Communities (REC) to sustainably manage their animal resources for the improvement of human livelihoods and conservation of ecosystems, organized a five (5) day training for technical staff and partners from the five regions. The training took place in Kenya from 4th to 8th July, 2022 and was attended by stakeholders from UMA, ECCAS, ECOWAS, SADC, IGAD.

Background

In the month of June 2022, UA-IBAR organized for write shop to review progress made with regards to the implementation of; the AU Policy Framework on Pastoralism, The Africa Regional Strategy for Disaster Risk Reduction (ARS-DRR) and the Senda Framework and how their implementation have embedded the Indigenous Traditional Knowledge (ITK). Based on the feedback from the stakeholders in the write shop, more technical knowledge and skills were needed towards making the implementation a reality. As such the training largely focused on deepening the understanding of participants on the ARS-DRR, strategy framework developed through the cooperation between the African Union (AU) and its New Partnership for Africa's Development (NEPAD) to implement the strategic approach for improving and enhancing effectiveness and efficiency by emphasising disaster risk reduction. The aim of ARS-DRR is to attain sustainable development and poverty eradication by facilitating the integration of disaster risk reduction into development. The Strategy's objectives can be summarised as: to increase political commitment to disaster risk reduction; to improve identification and assessment of disaster risks; to enhance knowledge management for disaster risk reduction; to increase public awareness of disaster risk reduction; to enhance governance of disaster risk reduction institutions and to integrate disaster risk reduction in emergency response management. A baseline study was carried out to establish the status of disaster risk reduction (DRR) in Africa, which indicates the gaps in institutional frameworks; governance; risk identification, knowledge management; and preparedness, and emergency response.

Therefore, it is a priority to promote the implementation of the ARS-DRR for promoting the livelihood and disaster risk management in the main pastoral communities in the five African regions (ECCAS, ECOWAS, IGAD, SADC and UMA). This regional training workshop will promote the stakeholders' capacity building and the adoption/domestication of the strategy.

About the Training Workshop; aim, delivery and participants

This training workshop was designed to build the capacity (theoretical and hands-on training) of pastoralists, key experts and practitioners in Disaster-Risk Management in Africa to enhance their capability and to promote the Member States adoption and implementation of the ARS-DRR and its action plan. The workshop was a technical training delivery through lectures, group discussions and field based learning. It was delivered in a 5-day expert training Workshop from 4-8 July 2022 in Naivasha, Kenya. The participants were drawn from the five African Regions and RECs Secretariat. The others were experts form the leading African Union organisation conducting activities in pastoralism and DRM in the continent (AU-PANVAC & AU-SAFGRAD).

The Main Training Subjects

i. Improved management of sustainable rangeland feeding resources to cope with cyclic disasters.
ii. Implementation and functionalization of early warning tools (Successful stories from IGAD: PLEWS, PET, AFBS, etc.).
iii. DRM Information system for timely action and feed-back mechanisms.
iv. Disaster-based animal health surveillance (e.g., cross-border disease control).
v. Application of Evidence-based Indigenous Knowledge Practices for DRR.
vi. Advocacy and awareness for promoting the implementation of ARS-DRR in rangeland and pastoral communities.

SESSION 1: OPENING CEREMONY

Opening Remarks

Dr. Ahmed Elbeltagy welcomed the participants with a concise introduction to the workshop objectives. In addition, the participants were also informed that this was the 3rd event of DRR. Dr. Ahmed hoped that the participants would enjoy their stay and would contribute actively towards a successful and fruitful workshop.

Mr. Ken Otieno welcomed the participants and acknowledged the presence of those who were part of the last DRR event as well as the representatives from the different African regions. Participants were reminded that the workshop will be a dialogue and learning process besides sharing experiences. Participants were encouraged to participate fully as the outcome of this regional workshop would as well largely determine the improved sustainable management of rangelands in Africa. Mr. Ken then invited regional representatives to give opening remarks.

Dr. George Njoroge – Deputy Director veterinary services Kenya, welcomed all the participants and acknowledged the importance of the workshop bringing together 5 regionals (ECCAS, ECOWAS, IGAD, SADC AND UMA) representatives to tackle issues around Disaster Risk Reduction. Following the COVID-19 pandemic, there is equal reason for persons in the livestock sector to invest in disaster management through training to be able to prevent, detect and respond accordingly to prevent disasters. It's important to have MOU's between regions to prevent disease

spread across the borders as has been the case among East African countries. He thanked AU-AIBAR and IGAD Kenya for organising the workshop.

Dr. Gaolathe Thobokwe- SADC representative noted that COVID-19 pandemic called for exclusively local food supply and most member states realised that they were food insecure since they could not meet the demand. However, people had to build responses against the pandemic for survival. This therefore a good opportunity to address food insecurity by having a way of managing disasters within the livestock sector for prevention purposes. During a meeting by the ministers of agriculture early this year, it was agreed that should there be an outbreak, surveillance should be done and an early warning system put in place to avert the spread across the country borders besides reducing the impact of the disasters. There is a need to come up with a new management system by fostering an environment that is inclusive of all the stakeholders to come up with an enabling system in Africa.

Dr. Faouzia CHAKIRI Head of Division Food Security Arab Maghreb Union pointed out that there's quite a lot of similarities to the problems that affect the countries across Africa and in 1992 there's a document on sustainable development that was adopted which involved creation of a ministerial for management. Since there has equally been transfer of technology to have resources to counter the risk of disasters. There's need to give a focus on SDG goal 17 to ensure there's coordination with concerned bodies when implementing the Africa Regional Strategy for Disaster Risk Reduction (ARS-DRR).

Caroline Kirungu - Project Coordinator, IGAD Centre for Pastoral Areas and Livestock Development, Kenya - On behalf of the IGAD secretariat, Caroline once again welcomed the participants to the workshop. She acknowledged that IGAD comprises 90% of ASAL areas that the main livelihood is pastoralism and agro pastoralism. The ASALs are prone to drought and due to climate change the incidences and intensity have increased overtime. This has resulted in increased fire incidents especially in the Eastern part of the region which has caused a threat to the people's livelihood. Therefore, there's need to have increased mechanisms for early warning and disaster risk reduction in order to reduce the disaster impact on the people. In 2011 IGAD put in place IDDRSI (IGAD Drought Disaster Resilience and Sustainability Initiative) consisting of efforts from the countries and the region to put up structures and mechanisms that can help us to build resilience of the people within the region. This has resulted in reduced drought magnitude, damages, deaths and losses as was experienced before 2011. This can be attributed to effort by the countries and the region with help of development partners to put in place both response and development initiatives. Several tools have been put in place for early warning and several initiatives brought up for disaster risk reduction. This workshop will give the participants an opportunity to interact with the tools, critique them and suggest the ways to improve them based on the gaps that will be identified. We'll identify ways we can work together as a continent to be able to spur development through the livestock sector since we are highly dependent on pastoralism and livestock development. Participants were urged to take the opportunity to cross learn and build networks.

Dr. Ahmed Elbeltagy - Animal Production Expert (Live2 Africa Project) AU-IBAR- on behalf of the Ag. Director of AU-IBAR, Dr. Nick Nwankpa, took the participants through the background of The Africa Regional Strategy for Disaster Risk Reduction (ARS-DRR) and the objectives of the workshop. He stated that the workshop is meant to enhance knowledge, understanding, capacity and practices for the implementation of the Africa Regional Strategy for Disaster Risk Reduction (ARS-DRR) in the main themes as stated in the workshop objectives. He thanked the government of Kenya and all the participating countries as well as the regional economic communities for supporting the implementation of Africa Regional Strategy for Disaster Risk Reduction (ARS-DRR) and full contribution to the training workshop. He wished the participants fruitful workshop activities and fulfilment of the Objectives.

Welcoming Address

Dr. George Njoroge thanked the regional representative for giving the opening remarks. He encouraged free discussion as the outcome of this regional workshop would determine the way forward for the implementation of Africa Regional Strategy for Disaster Risk Reduction (ARS-DRR). The workshop was officially opened.

SESSION 2: SETTING THE SCENE

Workshop Objectives & Programme Outline, and Adoption of Agenda

All the participants were given an opportunity to do self-introduction. It was pointed out that the workshop is going to be an opportunity for the participants engage, learn from each other so as to enrich the conversation around Disaster Risk Reduction by looking at how indigenous knowledge application can be an answer to some of the challenges due to disaster and most importantly to understand the tools, mechanisms and frameworks that can be used by different actors. The participants were reminded that the workshop is a DRR training workshop besides looking at the ARS. However, of critical importance is looking at the plan of action of implementing the SENDAI Framework. The workshop is a capacity building/ theoretical hands-on workshop which will involve discussions based on the available knowledge and the application. A concise introduction for the 5-day workshop program was done by Mr. Ken Otieno.

Training Workshop Objective

- To Provide capacity building (theoretical and hands-on training) for pastoralists, key experts and practitioners in Disaster-Risk Management/Reduction in Africa to enhance their capacity and to promote the Member States adoption and implementation of the ARS-DRR and its action plan.
    - The objective as such is expected to contribute to the promotion and implementation of the African Regional Strategy for Disaster Risk Reduction, ARS-DRR, for promoting the livelihood and disaster risk management/reduction in the main pastoral communities in the five African regions (ECCAS, ECOWAS, IGAD, SADC and

UMA). This training workshop will promote the stakeholders' capacity building and the adoption/domestication of the strategy.

- Equally enhance the application of Pastoralism and Indigenous Knowledge Practices both as a tool to addressing DDR and a livelihood system.

Workshop Outline

The workshop is organised into 6 sessions distributed within the 5 days

i. Session: Sustainable Rangeland Management for Disaster Risk Reduction
ii. Session: Disaster- Based Transboundary Surveillance
iii. Session: Early Warning Tools
iv. Session: Indigenous Knowledge Practices
v. Session: DRM information system
vi. Session: Awareness and Preparedness
vii. Ref. printed programme

Training Deliverable Areas

a. Sustainable management of rangeland resources to cope with cyclic and emerging disasters.
b. Implementation and functionalization of early warning tools (e.g., successful IGAD Early Warning tools: Predictive Livestock Early Warning System, PLEWS, Pictorial Evaluation Tool, PET, Animal Feed Balance Sheet, AFBS).
c. DRM Information system for timely action and feed-back mechanisms: Information generation, Information analysis, Information interpretation to end users, Information dissemination and sharing system, and Feedback relay)
d. Disaster-Based Surveillance for transboundary disease control.
e. Application of Evidence-based Indigenous Knowledge Practices (IKPs) for Disaster Risk Reduction
f. Awareness and Preparedness for promoting the implementation of ARS-DRR in rangeland and pastoral communities

Introduction on the ARS-DRR

OVERVIEW: Africa Regional Strategy for Disaster Risk Reduction

There is a general appreciation that both policies and projects exist in Africa and they recognize the importance of addressing Disaster Risks Reduction (DRR) in Africa. AU/NEPAD on the other hand recognizes that promoting disaster risk reduction as an integral part of development is a major challenge. As such the African Regional Strategy for Disaster Risk Reduction ARS-DRR adopted by African Ministers and subsequently by African Union (AU) Heads of State and Government in 2004 remains an important framework for addressing disasters in Africa. The Strategy is comprehensive in that it takes into account the need to reduce disaster risks sustainably, including those induced by

conflicts. The strategy is being implemented through a Plan of Action developed in 2005, subsequently extended in line with the Hyogo Framework for Action (HFA) 2005-2015 and in line with the Sendai Framework action plan 2015-2030.

i. In response to common hazards that trigger disasters;
ii. Droughts, floods, cyclones, earthquakes, epidemics, as well as environmental degradation and
iii. Technological hazards. Climate change and variability

The SENDAI Framework

The 2015-2030 Sendai Framework for Disaster Risk Reduction was adopted by the United Nations (UN) Member States at the 3rd UN World Conference for Disaster Risk Reduction (WCDRR) in March 2015 in Sendai, Japan and endorsed by the UN General Assembly. The aim of the SF. is to achieve 'The substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural & environmental assets of persons, businesses, communities & countries' by 2030.

SENDAI Framework Targets

The Framework has 7 targets that are monitored with the aim of

Reducing:

a. Mortality,
b. Number of affected people,
c. Economic losses,
d. Critical infrastructure damage; and
e. Increasing:
f. Number of national and local disaster risk reduction (DRR) strategies,
g. Level of international cooperation,
h. Availability of and access to multi-hazard early warning systems and disaster risk information and assessments

In order to achieve the above targets, the pillars of risk reduction must be considered which Include; Disaster preparedness, Disaster response, Disaster recovery, Disaster mitigation, Development and adaptation to climate change. This enables us to put up systems, strategies, institutions and infrastructures which can enable action.

Priority Actions for ARS-DRR

1. Understanding the risks are increasing due to population increase, urbanisation, Disasters disproportionately affect, disasters set back progress and growth and response not capturing real needs.
2. Strengthening disaster risk governance to manage disaster risk
3. Enhancing disaster preparedness for effective response through increased level of disaster preparedness, capacity to disaster response, ability for recovery, mechanisms for mitigation, plans for development as well as signs for Vulnerability.

4. Investing in disaster risk reduction for resilience through Establishing overarching benchmarks for resilient infrastructure, increase and improve data collection on SF Target, prioritise the inclusion of infrastructure resilience in national DRR strategies, promote Resilience-Based approach to all infrastructure investments and alignment of both national and international opportunities and development strategies towards resilience activities with the 2030 initiatives.

Programme of Action ARS-DRR

MAJOR AREAS OF ACTIVITY (As in the AU/NEPAD Strategy for DRR)	EXPECTED RESULTS
Enhancing and strengthening mobilization for political commitment, responsibility and accountability.	Increased awareness of commitments and strategies for DRR amongst policy-and decision-makers at all levels.
Strengthening capacities of the regional inter-government commission (AU Commission) / NEPAD Planning and Coordinating Agency and Regional Economic Communities (RECs)) for implementation of this Strategy.	Sustained technical support provided to the AU Commission / NEPAD Planning and Coordinating Agency and RECs.
Developing and strengthening national platforms for DRR at required level. Strengthening decentralization of DRR interventions.	National platforms developed. DRR responsibilities and resources decentralized.
Advocating the inclusion of DRR in emergency risk management at local, national, sub-regional and regional levels. Preparing and disseminating guidelines for integrating disaster risk reduction in emergency response and management.	DRR integrated into emergency response management. Advocacy material and tools developed to facilitate the integration of DRR into emergency response and management.
Co-ordinating the collaboration with development partners for the integration of DRR into development programmes in Africa.	Sub-regional strategies developed in harmony with the Strategy and the HFA

Table 1: Programme of Action ARS-DRR Summary

Policy Objectives

Address both Relief Recovery & Development as a process and not isolated, therefore:

I. Lead to rehabilitation of more resistant livelihoods.
II. Provide integrated planning that consults with & involves communities and eases the transition from relief to development.
III. Be people-centred, enhance local capacities, use local materials and resources for recovery and development and provide models that can improve disaster management;
IV. Do not inadvertently reinforce tensions or conflict but contribute to reconciliation and harmony.
V. Contribute to more systematic and proactive coordination through joint assessments, planning and information exchange

Plenary Discussion

- **Population growth as a factor that increases the risk to disaster:** Population growth was noted to be one of the major factors increasing the risks to disasters since it leads to overexploitation of the scarce resources leading to lose of indigenous knowledge which pastoralists are highly dependent on thus leaving them more vulnerable to disasters.

- **Can bushfire, conflict, land degradation and livestock road accidents be considered as disasters?** From the discussion bush fires and conflicts were included as part for the disaster since they affect the livestock either directly or indirectly. Bush fires have in the past in some countries, led to the loss of a number of livestock besides destruction of the infrastructure. On the other hand, it was noted that conflict varies regionally in capacity across regions basically due to scarcity of resources. It has however led to displacement of people in some countries e.g. Burkina Faso and Algeria. This makes pastoralists move from one region to next which affect the development of those regions. Road accidents were not regarded as disasters since it can be prevented through proper planning i.e. demarcation of the animal corridors / migratory routes. It's the responsibility of the community to take its own initiative to reduce such occurrences. Land degradation was regarded as a disaster however policy and advocacy would be the best approach to tackle it taking into consideration it's a gradual process.
- **What's the difference between the SENDAI framework and the other already existing tools?** For better understanding of the difference between the SENDAI Framework and the other tools, participants were informed that the two documents complement each other and there's need for member states to look into them and figure out the best way to harmonise them for execution at national level.

SESSION 3: SUSTAINABLE MANAGEMENT OF RANGELAND RESOURCES TO COPE WITH CYCLIC AND EMERGING DISASTERS.

What are Rangelands?

Rangelands: Are vast natural landscapes in the form of grasslands, bushland, woodlands, wetlands and deserts; and are primarily inhabited by indigenous vegetation, rather than plants established by mankind. About 54 per cent of the world's land surface consists of Rangelands that support millions of pastoralists, hunter gatherers, ranchers and large populations of wildlife Rangelands cover some 43 percent of Africa's land area which is approximately 5.1 million square miles. In the IGAD region, Arid and Semi-arid rangelands account for about 60 -70% of the land area. In Kenya Rangelands constitute about 86% of all the land mass in Kenya. In terms of disasters and vulnerabilities a large proportion is inclined towards food insecurity which is mainly caused by: Droughts, floods, rising fuel and energy prices, high prices of basic food commodities, conflicts over resources. Malnutrition and hunger have become the new reality for many children and their families especially in the households that occupy the rangelands where pastoralism is the major livestock production system.

Current situation

An estimated 38.3 million people across Africa face acute food insecurity between June and August 2022. This is mainly due to previous consecutive rainfall failures. The number of people affected in West and Central Africa is expected to quadruple in just three years from 10.7 million in 2019 to 41 million in 2022. IGAD reports that 29 million people in eastern Africa face high levels of food

insecurity due to prolonged droughts. In eastern and northern Kenya, most arid and semi-arid lands are experiencing critical drought conditions, leaving 4.1 million people facing severe hunger

Among the causes of disasters in the rangelands are: Increased frequency of droughts accompanied by floods, Overpopulation, Overstocking Livestock, Poverty, Land tenure systems, Inadequate extension services and land degradation. Degradation of grazing lands is mostly as a result of overgrazing coupled with frequent droughts. This has led to an increase of unpalatable species in some livestock grazing areas. More preferred and palatable species decline in abundance and productivity. Bush encroachment also becomes a potential threat due to degradation, where species like *Prosopis juliflora*, Acacia reficiens become a big challenge. In order to address challenges facing rangelands there is need to put in place appropriate governance systems with appropriate legal backing from the national government. Indigenous knowledge of the land users must be incorporated and participatory approaches enhanced. There must be appropriate and economically viable livestock value chains Disasters such as food insecurity leading to humanitarian crisis can be mitigated through well-developed livestock security feed, livestock breed development, livestock enterprises value chains. This includes well developed market and cottage industries and storage facilities to reduce wastage

In conclusion, the livestock keepers in continent range livestock production must be commercial oriented. Countries should develop implementable strategic plans on Rangeland and pastoralism, livestock production among others areas in the ASALs. In the medium- and long term, food sustainability and self-sufficiency must be Africa's goal. The continent of Africa remains an overly dependent importer of food despite hosting 60 percent of the world's arable land. Stakeholders must pool their resources to support development of agriculture, livestock and fisheries in Africa, which will guarantee enhanced and sustainable food production.

Group Discussion: Actions to minimise losses due to disasters

Following the presentation, Participants formed three groups to brainstorm on the following:

a) Actions to minimise losses due to disasters (drought, floods, disease, conflicts, etc.)
b) Mitigation practices in place (policies, technical, inputs, etc.).
c) Strategies for sustainable rangeland management to cope with disasters
d) The way forward for sustainable management to cope with disasters.

Figure 1: Group Discussions on actions to minimize losses due to disasters

Table 2: ***Outcome of group discussion on: Actions to minimise losses due to disasters***

Disaster	What are the long-term mitigation practices in place	Way forward for sustainable management to cope with disasters
Drought	Drought Policy i.e., scale up user policy Subsidy (Animal vaccine, Feed and Pasture) Relief food Supplementary budget Destocking of animals Capacity building (range management and animal husbandry Livestock Insurance Drought contingency plan Water development Strategy Animal Family Planning during dry periods Integration of indigenous and modern technology and methods Governance of grazing patterns	Genetic resources selection tolerant to drought Fodder production
Floods	Livestock Insurance Early warning i.e., forecasting Evacuation strategy Coordination of same efforts from different ministries, especially climate issues Establish platforms and technical groups for different thematic areas Contingency plans that need to be updated regularly Community capacity building	Controlled settlements in flood zones
Animal diseases	Administer Vaccines/ vaccine campaigns Known vaccination routine Animal diseases Acts Disease surveillance	Cross border control Vaccination Restriction on animal imports

	Disease control strategies Movement control Early warning Systems at all levels (Local, national and regional) Need for epidemiological maps for diseases Multi sector approach Cordon fences for repatriating animals Make use of stock removal permits (import permits and local permits) Extension services _Transboundary Animal Diseases More research on mysterious animal diseases	
Wildfires	Firebreaks Aridity index Capacity building i.e., sensitization Rangeland management strategies	Establishment of fodder banks Historical analysis Legislation
Conflicts	Use of existing community declarations Peace dividends _ Cross border trade sharing of common resources such as water Conflict Early warning and response Peace tournament Trans human strategy	
Land degradation/Land Tenure	LDNs Rangeland Management strategies Land use plan Legislation Animal feed strategy	
Overgrazing		
Invasive species		
Pests		

Plenary Discussion

- **How to get access to the maps that were presented:** Participants were informed that the Kenyan maps showing trends in climate change over the years are generated by FEWS NET (Famine Early Warning System Network and NDMA (National Drought Management Authority). There's a need to link with the institutions to access these maps for information which is important especially to the local communities.
- **What information goes behind the land rehabilitation**? For successful land rehabilitation, most institutions sensitise the community and focus on reaching as many as possible besides covering large tracts of land unlike in the past when the focus was basically on pilot studies. Most pastoralists are keen to adopt the new initiatives after sensitization and training.
- **Role of policy**: Policies provide guidance and direction. It is an individual responsibility to ensure that the formed policies are implemented.
- **Are there conventional livestock feeds:** There are no conventional feed that can be used by pastoralists during drought? They are however adapted to moving with their animals from one place to another in search of forage during the dry seasons. There are feed conservation strategies in place to supplement animal feeds.
- **Can we see the training from the lines of the beneficiary i.e. the community**: To ensure farmers adopt the new strategies that scientists come up with, besides capacity building there's need to have an appropriate method based on the systems and technology that we have as well as understand the livelihood of the pastoralists?

SESSION 4: DISASTER- BASED TRANSBOUNDARY SURVEILLANCE

Importance of Trans-Border Disease Surveillance in Disaster and Risk Reduction

Disasters are serious disruptions to the functioning of a community that exceed its capacity to cope using its own resources (Disease outbreaks)-Covid19. In order for any system to cope with disasters, it should be prepared to counteract the impacts of the same. Disease outbreaks are classified as disasters. There is a massive cross-border nature of risks and disasters posed by infectious diseases (Ebola, Avian influenza, Covid19, etc.). Some of the diseases are either emerging (covid-19) or re-emerging (Bird flu in Central Africa)

Importance of Trans border Disease Control/Surveillance

Surveillance within and across borders is necessary for early detection of diseases and response especially for zoonotic diseases, by the time the disease (RVF) has been detected in humans, it has also There is increasing incidence of emerging and re-emerging diseases, many of which are zoonotic such Ebola, Rift Valley Fever, Rabies, Corona, and bird flu. However, Africa's animal health service delivery systems are generally weak to respond to these disease outbreaks. Majority of the African veterinary services assessed based on global standards (PVS) have medium to low capacity in the critical competences. ready to be there with livestock.

AU-IBAR Role in Prevention of Trans-Border Diseases

AU-IBAR implements its strategic plan through various projects, most of which incorporate disease control in their approaches.

AU-IBAR Related Interventions

1. The Animal Health Strategy for Africa (AHSA) 2020-2035. The strategy provides a framework for:
    - Delivering a sustainable animal health system in Africa that meets OIE and other relevant global standards
    - Provides a common vision and goals for the African continent for the improvement of animal health delivery systems.
2. AHSA calls upon the African Union institutions, Regional Economic Communities (RECs), Member States and partners to adopt an integrated and holistic approach for the improvement of animal health systems in Africa.

The key objective is Improved capacity at all levels (continental, Regional and National) to anticipate and mitigate the negative impacts of animal diseases, zoonosis, climate change and disasters.

Disease Surveillance

Disease Surveillance is the systematic collection, analysis, and interpretation of death, injury, and illness data, which enables public health to identify adverse health effects in the community. The purpose of surveillance is to try to detect where disease organisms, such as bacteria and viruses, might be located in order to predict and prevent human illness.

Importance of Disease Surveillance

An effective disease surveillance system is essential to detecting disease outbreaks quickly before they spread, cost lives and become difficult to control. It can improve disease outbreak detection in emergency settings, such as in countries in conflict or following a natural disaster. Disease surveillance is therefore very key to early warning, detection and response to disease outbreaks (to be warned is to be prepared).

Trans Border Disease Surveillance, Emergency Preparedness and Response

Disease surveillance is very key to emergency preparedness and response. Trans border disease surveillance is important since disease pathogens can be transmitted across geographical borders through movements of humans, animals and goods, especially when there is an outbreak. Critical, life-saving information and data sharing among Member States is therefore a priority to limit or eliminate such transmissions. During a disaster, it is important to conduct surveillance to determine the extent and scope of the health effects on the affected populations. Disaster surveillance allows us to identify risk factors, track disease trends, determine action items, and target. Disaster surveillance is often categorised broadly as mortality and morbidity surveillance.

Types of Surveillance

1. **Mortality surveillance** measures death in a population. It is an important indicator of the gravity of a disaster. Identifying the leading cause(s) and circumstances of death can help guide immediate and future prevention strategies. Health studies has developed tools and guidelines to help partners with disaster mortality surveillance including the following
2. **Morbidity surveillance** during a disaster allows for the detection of potential disease outbreaks and track disease and injury trends. A common myth is that epidemics are inevitable during a disaster. However, epidemics do not spontaneously occur and public health surveillance can mitigate the likelihood for outbreaks through early detection and response.

Standard Methods and Procedures for Animal Health (SMP-AHs)

SMP-AHs have been developed and are being implemented in the IGAD region. The initiative is being cascaded in other regions. The SMP-AH addresses the gaps in disease surveillance and control and specifically addresses the following areas:

a. Standardisation/harmonisation of diseases surveillance and control procedures
b. Strengthening of disease surveillance and control at National levels

c. Coordination of surveillance and disease control at regional level
d. Developing labs and diagnostic capacities
e. Ensuring information sharing on TADs with SH including trading partners
f. Strengthening Traders organisations at regional levels to promote intra-regional trade in livestock and livestock products

How do the SMP-AHs Operate?

SMP-AHs are developed for each disease. The African Union – Inter-African Bureau for Animal Resources has developed 13 Standard Methods and Procedures for Control of 13 trans-border diseases in the Greater Horn of Africa. They are used for Epidemiological Investigations which involve the following:

i. Collection of information to trace source and spread of a disease e.g., rabies, including trace back and forward;
ii. Collection of data for geospatial analysis and risk mapping;
iii. Gathering information for investigation of factors related to livestock management and movement to determine source of outbreaks and spread of disease and for identification of appropriate intervention strategies;
iv. Collection of information to assess if the disease outbreak has been controlled;
v. Post Disease outbreak surveillance may be intended to confirm freedom of the area/ herd(s) from infection, to detect viral activity in a vaccinated population, and to establish whether or not a vaccination campaign has been effective;
vi. Collection data on socioeconomic impacts of the disease outbreak

Plenary Discussion

- **With emerging diseases, trans border surveillance is becoming a challenge**. It was clarified that existing experience, strategies/contingency plans/tools and lessons learnt and best practices from controlling other disease emergencies could be very useful in responding to new/emerging diseases.

- **Definition of an epidemiology unit**: An epidemiology unit is defined by the nature of the spread of the disease in question. It could be defined as a household, ecosystem, county, region, country or even the globe depending on the spread of the disease risk.
- **What is IBAR doing about strengthening cross-border surveillance**? AU-IBAR implements various strategies and projects that have components for strengthening/ building capacities for MSs in cross-border disease surveillance. Among the strategies is the Animal Health Strategy for Africa (AHSA), Animal Welfare Strategy for Africa and the Standard Methods and Procedures in Animal Health (SMP-AH) and the Live2 project. However, at country and regional levels,
- Cross-border disease surveillance/control is constrained by limited national budgets
- The mysterious camel disease in the IGAD region was highlighted as a disease that needs investigations and intervention.

- The need to link livestock diseases with animal resources value chains was emphasised.
- **AMR** due to misuse of vet. Drugs were also highlighted as an urgent issue to be addressed. The national governments need to look into the issue
- **Capacity for African Countries to do surveillance** is weak as reported from Performance Veterinary Services (PVS) and Gap analysis.
- **Funding for disease related emergencies** has not been embraced by most countries WOH health is key in disease surveillance and control

SESSION 5: EARLY WARNING TOOLS

Animal Feed Balance Sheet (AFBS)

Pastoral destitution is largely driven by feed and water scarcity resulting in droughts. The natural resource base in the rangelands is shrinking fast due to prolonged and more frequent droughts, overgrazing and grassland degradation, land tenure and land use, resource use conflicts and encroachment of invasive plant species among many more. Feed resources ought to be considered in the broader perspective and not predominantly during emergencies as is the case in many regions and countries. Institutionalisation of a feed security system is therefore requisite such that the region or country is aware of its needs, resource availability, gaps and how the gap can be addressed within the country, the region or beyond. The motivation is "*If you can't measure it, you can't manage it.*". This will make feed interventions in the country effective in the immediate, medium and long term and provide solutions for replication in the region. A 360-degree view of feed and feeding shows that feed is the driver of economically viable production systems. For a country to have sustainable livestock intensification there should be improvement in the efficiency of use of natural resources over time.

There are three early warning tools implemented in IGAD member states and these are Animal Feed Balance Sheet (AFBS), Pictorial Evaluation Tool (PET) and Predictive Livestock Early Warning Systems (PLEWS). The feed inventory comprises crop-based models, competitive biomass use, agro-industrial by-products, grazing biomass, a product of PLEWS among others. Feed calculation requirement of ruminant species is computed using nutrient requirement models. Feed consumption models are used for monogastric species. PLEWS is an early warning system for grazing biomass and water availability. Validation of PLEWS biomass data can be done using PET forage. Feed inventory and Feed Balance and PLEWS are both done at National and Subnational level whereas PET livestock and forage at a targeted level.

National feed inventory answers three questions of what feed resources, how much and where. Feed balance at its simplest level, is a comparison between Requirements of livestock (demand) and amount of utilisable feed (supply). National feed inventories are important in that they assist in:

- Development of National Feed and Feeding Strategy
- Development of Livestock Production Strategy that is aligned to the National Feed and Feeding Strategy
- Setting up of environmentally sustainable stocking rates and better handling of emergencies
- Baseline information to build a detailed national feeding strategy for the country
- Designing a sustainable development pathway for the livestock sector based on feed resource availability in terms of what feed resource required to achieve the production objective
- Identifying investment strategies on efficient use of biomass and development of agro-based industries
- Spatial and temporal assessments of forecasted feed resources
- Providing Knowledge of forage biomass availabilities and distributions assist pastoralists in determining where to move and whether to buy or sell animals

- Making informed decisions related to the nature and quantities of feed resources that could be traded locally, imported and exported and potential areas for feed markets

Feed balance can either be in surplus or deficit. It helps in the: Assessment of shortage/surplus of feed resources for current levels of production, estimation of potential shortages in feed resources to meet a targeted level of animal products and identification of types of feeds that might be required where shortfalls are identified just to name a few.

AFBS is developed through steps which involves procedures, personnel, capacity building among others. Several tools are used. Crop tools are excel based for collecting potential feed inventory, word based for collecting competitive uses proportions of feed resources, excel based tool for converting potential feed availability to actual feed availability and calculating feed resource wastages and monetization. Animal tools are excelling based models for estimation of dry matter, metabolizable energy and crude protein requirements of different animal species. Monogastric templates are used to capture grains and concentrates consumed by animals. Crop tool data includes Crop annual production data and area under plantation (cereals, cultivated fodders & pods). Conversion factors generated from international publications are used to convert grains to respective crop parts. Feed inventory is categorised into two major categories of roughages and concentrates. Animal data includes animal species, population numbers and herd structure of each animal species. Monogastric population numbers, amount and type of grain consumed and ingredients of concentrates is used in computing feed consumption. Feed balance is calculated based on both potential and actual feed availability as a percent. Tropical livestock unit production under actual feed resource production per year by country is compared with existing TLUs and recommendations given.

Plenary Discussion

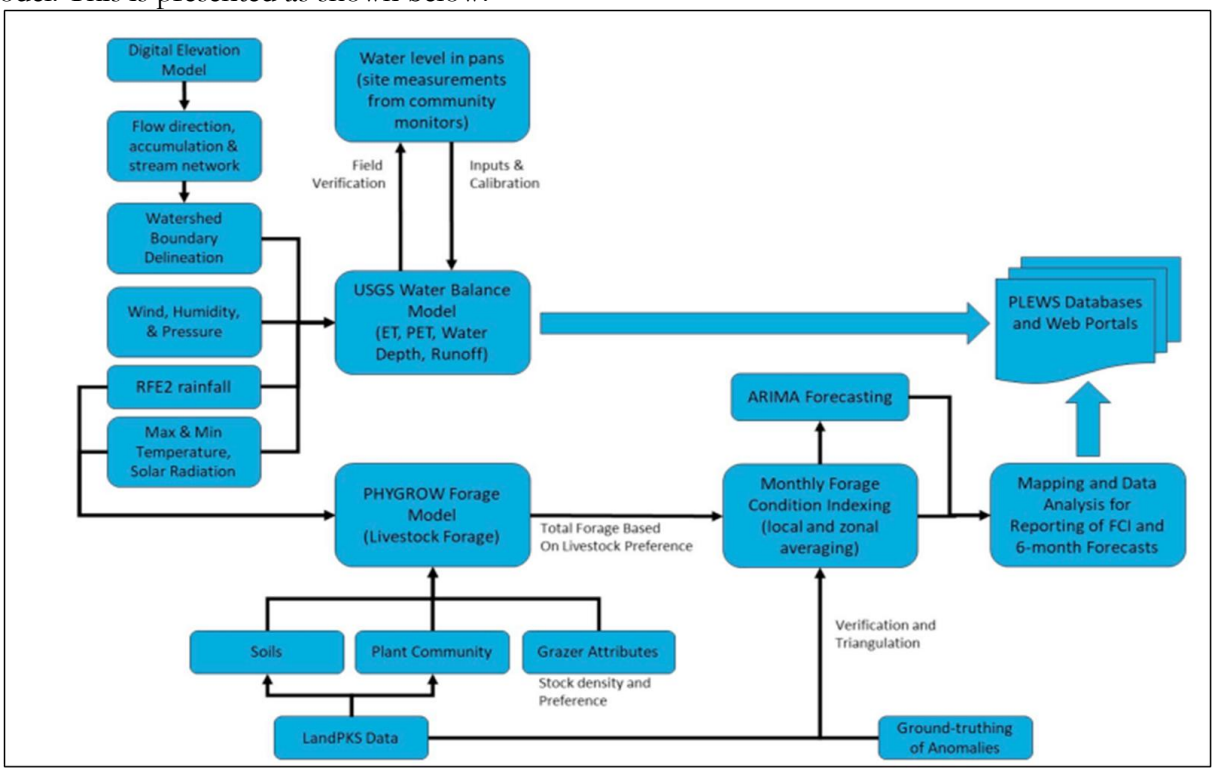
- **Is 0.7 a conventional factor for calculating animal feed requirement?** Tropical Livestock Units are livestock numbers converted to a common unit. Livestock Units is a reference unit which facilitates the aggregation of livestock from various species and age through use of specific coefficients established initially on the basis of the nutritional or feed requirements of each type of animal. The coefficients were set by ILRI.
- **Does the AFBS take care of the different animal breeds having different body weights?** Different animal species at different age groups, weights and physiological production levels are considered in the modules used to calculate feed requirements. The 2.5 percent can be reduced to two or less if you want to determine the amount of feed needed to maintain animals for a given duration.
- **How was the tool sub-aggregated from the national to the sub-national to ensure inclusivity but at the same time cost effective?** The tools are currently being implemented at national and sub-national levels in Kenya. However other countries e.g., Uganda, Somalia and Sudan are still working on the tool at regional then finally at national level. The tool can also be used at farm level by the farmers. However, there's a need for capacity building to achieve this.
- ***Some Livestock farmers use grains as animal feed, especially the monogastric. Does the tool include grain as part of the feeds?*** This is catered for in the crop tool. There is also a separate tool that captures the number of grains and concentrates consumed by monogastric.

The portion consumed by the monogastric can therefore be included in the national feed balance.

- **Does the crop tool take into consideration feed available in cases of crop failure?** Yes, this can be captured.
- **Was the weight per age factored in by the tool?** Age was not a factor that was considered while taking the animal weights for AFBS. However, if the information on age weight per category is available it can be captured and modified to address that aspect in the AFBS.

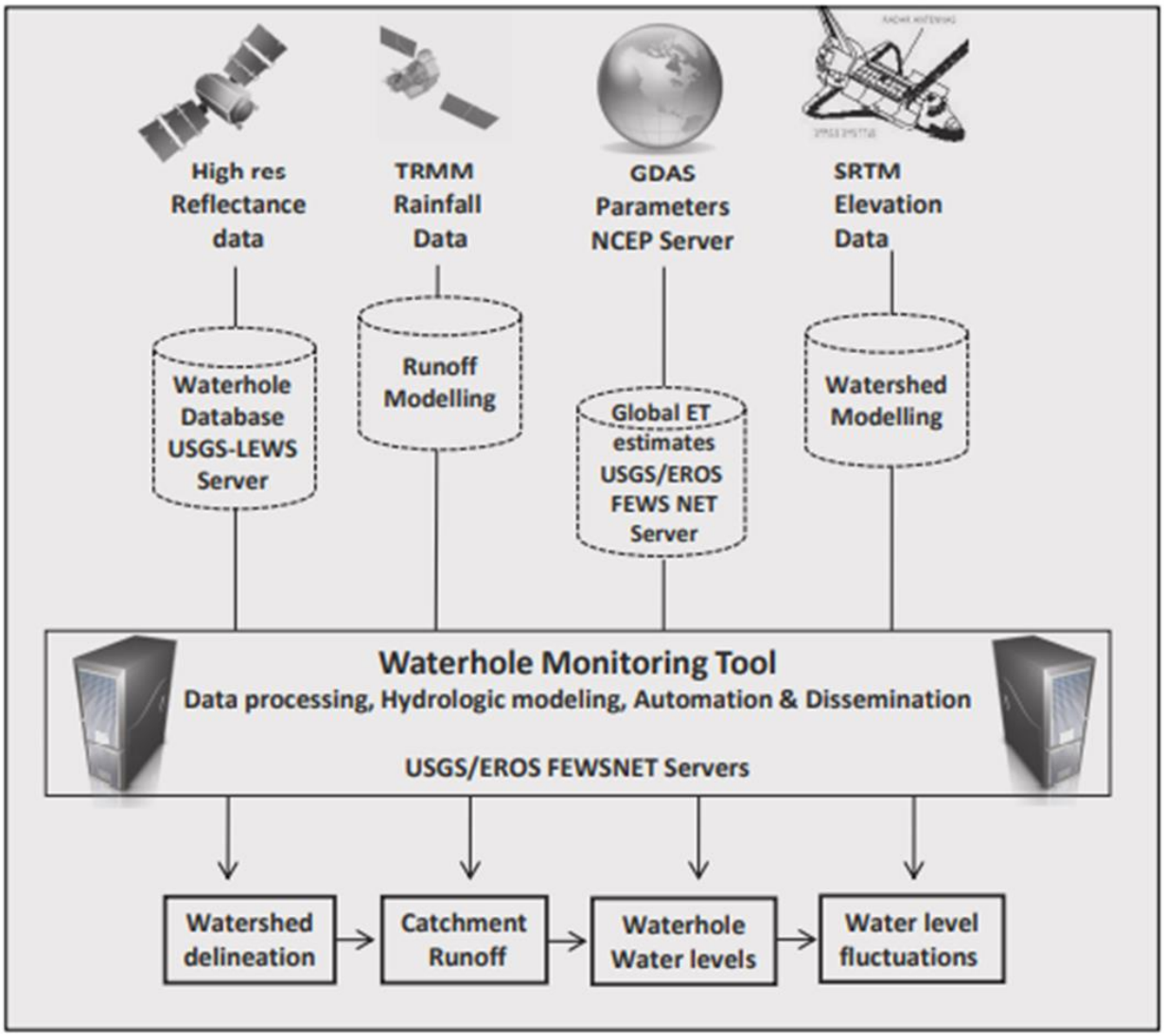
PREDICTIVE LIVESTOCK EARLY WARNING SYSTEM (PLEWS)

The Predictive Livestock Early Warning System (PLEWS) combines field monitoring, remote sensing data, and simulation modelling Produce near real-time assessments of livestock forage and water conditions. PLEWS combines two sub models including; Water balance model and PHYGROW model. This is presented as shown below.



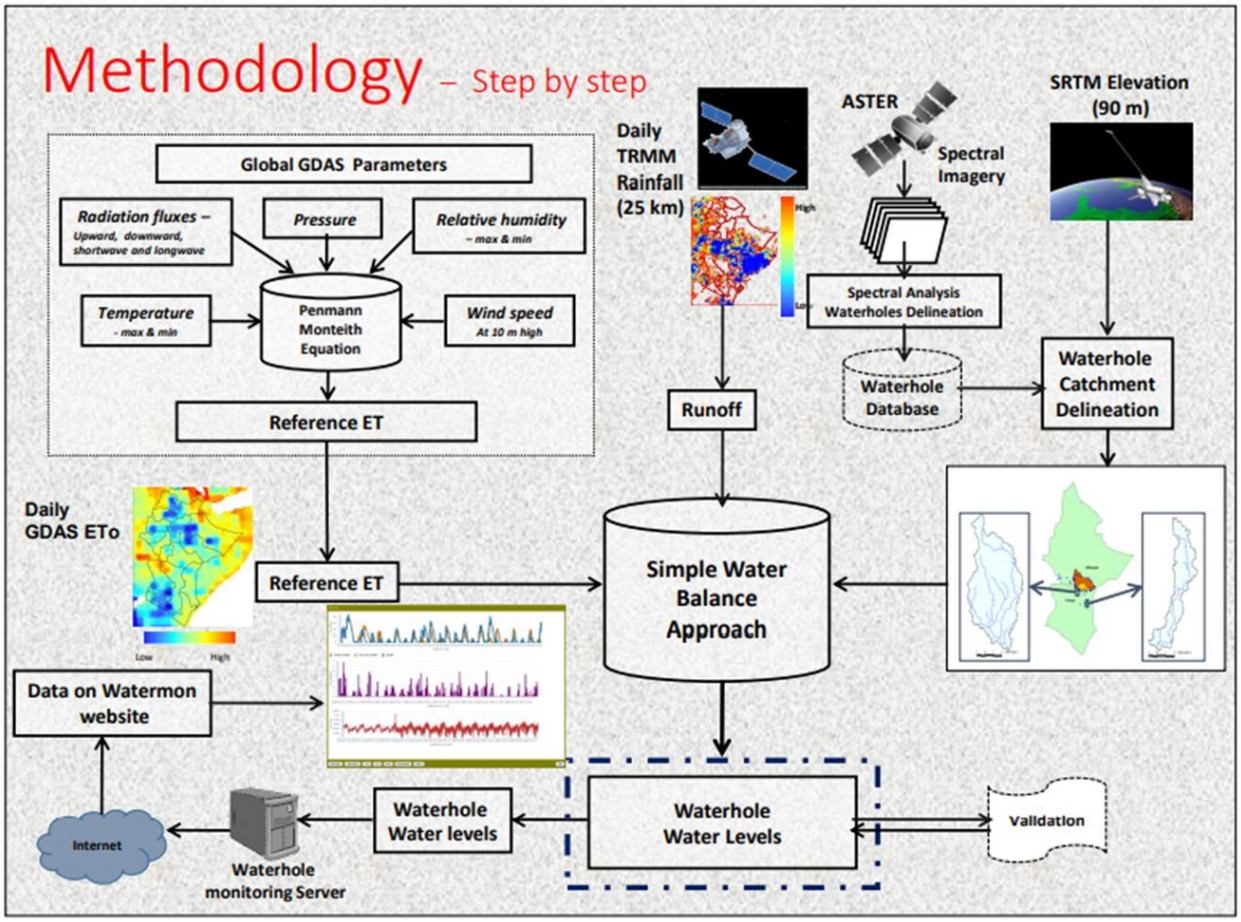
Water Balance Model: The livestock water monitoring system uses a water balance approach similar to the lake level modelling approach. This spatially distributed model, which has been parameterized using digital elevation data (Shuttle Radar Topography Mission [SRTM]), ingests rainfall (RFE2), and model derived runoff and evapotranspiration to simulate changing water depth from the surface pans or ponds on a daily basis Community based monitors were trained and inducted on the use of smart phones to collect baseline data on actual water levels and sensitise communities about system. A portion of this data was used to calibrate the model to enable close correlation between observed and

modelled data. The remaining data are used for model verification. Epicollect mobile App is used for ground truthing, model data collection.



Waterpoint Monitoring System.

It's an arid to semiarid area and waterholes are naturally small. Generally, contain shallow water loaded with sediment or other particles. Selection of satellite images and Digital Elevation Model (DEM). Shuttle Radar Topography Mission (SRTM) DEM was selected for watershed delineation. End of the wet season images were considered to capture the maximum number of waterholes with water. Clouds and cloud shadows were masked out first prior to classification



Phytomass Growth Model. The PHYGROW model is used for simulation of daily forage growth and consumption. Each site is parametrized using plant species, soil data, grazing management information and near-real time climate. The model provides outputs for forage availability, forage consumption, total plant biomass, water runoff, and soil moisture, among others. PHYGROW is hydrologically-based and can conduct a water balance as part of its simulation process. However, the model mainly serves as a plant growth simulation model, simulating both plant growth and grazing by livestock. The model has four integrated sub-models: climate, soil, plant growth and grazing. PHYGROW is based on the light use efficiency model concept that stimulates plant growth under optimal conditions (water not limiting). The model then discounts plant growth based on the degree of water stress (calculated from the water balance), temperature stress (based on species temperature tolerances for growth), and livestock grazing demand (forage intake kg/ha). PHYGROW contains parameters for soil surface and layer information, plant species and community data, livestock grazing management and stocking rates, and is driven by daily climate data. LandPKS is used for ground truthing, model data collection for the PHYGROW model.

PHYGROW: Technical Information

- R
- Coded in C++
- Object-Oriented Design
- Stand-alone and web-based versions
  - Web version allows automation
  - Web version utilizes SQL databases

```
import numpy as np
class Network(object):
    def __init__(self, sizes):
        self.num_layers = len(sizes)
        self.sizes = sizes
        self.biases = [np.random.randn(y, 1) for y in sizes[1:]]
        self.weights = [np.random.randn(y, x)
                        for x, y in zip(sizes[:-1], sizes[1:])]
    def feedforward(self, a):
        for b, w in zip(self.biases, self.weights):
            a = sigmoid(np.dot(w, a)+b)
        return a
    def SGD(self, training_data, epochs, mini_batch_size, eta,
            test_data=None):
        if test_data: n_test = len(test_data)
        n = len(training_data)
        for j in xrange(epochs):
            random.shuffle(training_data)
            mini_batches = [
                training_data[k:k+mini_batch_size]
                for k in xrange(0, n, mini_batch_size)]
            for mini_batch in mini_batches:
```

Plenary Discussion

- **The model uses 30m DEM combined with a sentinel of 10m which bring interpolation inaccuracy on the information produced. How is this addressed?** This is taken care of by the model serve which captures the variabilities to ensure information accuracy
- The system works in such a way that it masks out the mountainous areas and areas with no pasture which are excluded from the analysis.
- **How did you cater for the issue of seasonality in data?** The dry and wet seasons are factored in throughout the year. The model captures them as good/ bad seasons
- **IGAD is more focused on drought EWT, what happens to other disasters in the region?**
- Cross border issues have been quite critical to handle since most pastoralists are nomads and tend to move across the borders in search of resources (water and pasture) for their livestock especially during the dry seasons. It calls for the stakeholders involved take lead in case of any concerns
- **How do you package this information so that it can be used with pastoralists**? It's important to take all the stakeholders involved from the technical, scientists and the community into account to figure out the best way to disseminate the information for adoption. In our case we have the monthly early warning bulletin with pictures and simplified language targeting the local people for information dissemination on the weather variation as well as the forage conditions. We also try to include that aspect in the food security assessment which is conducted twice in a year during the long (March- May) and the short (October - December) rainy seasons. This analysis report gives information on the forage characteristics based on the rainy seasons and this is usually shared nationally and regionally by FAO for access.
- **How do you factor in quality control?** Quality control is done by the model. The data fed into the model are usually masked out to do away with any errors or noise to remain with the signal which is the forage available on the ground for livestock use.
- **How much does it cost to put in place such a system for inclusion in the budget line**

- **What are the skills required in order to put in place such a system?** The system is quite costly to install, putting into account the need to have its own server. We currently have our servers in Texas. However, we are developing a platform that will be hosted in the country
- **How do you get the information to trickle from the regional level to the community level for adoption?** This is done through training carried out by the experts provided resources to support such training are available. It's important to note that there are policies governing data sharing which should also be put in account
- **How does it incorporate issues on ground truthing? Are the findings of ground trothing incorporated into the system?** We have two aspects of ground truthing which are captured by the system. This includes land PKS for forage and the Epicollect for water balance ground truthing. The masking out of the invasive species has not been achieved yet but there are research going on to ensure this it tackled in the future
- **How can we synergize the other EWS that already exist with PLEWS on matters of cost and rapid Response?** This is the responsibility of the individual governments to take up the initiative to ensure effective EWS for their country. Depending the need, the cost implications should not be an inhibitor since the cost of disaster response is usually higher as compared to the cost of prevention
- **Regional centres for data systems:** There are centralised data system e.g. IGAD has a centralised climate data access, IGAD Climate Prediction and Application Centre (ICPAC), Regional Centre for Mapping of Resources for Development (RCMRD) which hosts the remote sensing data
- **Does NDVI give an index of the health of the forage:** The EWT tools (ANFB, PET, PLEWS) are integrated. The NDVI just gives forage cover within a particular domain, In that case, the Pictorial Evaluation Tool (PET) is used as a means of validation of the PLEWS product especially biomass and FCI.

Hands-on training (LandPKS and Epicollect)

LandPKS (Land Potential Knowledge System)

LandPKS was developed to help users determine the sustainable potential of their land, including its restoration potential, based on its unique soil, topography and climate. The knowledge engine, together with mobile phone applications and cloud computing technologies, facilitates more rapid and complete integration of local and scientific knowledge into land management. The current version supports the collection and automated storage and sharing of the basic information needed to determine land potential (Land Info module). It includes a Land Cover module for vegetation inventory and monitoring especially in Predictive Livestock early Warning System (PLEWS) for PHYGROW model ground truthing.

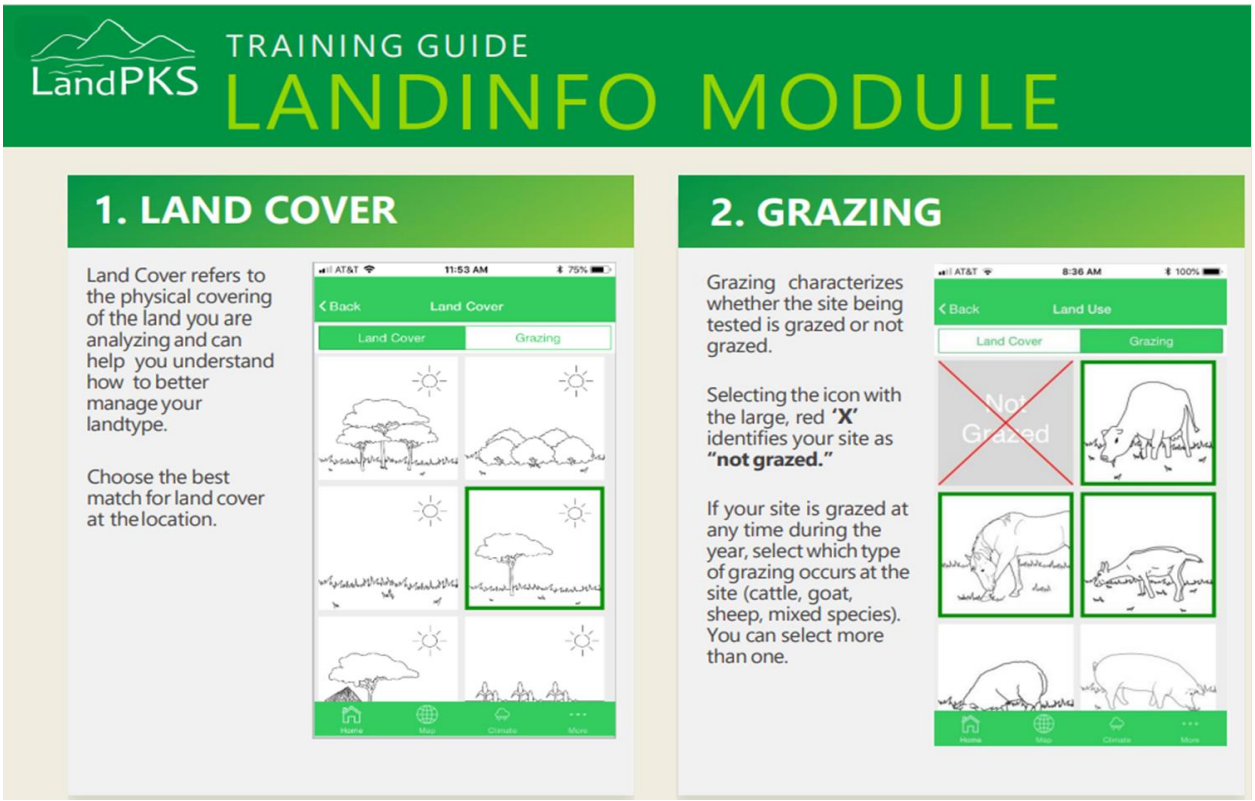
Land Info – for rapid soil (texture, colour) characterization, soil identification, and accessing soil and ecological site information.

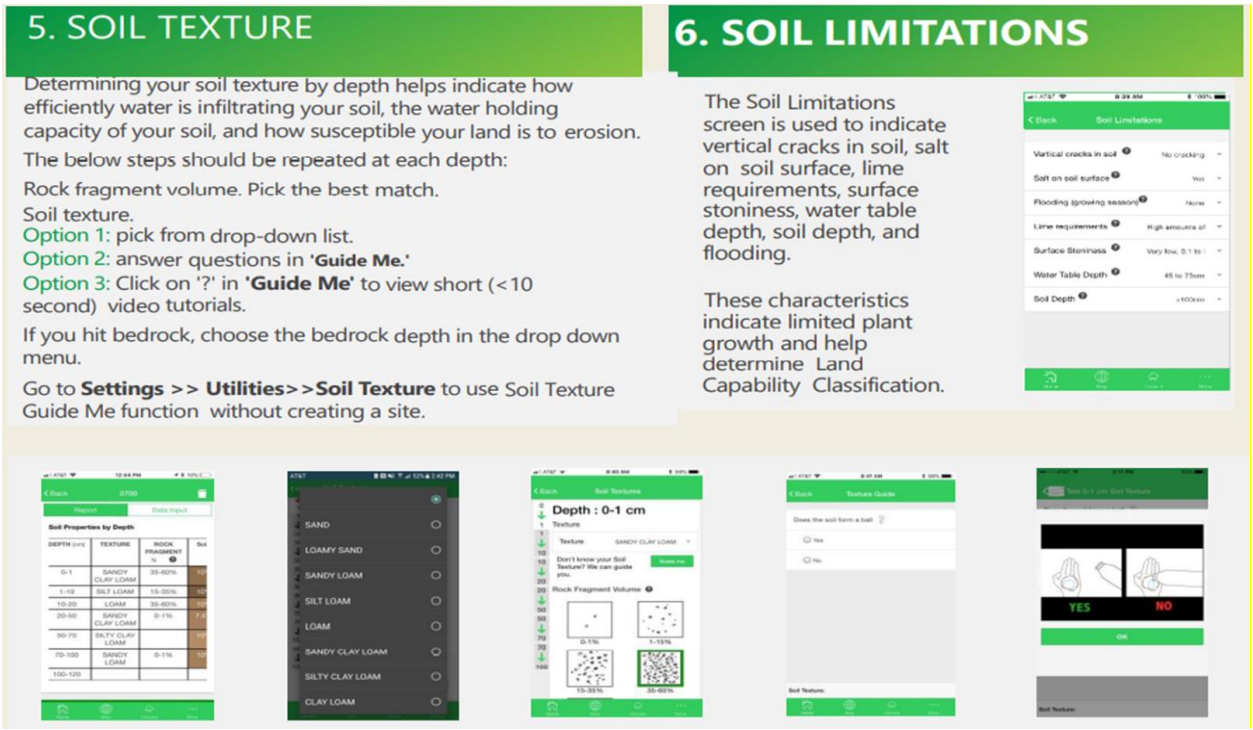
- Predicts soil infiltration & plant available water-holding capacity (AWC) at variable soil organic matter (SOM)
- Determines Land Capability Class (LCC) for sustainable land use planning and management
- Determines Soil Colour using the phone's camera and a standardised reference card
- Soil ID – matches user inputs to global soil databases to identify the soil

Land Cover – for rapid vegetation monitoring (vegetation composition, plant height, and canopy/basal gaps).

- NRCS/BLM-compatible methods
- Used for rangeland monitoring, natural resource conservation, and crop residue monitoring
- Determines vegetation composition, plant height, and canopy/basal gaps

Soil and Vegetation Monitoring Using LandPKS App





Example of LandPKS Data Collection in IGAD Countries

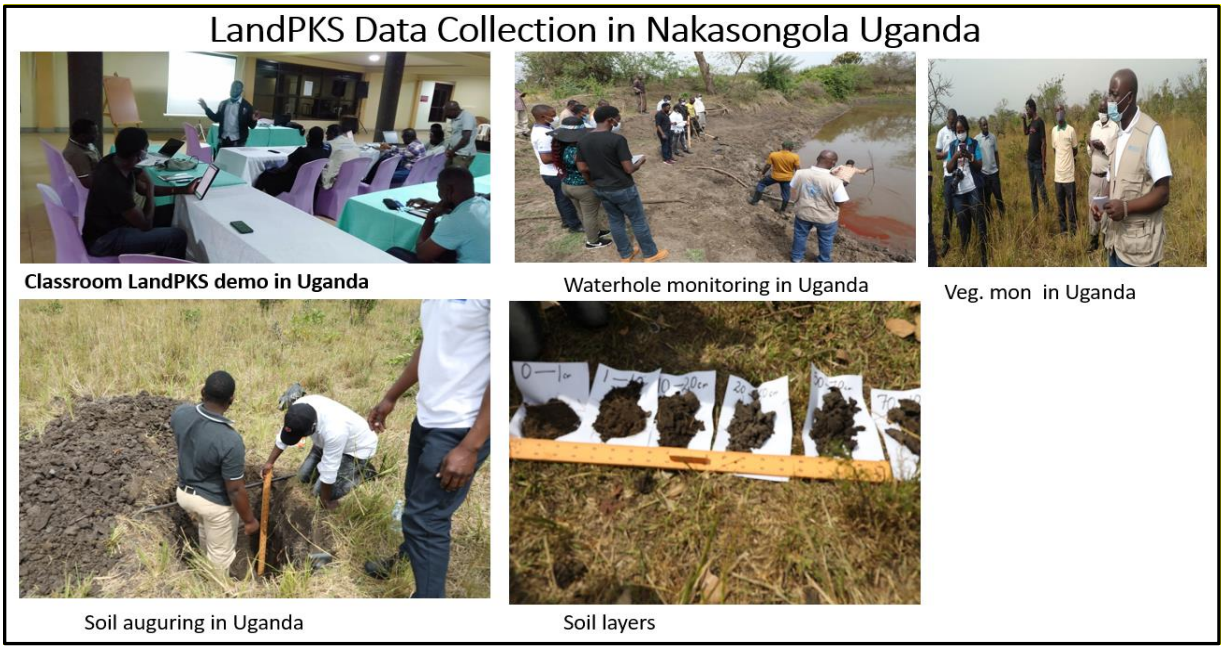


Figure 4: LandPKS Data Collection in Nakasongola Uganda

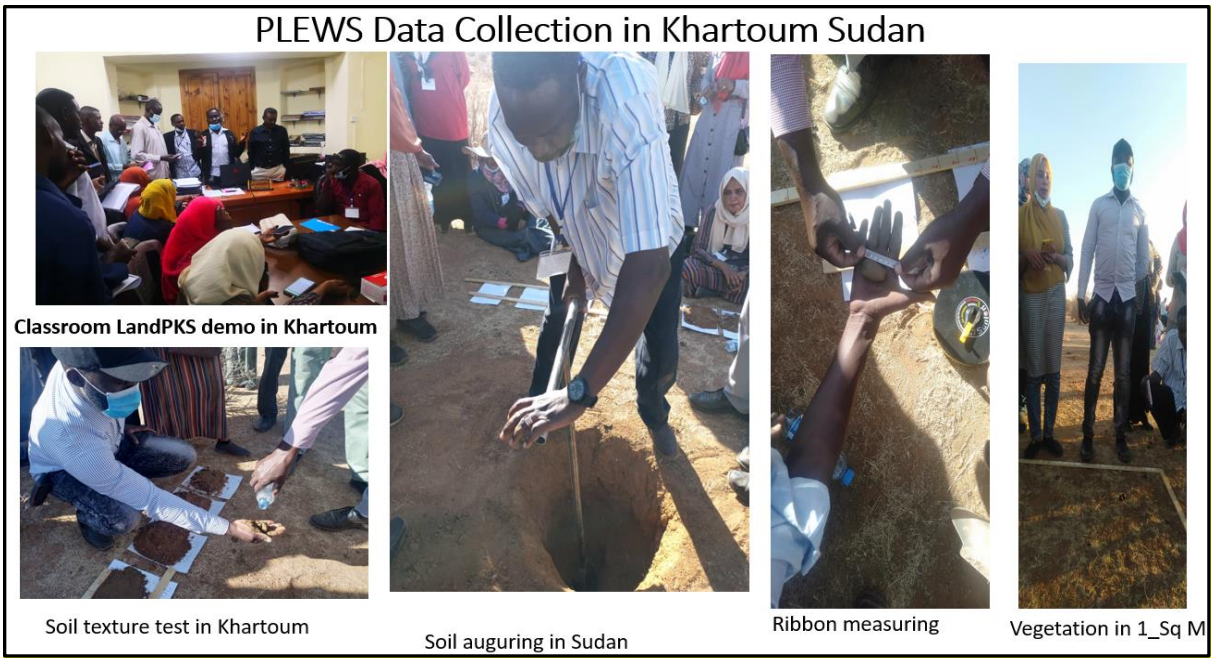


Figure 5: PLEWS Data Collection in Khartoum Sudan

Waterhole Monitoring Using LandPKS App

Epicollect is a mobile & web application for free and easy data collection. It is used for observational data collection for ground truthing in the water balance model in the PLEWS model. It provides both the web and mobile applications for the generation of forms (questionnaires) and freely hosted project websites for data collection. Projects are created by using the web application at five.epicollect.net then downloaded to the device to perform the data collection (see how to add a project to the mobile app). Data is collected (including GPS and media) using multiple devices and all data can be viewed on a central server (via map, tables, and charts). Data can be exported in csv and json format. The mobile app is available for both Android (6+) and iOS (12+).

I. Go to add entry

II. Fill in temporal details; date and time of data collection; **prompt select**

III. Add your details, Your full names; e.g., **Clinton Ouma Ogola,** Phone number**: country code (+2547)…..**

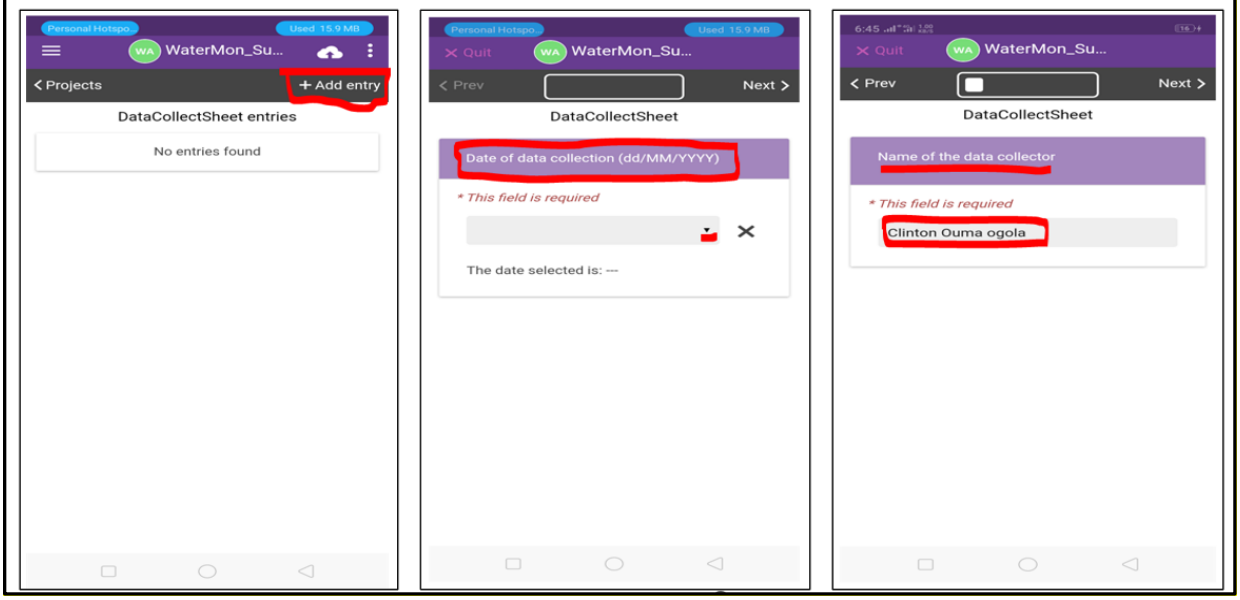


Figure 6: Stepwise demonstration on how to add project to the Epicollect mobile App

I. With Meter stick, dip it inside the water and measure its level and note it in the app. Then click next

II. Add picture of the current state of water point by clicking Take and not pick.

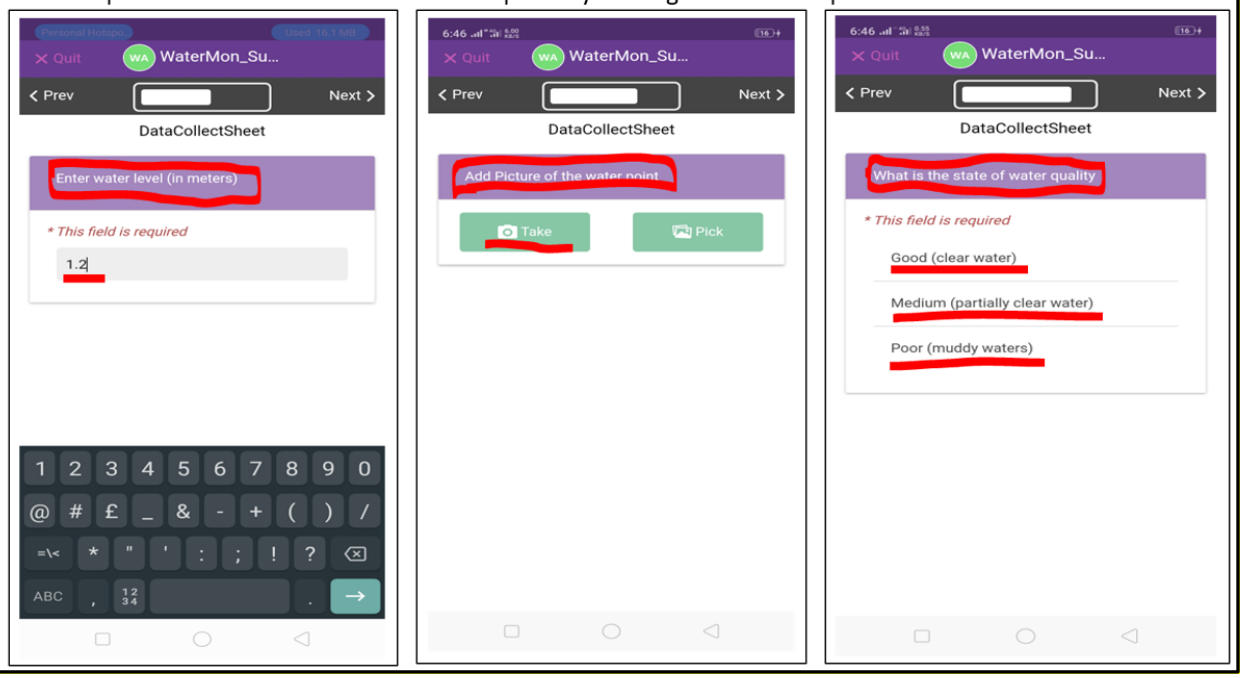


Figure 7: Stepwise demonstration on how to add project to the Epicollect App

Figure 8: Examples of waterhole monitoring using Epicollect Mobile App

Pictorial Evaluation Tool (PET)

Overview of PET

Manuals developed for Ethiopia, Sudan, South Sudan, Somalia, Uganda and Middle East. This is a visual method for rapid assessment using a custom-built app and applying Optimum Levels of Accuracy (OLA). It is a standardised set of simple tools, protocols and procedures that compare observations with photo-indicators (an annotated images) to assess crops, livestock and forage. PET is objective in that you record what you see, has a standardised methodology, it's rapid and requires simple mathematical calculations. PET is not a statistically-based survey, not a means of forecasting (for immature crops, new pastures, or livestock body condition), not qualitative and not a tool for assessing all types of crops/forage and animals. The PET methodology is easily explained, and can be used by, non-agricultural/livestock specialists. Its inherent simplicity allows almost anybody to use/master it. PET may be applied at all levels from Project to Community to District to Region to Country. It is used when results are required quickly and when rapid estimates are needed to determine trends for immediate decision making, including areas of surplus and areas of deficit. PET approach has many merits when compared with statistically based surveys. The PET approach compares observations of crops, forage or livestock.

PET LIVESTOCK

The sets of photo-indicators allow you to instantly score different crops/ forage/ livestock. Photo-indicators are photos of crops, forage or livestock at a known yield or BCS. Observations are done in transects, these include; driving transects, walking transects and hybrid transect. For PET forages, performance is categorised into yield ranges (crops/forage) or body condition scores (livestock).

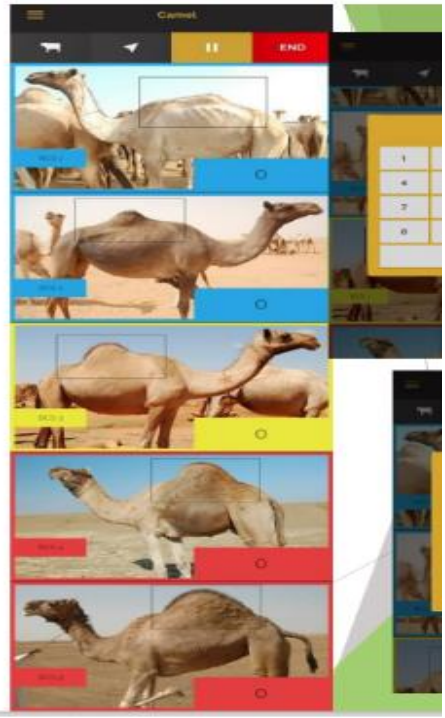
Yields/scores are colour-coded; blue, yellow and red. You have three types of PET transects; driving, walking and hybrid. Observation sequence is that a sample decreases in number, increase in detail. The inputs for PET crop forage are yield scores and estimated area of fields whereas that of livestock is body condition scores and number of animals with that score. His output in PET crop/ forage and livestock is production estimate and average body condition score respectively.

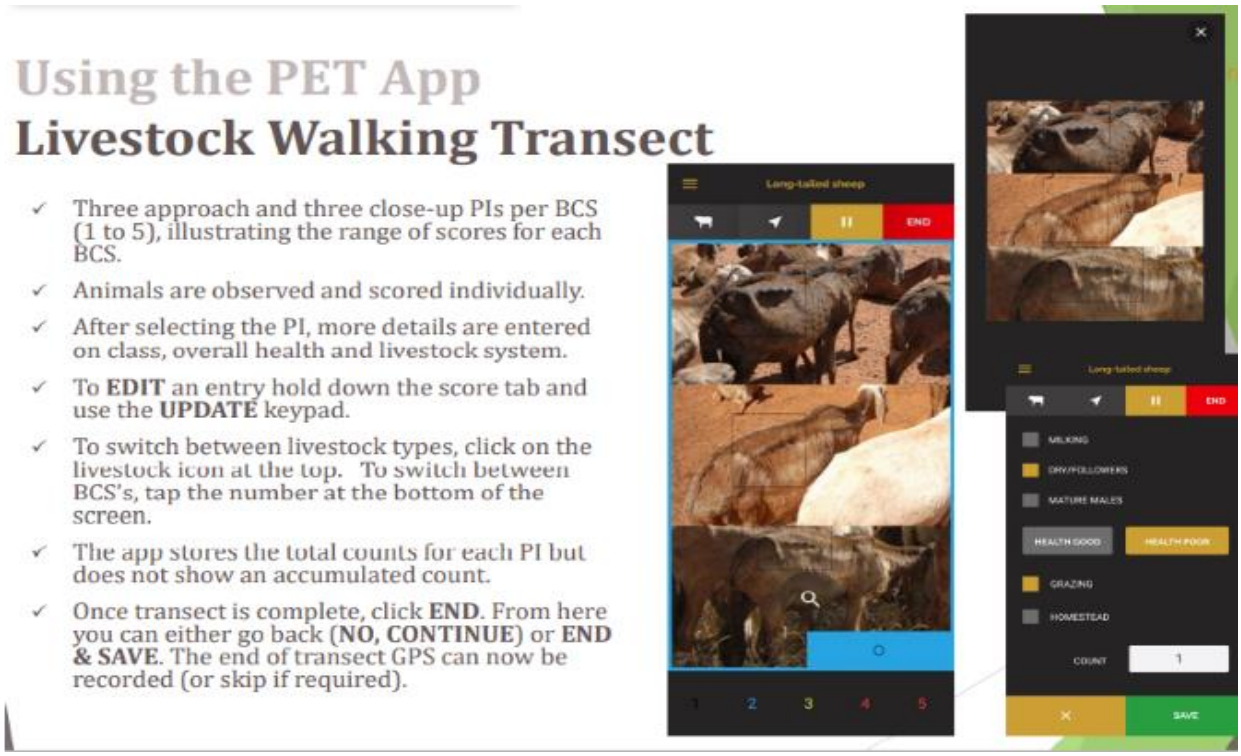
PET Livestock Contains sets of photo-indicators of familiar domestic species reared in a region/country that are divided into Body Condition Scores, based on deposits of flesh, laid down in strategic locations, or in obvious features of the body. Animals and herds/flocks are scored against the photo-indicators, providing a rapid assessment of their body condition. At the end of the assessment, weighted averages are calculated, to be used as indicators for project management or early warning systems.

In locations where the animals are held under control in confined spaces, with the permission of the livestock keepers, all livestock may be easily scored. Identify the target area or feature of the animals to be assessed which differs across the species. Score your animals. Observe, compare and score. condition scores CS1 - CS5 with the help of the photo-indicators displayed in the PET App. Each body CS for each species is portrayed by photo-indicators of carefully selected animals exhibiting the characteristics that define the given condition score. The conditions scores are colour coded; CS1 and 2 (blue), CS3 yellow and CS4 and 5 (red). Only mature animals are scored.

Using the PET App
Livestock Driving Transect

- ✓ One approach photo-indicator (PI) per BCS (1 to 5).
- ✓ The **mode score** of the group is recorded by taping on the BCS picture
- ✓ **Total number of animals** in the whole group is recorded using the keypad.
- ✓ To **EDIT** an entry hold down the score tab and use the **EDIT** keypad. The corrected value will be shown on the score tab.
- ✓ To switch between livestock types, click on the livestock icon (at the top left).
- ✓ The app stores the total counts for each PI but does not show an accumulated count.
- ✓ The app allows to collect further GPS points along the transect by tapping the arrow at the top.
- ✓ Once transect is complete, click **END**. From here you can either go back (**NO, CONTINUE**) or **END & SAVE**.. The end of transect GPS can now be recorded (or skip if required).



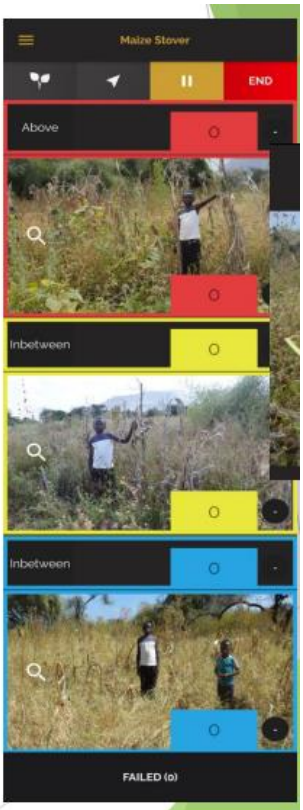


PET FORAGE

Forage monitoring majorly includes pasture (grasses and forbs) and grazing straws and stovers from cereals and pulses. Other sources of forage come from browsing bushes and trees and other cut and carried forage from all sources. PET-Forage displays photo-indicators for different types of pasture, comprising: Star grass (Cynodon nlemfuensis), Thatching grass (Hyparrhenia rufa), and Alet grass (Sporobolus africans), as well as more generic classifications of grazing areas, including Annual grass, Perennial grass, Mixed grassland, as well as Standing Sorghum and Maize Stover. Photo-indicators representing three different yields, across a representative range, are presented for each type. PET-Forage displays photos from-a-distance (approach), as well as close-up. The close-up photos are available for walking transects only. These show the standing crop within a 1 square metre area, as well as its corresponding dry matter yield in tonnes/hectare (which were identified by cutting, drying and weighing these 1m2 areas). The photo-indicators are arranged in colour-coded levels of red, yellow and blue, signifying high, medium and low performance.

Using PET Forage App
Walking Transect

- ✓ One approach and one close-up PI per forage type, plus the option to score at, above or between colour bands.
- ✓ A **FAILED** tab is available at the bottom of the screen for forages that have failed.
- ✓ At each sample point within the transect, survey the forage/stover immediately in front of where you are standing. Make your initial choice of which PI matches your sample matches.
- ✓ Open the close-up image (via the magnifying glass) for this initial choice and inspect a 1m^{2}area in front of you. If this still matches your initial choice then score this yield. If not, select and inspect a different indicator. If required, yields that appear to be between/above the PI levels can be scored. Turn to face or move on to the next sampling point.
- ✓ To **EDIT** an entry tap the minus button. To deduct from the **FAILED** crop score, hold down the **FAILED** button, enter the correct score and click **EDIT**.
- ✓ Scores entered for all PIs during a transect are accumulated and stored until syncing. The PI shows an accumulated count.
- ✓ Switch between forage type using the leaf icon on the top left of the screen.
- ✓ Once the transect is complete, click **END**. From here you can either go back (**NO, CONTINUE**) or **END & SAVE**. The end of transect GPS can now be recorded (or **SKIP** if required).



By comparing them with the pasture/stover crop being assessed and scoring accordingly, PET-Forage provides a rapid way of estimating dry matter yield. In some years, it is possible, although unlikely, that there will be no pastures/stovers in the red band. In such a year, the highest crop may be found in the yellow band. Other years, there may be none in the blue band, the lowest observation being found in the yellow band - again equally unlikely, but possible; and, if and when these situations occur, they will still be fully accounted for by the PET methodology. Two transects are available; driving and walking. Walking transects allow the level of variability across a pasture/field to be accounted for because they involve stopping and noting production at a series of points. Moving in a W-shape across the pasture/field and estimating production at scoring points spaced at regular intervals is a standard way in which the yield of the whole pasture/field may be calculated. The number of stations depends on the area and uniformity of the pasture/field being sampled. For larger areas, ten stations are normally scored. The distance between sampling points or stations will vary according to the size of the field. For most accurate estimations of yield, four readings should be taken at every station (north, south east and west). For a large field with ten or more stations. Cross check yield estimates by selecting an area of range that is uniform, select one square metre of pasture and harvest the pasture. Weigh immediately after harvesting using a sickle and weigh the grass immediately after cutting. Place the sub-sample in a tray, in a sunny, protected area for five or six hours. Turn the drying grass every hour or so. Weigh again and again, repeating the process until the same weight is recorded at two consecutive weightings. Take dry weight after each session until constant dry weight is reached. Calculations of feed availability is calculated and converted to tonnes per hectare. With this data then

one can calculate the number of animals that can be sustained by the feed in the farm and for what period of time.

PET Data Collection in the Field, Sawela Farm, Naivasha Nakuru County, Kenya.

Figure 9: Pictures showing PET Livestock Field Exercise

Experiences from the Field

- The similarities between the grass species in Kenya and those in South Africa
- Cactus species with edible fruits that serve as animal feeds as well as the plant. The plant in some cases is used for fencing.
- The integrated system: Real integrated system of a value chain from the farmer to the consumer i.e., Animal production, Animal Feed production and crop production. Besides the product value addition is done here and the products used at the hotel. Therefore, it's a complete value chain since it accommodates production, processing and the consumer.

Hands-on training on data analysis (PET)

Participants were taken through stepwise data synchronisation using the PET App. Once the data has been synchronised it can be accessed on the website where you can view, download and carry out the analysis.

Example of Analysed PET monthly data

Marsabit County PET February data

1	item_description	colour_band	value_type	value	observation_cour	milking	dry_or_followers	healthy	grazing
2	Goat	Blue	BCS	1	1	FALSE	TRUE	FALSE	TRUE
3	Goat	Blue	BCS	1	1	FALSE	TRUE	FALSE	TRUE
4	Goat	Blue	BCS	1	1	FALSE	TRUE	FALSE	TRUE
5	Goat	Blue	BCS	1	1	FALSE	TRUE	FALSE	TRUE
6	Goat	Blue	BCS	2	1	TRUE	FALSE	FALSE	TRUE
7	Goat	Blue	BCS	2	1	TRUE	FALSE	FALSE	TRUE
8	Goat	Blue	BCS	2	1	TRUE	FALSE	FALSE	TRUE
9	Goat	Blue	BCS	2	1	TRUE	FALSE	FALSE	TRUE
10	Goat	Blue	BCS	2	1	TRUE	FALSE	FALSE	TRUE
11	Goat	Blue	BCS	2	1	TRUE	FALSE	FALSE	TRUE
12	Goat	Blue	BCS	2	1	TRUE	FALSE	FALSE	TRUE
13	Goat	Blue	BCS	2	1	TRUE	FALSE	FALSE	TRUE
14	Goat	Blue	BCS	2	1	TRUE	FALSE	FALSE	TRUE
15	Goat	Blue	BCS	2	1	TRUE	FALSE	FALSE	TRUE
16	Goat	Blue	BCS	2	1	TRUE	FALSE	FALSE	TRUE
17	Goat	Blue	BCS	2	1	FALSE	FALSE	FALSE	TRUE
18	Goat	Blue	BCS	2	1	FALSE	FALSE	FALSE	TRUE
19	Goat	Blue	BCS	2	1	TRUE	FALSE	FALSE	TRUE
20	Goat	Blue	BCS	2	1	TRUE	FALSE	FALSE	TRUE
21	Goat	Blue	BCS	2	1	TRUE	FALSE	FALSE	TRUE
22	Goat	Blue	BCS	2	1	TRUE	FALSE	FALSE	TRUE
23	Fat-tailed sheep	Blue	BCS	1	1	TRUE	FALSE	FALSE	TRUE
24	Fat-tailed sheep	Blue	BCS	1	1	TRUE	FALSE	FALSE	TRUE
25	Fat-tailed sheep	Blue	BCS	1	1	TRUE	FALSE	FALSE	TRUE
26	Fat-tailed sheep	Blue	BCS	1	1	TRUE	FALSE	FALSE	TRUE

PET Reporting Format

PET LIVESTOCK DATA ANALYSIS – KENYA: MARSABIT COUNTY

Assessment dated 21st January to 20th February 2022

INTRODUCTION

This report presents analyses of data collected during the 21st January 2021 - 20th February 2022 PET Livestock assessment, in Marsabit County. Data was collected in the constituencies of Laisamis, North Horr, Moyale and Saku. The period that data were collected in this county was 22nd January - 20th February 2022. All data was sync to the PET server by 22nd February. Data was collected and submitted by 9 officers. PET data are collected using a combination of driving, hybrid and walking transects. During these transects, animals that were observed by the officers were scored on a scale of 1-5. The body condition (BC) scores correspond to previous qualitative scoring systems **used in Kenya as follows:**

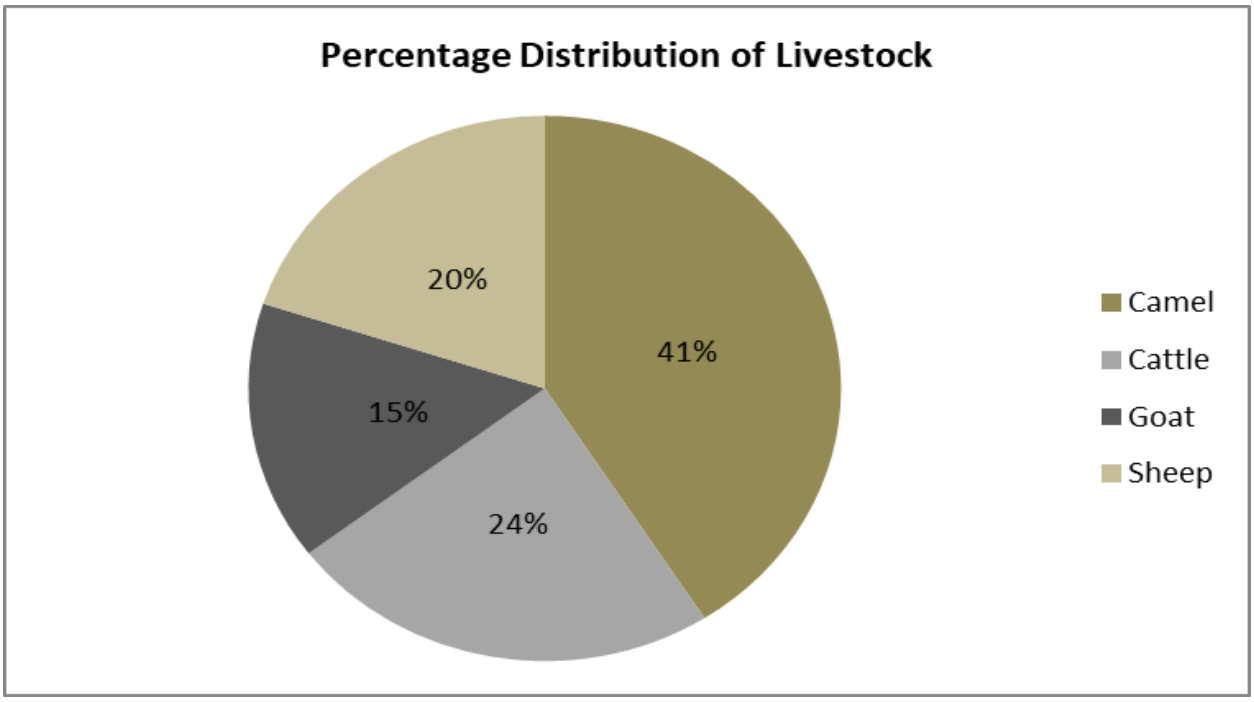
BCS	Description	Colour Codes
1	Very poor BC	Maroon
2	Poor BC	Red
3	Fair BC	Orange
4	Good BC	Light green
5	Very Good BC	Green

NOTE: Following standard procedures, before analysis commenced, walking transect data with counts of over 5 were removed. Livestock types for which 50 or less animals were scored over the assessment, are not included in the analysis. AA International is not responsible for validation of data, and has carried out <u>no other quality control of data</u> submitted to the server as part of this assessment.

The numbers of each type of transect conducted during the entire assessment; as well as the total numbers of observations analysed for these transects are shown below.

Note that the number of observations does not necessarily correspond to the total number of animals seen, as assessors working in the same region may score the same animals.

Transect Type	No. Transects	No. Obs.
Driving	7	3,059
Walking	29	6,279
Hybrid	15	8,814
Total	51	18,152



Plenary Discussion

- **Could we add more modules into PET to accommodate other Apps?** e.g., Epicollect – The app is flexible for modification.
- **Recommended sample size to be scored to be a representative**: The more the sample size the better. No standard limit applies. The limit is not established yet because the number of animals varies from farm to another.
- **Need to have animal identification to avoid duplication** – It is possible to score one animal more than once without any particular identification. If possible, to include animal individual animal identification on the app to avoid duplication during scoring. Participants were informed that an aspect of identification is captured in the hybrid transect where you get to score one animal at time in an orderly manner.
- **Scoring of only mature animals**: It was suggested that young animals should be scored to inform the farmer to improve the feeds for better health. However, the participants were informed that young animals don't contribute to food security hence not scored. However, this can be done for regions that use young animals to contribute to food security e.g., Use of young camels in Algeria but a limit must be set for the age that contribute to food security
- **SADC left out as a region**: A request was made if a reconsideration can be made so that SADC can come on board and put their heads together with the rest to localise the tool.
- **Can the app be localised**: The app can be modelled to fit a given country's requirements?
- **Indicators of Animal body condition**: The Indicators of livestock body condition is based on research over time. The app can be modified to suit a given region based on the type of animals and forage/crop in the region and the country requirements.
- **App adoption by member states**: This will be decided by the members.
- There's need to separately score the castrate since they differ from the mature bulls in terms of body condition and the scores may not reflect the same visual observation.
- The App should include specific features to be observed for clarification other than just individual judgement based on the observed features. Well explained expected features e.g. concave/convex shaped pelvic bone etc.

East Africa Hazard Watch by ICPAC.

https://eahazardswatch.icpac.net

Problem: East Africa Hazard Watch is a platform developed by IGAD to tackle the increased intensity and frequency of extreme climatic events. IGAD is a region that is prone to drought and other climatic hazards whose intensity has been on the increase since 1985. However, there's a lot of information gaps and little automation where information is not packaged for decision making. There was a need to put all the available tools into one platform for use at a glance to inform decision making. A trans-national coordination was therefore necessary for alerts due to the feedback, linkages and interdependencies between countries.

The solution was to come up with a regional public multi-hazard automated system that can facilitate early action which accompanies early warning. This is a simplified multi-hazard risk information system that is actionable and easy to use. It is also a way of moving from analysis ready data to decision

making ready information. The system is built on an open-source platform to ensure sustainability and continued customization.

The approach: To harvest key data/information considered Risk information from specialised systems, leverage on standardisation to access and disseminate risk information and come up with one centralised platform to access pertinent information from different multiple systems.

Current Work: This is still work in progress and currently it has been looking into risk information visualisation for heavy rainfall, extreme temperatures, Climate Change, Food Insecurity from IPC, Crops Conditions, drought monitoring systems, pests, cyclones and floods and their Analysis. Some of this is done or near conclusion while others haven't started yet.

ICPAC is an IGAD institution that is mandated to do climate focus or prediction and applications within the IGAD region. It also covers Rwanda, Burundi and Tanzania. The East Africa Watch hosts the ICPAC regional climate focus where one can access weekly, monthly and seasonal focus. Additionally, it shows the trends in climate change, Agricultural monitoring, food security monitoring, drought monitoring and forage forecast.

Planned Work:

a. Integration of Vulnerability and Impact based analysis using different techniques including Artificial Intelligence & Machine Learning (supported by NORCAP)
b. Climate Change Monitoring
    - Air Quality and Pollution
    - Greenhouse Gas Emissions
c. Environmental Monitoring
    - Forest Monitoring – Coverage, Status, Disturbance & Change over time using cloud computing technologies e.g., Google Earth Engine
    - Biodiversity
d. More Socio-Economic Data
    - Livelihood Zones

Plenary Discussion

- **Integration beyond IGAD region:** Mandate is limited to IGAD for now. Other countries can adopt the tool. IGAD is open for collaboration. All they need to have is the data and the tool for integration. It opened to up scaling to other regions
- **The magnitude of the work in progress and who is the host:** The system is currently hosted by ICPAC based in Nairobi
- **Data Delays for IPC Somalia:** Sometimes it takes time before the country submits the data to be uploaded into the system. Check with member states on the status so far.
- Forage factors are very important for the region. It's important to expand the EWS pass cross border
- **Cross border area**: Piloting has been done. Looking for resources to go beyond the three cross border areas
- **Forage Management and Integration:** The Forage focus by ICPAD runs behind a statistical model that has been done using the long-term forage and climate data and has also been ground trothed and verifications done. Therefore, the correlation is good and can be used with

a good level of confidence. Ground truthing is helping with the low forage management however the finer details are still under integration and having the background knowledge on the area. Explains why we work with member states to help understand what happens in a given area.

- Help other member states to integrate the forage and the crop since they have only been focused on the IPC for food security only.
- **What are the inputs that drive the results?** The different modules were handled independently and therefore could have different drivers. They are basically statistical models. E.g., For crops it's the crop models. The EAHW is basically meant to put them together.
- **Contribution of the rangeland patterns:** There are atlas that informs the various triggers based on the different focus highlighted that give early warning information on the disasters for the Kenyan situation. It also informs the movement of livestock for given periods

SESSION 6: EVIDENCE-BASED INDIGENOUS KNOWLEDGE PRACTICES: THE APPLICATION IN DRR

Overview of Indigenous Knowledge

Indigenous knowledge refers to the methods and practices developed by;

- a group of people from an advanced understanding of the local environment, which has formed over numerous generations of habitation in a certain location.
- This knowledge differs from other types of knowledge as it originates within the community, is transferred through informal means of dissemination, is collectively owned, developed over several generations and;
- Subjected to adaptation, and is embedded in a community's way of life as a means of survival and well-being

The Main Characteristics of Indigenous Knowledge

Indigenous knowledge is:

- Home-grown, derived from the solution of everyday life problems;
- Part and parcel of a community's cultural practices and ways of life;
- Often undocumented, passed on orally from one generation to another;
- Used in solving the immediate problems faced by the community;
- Dynamic, changing in parallel with events that may be taking place in a society; and
- Always under scrutiny, as it is valued for its ability to solve prevailing problems.

Examples of Application of ITK

Indigenous knowledge in agriculture

1. Local cultivation of crops and rearing of livestock in Africa are largely dependent on indigenous knowledge of local people.

Indigenous knowledge in land and soil management

2. To manage the lands on which these important crops are planted, indigenous practices such as mixed cropping which preserves the fertility of soil to ensure availability of food, and minimal tillage keeping the top soil strong enough.

Indigenous knowledge in natural resource management

3. Conservation of natural resources to ensure sustainability is another area where indigenous knowledge is invaluable. In West Africa, traditional forest management techniques help with forest conservation.

Indigenous knowledge in disaster risk management

4. Local people in Nigeria have used indigenous plants to tackle bank and gully erosions
5. In Swaziland, the presence of specific birds' species on trees can indicate the onset of the rainy season for the local people and floods can be predicted by how high birds build their nests from river surfaces (Domfeh 2007).

Vulnerability, Resilience & Indigenous Knowledge

Our mitigation approaches; Mitigating impacts of hazards and climate change often tend to focus on infrastructural development; (such as maps, building sea walls, high-tech solutions such as sophisticated early warning systems based on scientific data and models). They do save lives when hazards affect communities;

But; they need to be complemented by actions to address the underlying components of vulnerability such as; the interrelated human, social and cultural factors influencing risk and contributing to turning a hazard into a disaster.

Factor; the resilience of communities is their local knowledge.

Why? Evidence that local knowledge and practices can reduce disaster risk has grown has been clearly reflected in the Hyogo Framework for Action 2005–2015 (HFA) and, more recently, in the Sendai Framework for Disaster Risk Reduction 2015–2030 (SFDRR).

And; The latter clearly acknowledges traditional and indigenous knowledge and cultural heritage as a fundamental resource to build a culture of safety and resilience at all levels. https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030

Indigenous Knowledge & Technology

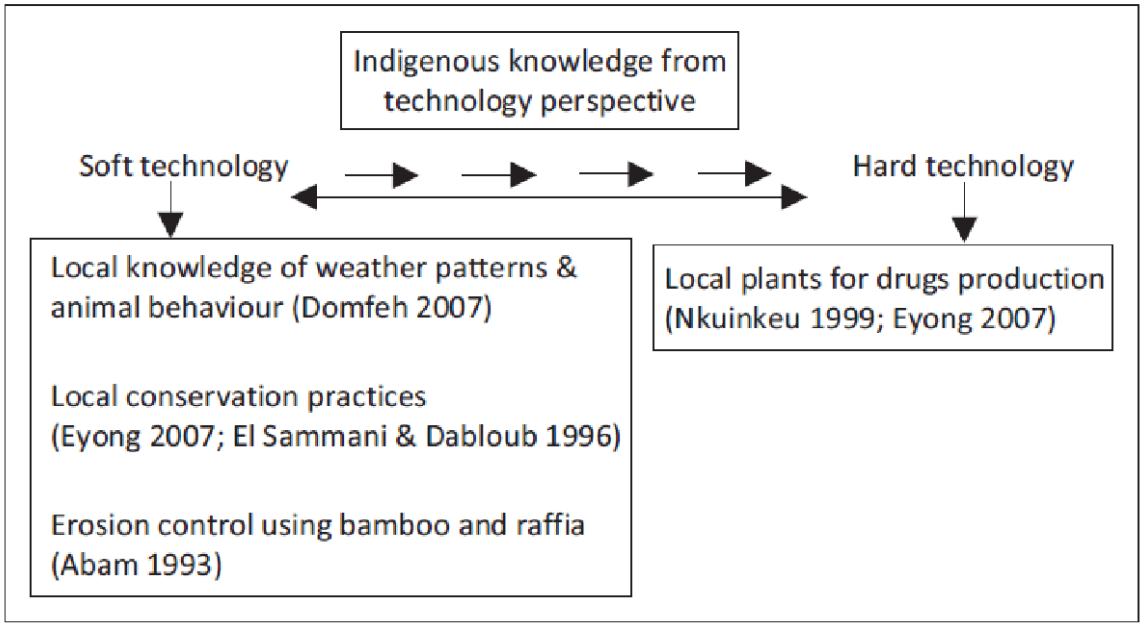


FIGURE 1: Examples of indigenous knowledge from a technology perspective.

Figure 10: Indigenous Knowledge and Technology

Policies, Plans & Programmes

- National forum to disseminate indigenous knowledge on DRR and climate change adaptation (CCA), and to discuss its integration into national and local policies and programs.
- Collaboration mechanism with Education agencies to promote the integration of indigenous knowledge in school curricula through the development of national- level policies mandating schools to integrate indigenous knowledge into appropriate subject areas.
- Promote Community-based DRR as entry point for enhancing DRR and CCA activities through the integration of local and indigenous practices with scientific and technological knowledge.

Why Integrating ITK in Policies

There are four primary arguments for the inclusion of local & indigenous knowledge in disaster risk reduction policies:

- Indigenous knowledge can be transferred and adapted to other communities in similar situations;

- Incorporating indigenous knowledge can empower communities by encouraging their participation to DRR efforts;
- Indigenous knowledge can provide invaluable information about the local context; and
- The non-formal means of disseminating indigenous knowledge can serve as a model for DRR education.

Figure 11: Plenary Discussions on ITK

Plenary Discussion

- ITK basically involves community institutions that govern the resources. There are indigenous ways of solving conflicts/ challenges as well as ways of disease reporting based on past experiences by the community. This knowledge supplements the already available scientific information especially at the community level.
- There's a need to document our ITK in Africa for benefit sharing. The genetic resources and the ITK are two components that can be harmonised to benefit us. ITK is quite applicable when it comes to veterinary resources especially in pharmacology
- In case of disease discovery in an animal, the community often tries to apply ITK to identify the disease and have it treated. In case here they are not able to do this then veterinary personnel must be informed.

Dr. Ahmed thanked the participants for their effort and commitment and for showing enthusiasm in the learning process. He recognized the suggestions made on how to adopt the EWT by the various member states which have different dimensional approaches including the political but that spells out the adoption process. The other part is the economic aspect which may focus on the models and the technical support. One of the biggest outcomes from the meeting today is to carry out need analysis per region to determine the way forward. He then thanked the facilitators and the trainers for a job well done for the day.

Group Discussion: Reflecting on the different initiatives, practices and application of indigenous traditional knowledge in DRR

Participants formed 3 groups to discuss the different initiatives, practices and application of ITK in DRR. The areas for discussion touched on the following:

1. Protecting Pastoral Livestock Assets
2. Protect African Genetic Resources – Pastoral Animals and Plants
3. Understanding disaster risk
4. Strengthening disaster risk governance to manage disaster risk
5. Investing in disaster risk reduction for resilience
6. Investing in disaster risk reduction for resilience
7. Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction.

The outcome of the discussions is summarised in the table below

Table 3: ***Reflecting on the initiatives, practices and application of indigenous traditional knowledge in DRR***

Strategic priority areas	Issues for the Indigenous Traditional intervention
Protecting Pastoral Livestock Assets	
1. Herding and night kraaling 2. Traditional health care 3. Traditional governance institutions 4. Traditional Fire management 5. Pastoral grazing land be protected from other land use (crop farmers, mining, unauthorised grazes, etc….) 6. Borrow (pastoral code) exciting success strategy e.g. from west Africa (Cameron – Burkina Faso) 7. Legal framework 8. Governance to be reviewed	1. Communal grazing system by elders 2. Migratory grazing (Static and motion) 3. Astrological experts 4. Traditional early warning experts (intestine readers, environment assessors) 5. Communal calendar 6. Transboundary agreements 7. Increase in water sources 8. Herding i.e. human and dogs 9. Use of traditional herbs to control disease e.g. aloe vera 10. Use of traditional doctors to protect livestock from theft 11. Having traps for problem animals e.g. predators 12. Construction of Kraals using strong wooden poles 13. Fencing around homesteads using acacia branches 14. Avoid being under trees to minimise lightning strikes 15. Herding for rangeland/grassland management and reduce degradation 16. Protecting livestock from predators and cattle rustlers 17. Upscaling and integrating in DRR interventions 18. Seasonal calendars 19. Use the community structures/ traditional elders (community declaration Kenya) along the Kenya borders instead of the conventional prevention methods
Protect African Genetic Resources – Pastoral Animals and Plants	

1. Rangeland deferment 2. Protection of indigenous breeds by controlling inbreeding 3. Resilient breeds (body frame for meat and milk) e.g., GMO 4. Improve local genetic resources through improvement research and traditional animal breeding	1. Avoid cross breeding/inbreeding 2. Provide market traditional breeds and products through agricultural shows/fairs 3. Provide subsidy for better traditional breeds 4. Social and cultural factors for breeding decisions 5. More resilient and adaptable to disasters (flora and fauna) 6. Conservation of genetic resources and endangered species (Nguni, Tuli etc.) 7. Conservation of plant species 8. Transboundary in breeding
Understanding disaster risk	
1. Traditional hazard identifications 2. Profile for risk assessment in each region 3. Legal framework (that are use driven) are not specific to pastoral	1. Monitor Animal and plants behaviour 2. Animal adaptability to climatic zone 3. Traditional weather and climate experts (intestine readers, environment assessors) 4. Male effect (controlled breeding during predicted disasters) 5. Excess storage of feed 6. Using this knowledge for early warning and disaster preparedness 7. Hazard profiling 8. Timely interventions (feed storage, early planting 9. Lack of data 10. Hazard profile 11. Advocacy to all stakeholders
Strengthening disaster risk governance to manage disaster risk.	
1. Traditional institutions 2. Organise sector of pastoralists 3. Set up mulita actor dialogue 4. Early warning system / Early response	1. Elected community leader committees (Communal conflict resolution) 2. Common communal guiding rules 3. Packaging and documenting Traditional Knowledge 4. Recognition of traditional knowledge

5. Rapid respond fund	5. Capacity building of traditional institutions and community institutions in DRR 6. Include the traditional institutions in DRR implementation strategy
Investing in disaster risk reduction for resilience	
1. Traditional breeds 2. Traditional rangeland and grazing management 3. Traditional cultural and rituals to guard against disasters 4. Natural resource management 5. Disease control 6. Herds management 7. Livestock marketing	1. Recognition of traditional experts 2. Production and conservation of feed production by pastoralists 3. Effecting of fines 4. Enhance research and development of indigenous breeds 5. Protection of native seeds harvesting and storage 6. Forage conservation and fodder flow planning 7. Enhance research for Protection of native seeds 8. Water / Soil / Drought issues
Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction.	
1. Traditional institutions 2. Traditional early warning system 3. Traditional hard profiling 4. Tradition rituals and cultures (Enhance confidence in the face of disasters) 5. Fund to support loss / damages 6. Capacity building 7. Raise community awareness 8. Improve public investment for pastoral area	1. Strict harmony and decency for migratory grazers 2. Communicate early warning information to community beneficiaries 3. Technological expansion to pastoral areas (telecommunication and internet 4. Strengthen and involve traditional institutions 5. Assist in development of disaster response plans 6. Traditional conservation methods 7. Traditional and community institutions capacity building

Plenary Discussion

- **The traditional doctors/medicine:** They do exist and should not be taken for granted since they play a great role in enhancing the livestock breeds
- **How can we bridge the gap between scientific research knowledge and the ITK?**
- **Need protect and enhance the indigenous livestock species e.g.,** the Boran cattle which are currently patented in Australia but whose origin is Ethiopia
- ITK is an important factor in DRR but theirs is need to consider best practices other than the ITK in general

- **Document and use of ITK technologies**: Some of the ITK are not documented hence people are sceptical about adapting the practices **or technology**
- **Conservation of the indigenous breeds:** Need to have the Indigenous societies for conservation of the indigenous breeds as well as the intervention of the government to conserve the breeds in the modern ways
- **Recognition of ITK:** In Burkina Faso the traditional medicine is highly recognized and they actually work in the medicine fraternity. However, in the livestock space the intervention has not picked up yet.
- **Comparative analysis of the ITK and the scientific knowledge:** Need to find a way in which the traditional knowledge could be compared with the conventional research knowledge. Organise regular seminars to discuss, compare and document both the ITK and the scientific knowledge. The gap could be lack of evidence or just a structured approach on how to go about it. Therefore, there's a need to come up with a guiding SOP on how to go about this.

SESSION 7: DRM INFORMATION SYSTEM

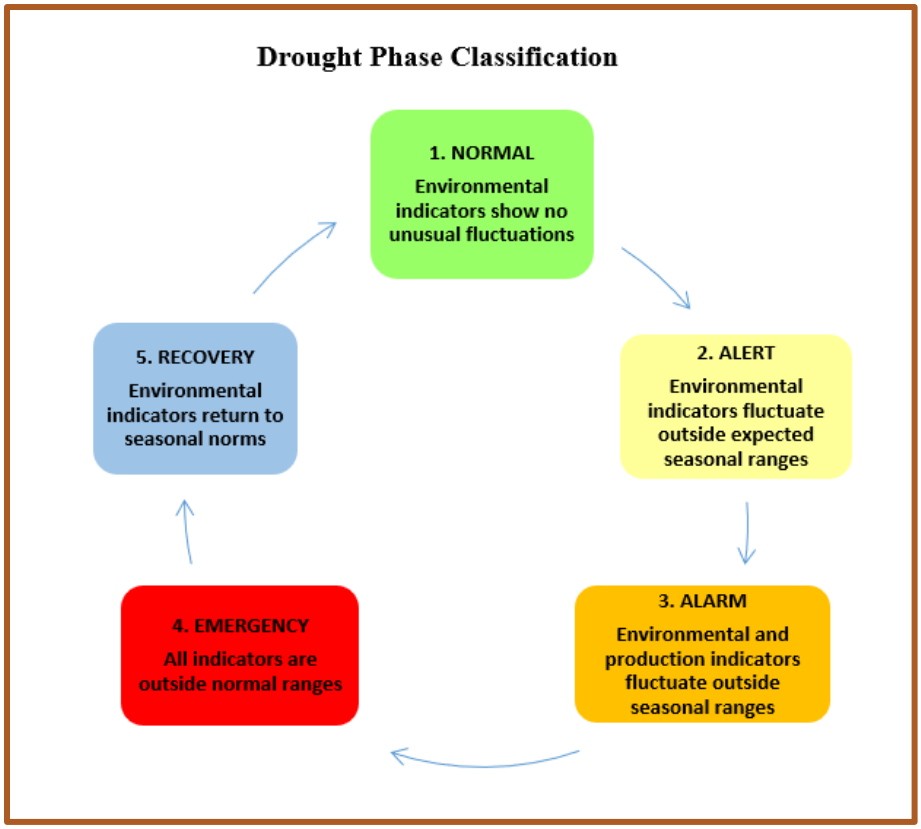
Case Study: Drought Risk Management (DRM)

Disaster risk management is the application of disaster risk reduction policies and strategies to prevent new disaster risk, reduce existing disaster risk and manage residual risk, contributing to the strengthening of resilience and reduction of disaster losses. Examples of disasters in the Greater Horn of Africa (GHA); Floods in Kenya, Droughts in Somalia and Sudan, Tropical Cyclones in Mozambique.

Drought Risk Management Case of Kenya Drought Management Authority

The drought management framework is as outlined below. Drought resilience, Drought information (EWS), Drought contingency planning and response, Knowledge management and Coordination. The drought management is closely connected to the drought phases.

The drought early warning system ensures that the following information are available to the public for consumption; Indicators data collection, Monthly County bulletin, Monthly National bulletin, Drought Situation update, Food Security Assessments (Short rains and long rains), IPC Phase



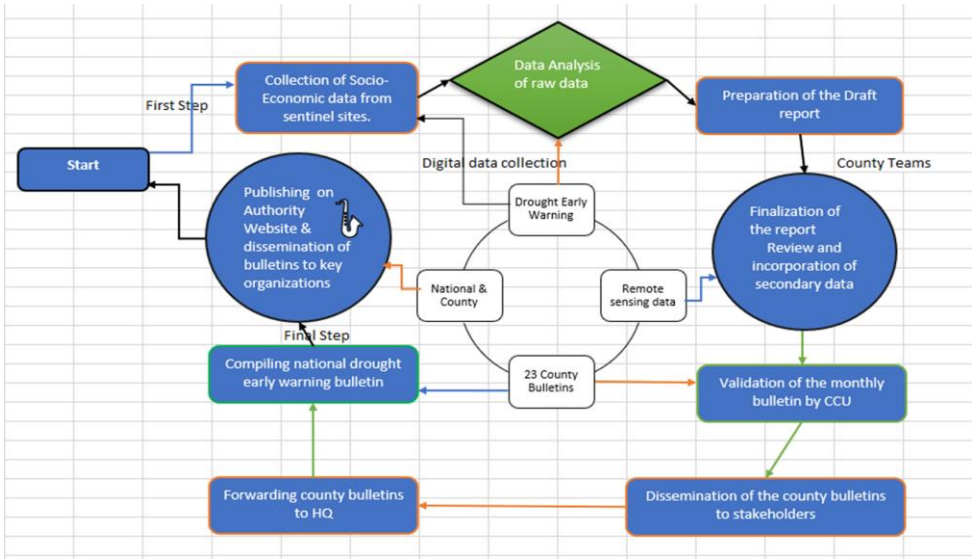
classification and Trigger mechanisms, hence drought Response. Indicators monitored for drought includes; Biophysical indicators, Production indicators, Access indicators and Utilisation indicators.

DROUGHT EARLY WARNING SYSTEM

The Kenya DEWS consists of; Indicators data collection, Monthly County bulletin, Monthly National bulletin, Drought Situation update, Food Security Assessments (Short rains and long rains), IPC Phase classification, Trigger mechanisms and Response

NDMA also conducts food security assessments twice in a year following the performance of either long rains or short rainfall seasons. This activity is steered by Kenya Food Security Steering Group (KFSSG). It involves checklist administration, to the 23 ASAL counties covering sectors of the economy that are mostly affected by the rainfall performance; health, agriculture, education, water and livestock. This activity involves, CSG briefing, fieldwork, report writing and debriefing which leads to daft county reports, the county reports are taken for collective report writing, IPC analysis and national report indicating food and nutrition security situation in the country. This is used to trigger response

activity in case of a worsening drought situation. The response includes; food assistance, non-food assistance cash transfers by HSNP.



TRIGGERS FOR RESPONSE

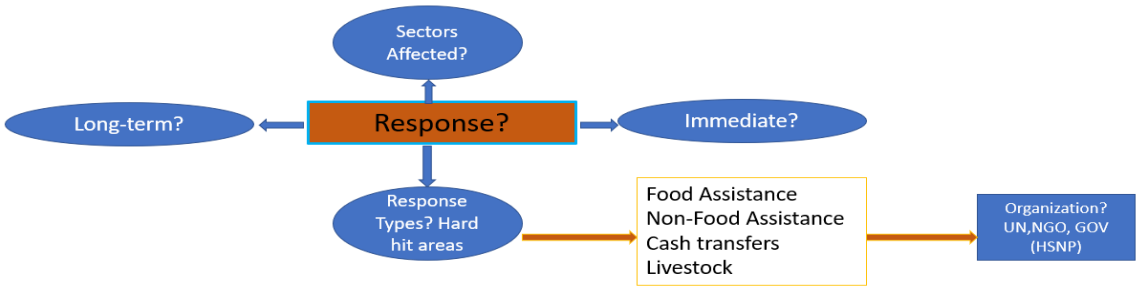
Biophysical Indicators - SPI?
- Soil moisture?
- VCI?
- FCI?

Critical level superseded?

Colour	VCI values (3-month)	Drought Category
	≥50	Vegetation greenness above normal
	>=35 - <50	Normal vegetation greenness
	>=20 - <35	Moderate vegetation deficit
	>=10 - <20	Severe vegetation deficit
	<10	Extreme vegetation deficit

What do socio-economic Indicators say?

YES !!!!



Group Discussion

Participants formed 4 regional group discussions to discuss the applicable steps in various disaster management strategies. The outcome of the various group discussions is summarised in the table below:

Table 4: Applicable steps in disaster management.

HAZARD?	THREATS?	BARRIERS?	DISASTER?	RECOVERY MEASURES?	ESCALATION FACTORS?	IMPACTS ON PEAR?	Ratings	Existing Early warning Systems Architecture
IGAD								
Drought						P E A R	P E A R	
	Livestock diseases, Water shortage, Crop failures and Increased migrations	Inadequate preparedness and response capacity Poverty Cultural attachment to livestock Limited access to drought information EWS.	Drought	Restocking, Reseeding of pasture, Seed fairs, Access to finance, Access to inputs markets, Provision of extension services, Access insurance Rehabilitation of water sources.	Poverty Conflict and insecurity Resources conflict Opportunistic diseases	**People** Mortality of humans Increased conflict Internal displacements and migration **Environment** Land degradation Deforestation Loss of biodiversity Encroachment of invasive species **Assets** Death of livestock Human – wildlife conflicts	4 4 4 4	Tradition methods National and subnational EWS Integrated Phase classification Existing DRR committees at community levels FEWSNET Food security and nutrition working groups regional, nation • Regional early warning system
Floods	Internal displacements, human diseases Livestock diseases,	A party to heed advice, Inadequate preparedness and response capacity, Poverty	Floods	Repair infrastructure Insurance Restocking	Land degradation Unserved canals	**People** Human deaths Increased conflict	2 2 2 2	Meteorological information at national level,

	Crop damage and Increased migrations, Landslides	Limited river level monitoring Lack of rapid information dissemination. Infrastructure damage		Public health interventions Reseeding of pasture Seed fairs Vector control Massive animal vaccination Access to finance Access to inputs markets Provision of extension services	Sand harvesting in rivers Deforestation	Damaged Infrastructure **Environment** Human wildlife conflicts, Land degradation, Deforestation, Loss of biodiversity, Internal displacements and migration **Assets** Disease outbreaks for both human and livestock, Death of livestock Crop fields damage		Rain gauges and rivers gauges at subnational levels, Traditional knowledge and prediction methods, East African Hazards watch, RANET(Kenya), Radio stations SWALIM
SADC								

Climate Change	Prolonged dry spells, High evapotranspiration (escalated temperatures), low rainfall	EWS, Pasture, water and Fodder conservation, selective breeding, CSA	Drought	Drought contingency plans, distribution of water and feed, destocking, fodder subsidy, migration, confine the animal movement	Lack of machinery for fodder production, disease outbreak, lack of coordination and capacity, for response teams, wildfires	**People** Food Insecurity (nutrition, access, availability) Diseases Death Psychological and physical effect High food prices **Environment** Loss on biodiversity (flora and fauna) Desertification and land degradation Water insecurity **Assets** Livestock mortality (diseases, hunger) Crop failure Loss of livestock products Reputation loss of status socio-economic reluctance of people to invest in agriculture		

						Encourage farmers to market their livestock.		

UMA								
Drought	Water ressources	Water points	Depletion of groundwater,	Promotions of the use of unconventional resources		Emergences of human and animal diseases		National strategies to combat the effects of drought
		Dams	Drying up of water points		Climatic changes			
		Underground dam		Tablecloth refill		Reduction in revenue		The establishment of funds for the safeguard of livestock and pasture
					Deforestation and overgrazing			
				Interconnection s of dams		Increase in the poverty rate		
					wood fire			
				Hill dams	Community conflicts	Reduction of water resources		
				Development of alternative food resources (pastoral resources, perennial crops,	Inadequate management and coordination of routes (collectives)	Soil degradation		
					Land status	Salinization and groundwater pollution		
				Establishment of funds to combat drought,				
					Epizootics			
				Fight against silting and				

				stabilisation of dunes				
					Socio-cultural factors			
	Animal Feeding and rangeland resources	Diversify alternative food resources,	Reduced livestock productivity (meat, milk, genetic potential, reproduction)					
		Promotion of resilient local plant genetic resources						
		scientific research funding						
		Prophylactic measures, controls and monitoring of cross-border diseases,	Increase in mortality rates,					
	Animal Health	Promotion of local breeds						
			Transmission of diseases / transhumance					
	Soil degradation	CES works	Loss of soil fertility,					
		Reforestation	Depletion of microorganisms					
		CP planting						
		Amendment in organic matter	Compaction					
		Workforce control						
ECOWAS & ECCAS								

Movement of animals (transhumance, trade, etc.)	Drought Drying up of water points Conflicts (inter-community, civil war, etc.) Scarcity/destruction of pastures (bush fires) Insect infestations	Sanitary checkpoint Construction of water points Establishment/construction of transhumance corridors Creation of grazing areas Firewall tape Awareness of actors Prevention and conflict management mechanism (agro-pastoral, etc.)	Avian Flu	Zoning of territories (quarantine, risk zone, etc.) Stamping out Destruction of carcasses (incineration, etc.) Distribution of contingency materials (disinfectants, etc.)	Failure to respect sanitary barriers Disinformation campaigns Non-involvement of actors in the response Clandestine slaughtering and marketing Scarcity of materials and contingency products Corruption Non-compliance with biosafety and biosecurity measures Border porosity	**People** Property losses (Animal Mortality, Morbidity) Spread of zoonotic diseases (loss of human life) Loss of jobs Price fluctuation **Materials** Destruction of non-compliant buildings **Reputation** Poor perception of poultry products and poultry farmers in society Food insecurity Border closure	P: 3 E: 1 A: 2 R: 4	Monitoring system (RESCAM, REPIMAT) Contingency plan
Risky behaviour (breeders' reluctance to vaccinate, etc.)	Failure of actors to adhere to vaccination or screening campaigns	Reinforcement of vaccination coverage Raising awareness and training of actors community relays						
Disinformation campaign	Position of ill-informed political actors, Rumours and social networks	Awareness raising and training Advocacy Information campaign on social networks						
Low coverage rate of animal health services	Conflicts Isolation of breeding areas	Basin opening up program						

(private or public)	Poor farmer adherence to animal health services							
Bad practices (poor storage conditions for veterinary products, etc.)	Existence of non-professional actors in animal health services street vending of veterinary products	Strengthening of quality control Strengthening the technical capacities of animal health workers Training of community relays						

AU-IBAR data modules and potential applications for DRR information System

Animal Resources Information System (ARIS) is a Customizable Multilingual Data Collection Tool for African Union Member States.

Table 5: Summary of Animal Resource Information System (IRIS)

Animal Resources Information System (ARIS)				
Components	***data collection features***	***Interoperability***	***Training and Certification Program***	*FAQ*
> Data Collection > Training and Certification Platform > Collaborative Platform > Alert Platform	> Offline Mode: Excel Files > Online Mode: Forms	> Format XLSForm > Open Data Kit > KoboToolbox	> Pre-Assessment > Foundation Level > Intermediate Level > Advanced Level Examine	> Hosted in Kenya > Based on Open-Source Tools > Costs absorbed in AU-IBAR Operational Costs

Plenary Discussions

- **ARIS tool; the adoption rate and the available version for use by member states:** It's taken some time to develop AAGRIS version 3. The 1st version of ARIS was used in 2007 in a project and the system came to an end at the end of the project for lack of financial resources. The technological structure was then changed for the 2nd version. 42 out of 55 countries achieved the right of use. For the need of upgrade, we rewrote the software and developed version 3 which has two options for data submission that is online using network or offline using excel sheet. Currently the version is not on for use by member states since data migration from the previous version is ongoing and we've achieved 35%. Once we are done, we will deploy the software in the countries. In terms of users, we are at 65%. The users have basically been the veterinary services persons but we intend to open it up to other users during deployment e.g., animal production, fisheries and aquaculture. For the Last quarter we intend to deploy it to a number of countries. For refresher courses different actors will be asked to connect to an online training platform.
- **Certification following the workshop training:** The training program has been quite dense. We will consider organising some training sessions for various tools categorised in three levels. However, there's also some multimedia content provided to make the platform more interactive
- **Do we have a connection between DAD-IS and ARIS? The North African region encountered issues with DAD-IS on data reliability.** Data should be submitted to the OIE every 6 months and for AU is on a monthly basis. However, the AU data is more detailed unlike the OIE data that just covers some diseases. Data must therefore be transferred from ARIS to OIE. OIE is working on their new system hence the delay. Discussions are underway on how AAGRIS and OIE can operate together moving forward. No adequate information on DAD-IS.
- **Warning System in ARIS:** The veterinary persons will feed in information on disease outbreak in a given place. Those registered by the early warning system will then get notification through messages. There are no costs involved, only registration is required and is only available to the social actors.
- **Is the use of ARIS open to use by universities that are working on risk management or they can develop their own tools and disseminate them**? For the non-state actors, it is under consideration but we haven't decided on the administrative procedures to include all the private sectors. It is feasible but there's a need to ensure the administrative processes/ regulations are in place simply because of the economic impacts and implications that could be involved. Their inclusion is very important since they are also source of information

Applications of Animal Health Surveillance – Case studies: Kenya

National Surveillance in Livestock Health Sector-Kenya

Surveillance is the systematic, continuous collection, collation, analysis and interpretation of health data. Animal health information is disseminated in a timely manner for assessment and response as necessary.

Why do we carry out surveillance?

- Emergency preparedness (Early Warning systems). It enables the rapid detection of incursion or sudden surge in the incidence of priority livestock Diseases-Early detection of disease-index case if possible
- Prediction of the source and progression of the disease outbreaks- surveillance data can be used to detect changes in disease characteristics that affect the population
- Planning and monitoring of disease control programs;
- Provision of evidence-based animal health advice to farmers
- Trade

DVS Epidemiological surveillance system.

The DVS ESS is made up of:

- *Passive surveillance system:* Passive surveillance relies upon data collected from farmers and community, disease reporters reporting diseases, meat inspection reports, analysis of samples submitted to laboratories and border inspection points. It requires a reliable veterinary service. It is a continuous activity and a basic requirement of the World Animal Health Organisation (OIE).
- *Active surveillance system:* Is an activity that is designed and initiated by the prime users of the data. Aims at detecting and measuring the presence or absence of a specific disease (infection) or diseases
- *Laboratory diagnostic system*

Disease reporting as a component of ESS

- Disease reporting as a requirement of the OIE
    - Article 1.1.2 –Member countries must notify other member countries of any important event 'event' means a single outbreak or a group of epidemiologically related outbreaks of a given disease, infection or infestation that is the subject of a notification. Member Countries shall also provide information on the measures taken to prevent the spread
- Under Cap 364 (The Animal Diseases Act): disease reporting is mandatory.
- Notifiable diseases- are those diseases whose presence or suspicion must be reported to the DVS. These diseases have been gazette by the Director under Cap 364

There are two disease reporting tools: The Notifiable Disease reporting forms (ND1) forms and Zero report forms.

Kenya Animal Bio Surveillance System (KABS) is a near real-time disease surveillance system capable of real time data collection, transmission, analysis, and feedback to field surveillance officer to improve detection of diseases in both domestic and wild animals. The KABS provides an electronic platform that allows government and private veterinary surgeons and veterinary paraprofessionals to capture data electronically and transmit to the server on near- real time basis

Challenges in surveillance system

i. Low specificity of this surveillance system since majority of the data from counties is based on clinical diagnosis
ii. Inadequate participation by private AHSPs in surveillance and reporting

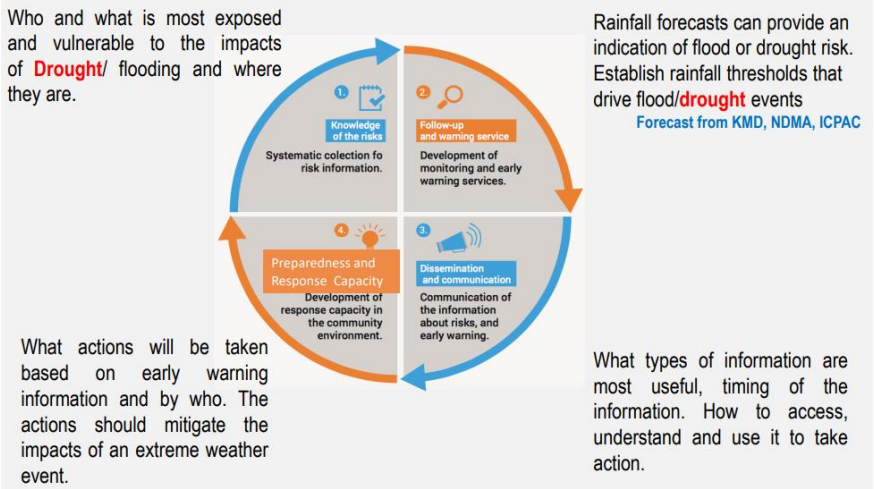
iii. Inadequate feedback system to the ground- National and County levels
iv. Limited resources – capacity building, active surveillance, reporting
v. Response rate by AHSPs to disease reports is low

SESSION 8: AWARENESS AND PREPAREDNESS

Disaster preparedness refers to measures taken to prepare for and reduce the effects of disasters. That is, to predict and where possible prevent them, mitigate their impact on vulnerable populations, and respond to and effectively cope with their consequences. Disaster preparedness is best viewed from a broad perspective and is more appropriately conceived of as a goal, rather than as a specialised programme or stage that immediately precedes disaster response. Disaster preparedness is a continuous and integrated process resulting from a wide range of activities and resources rather than from a distinct sectoral activity by itself. It requires the contributions of many different areas ranging from training and logistics, to health care to institutional development.

Early Action (EWEA) System translates warnings into anticipatory actions to reduce the impact of specific disaster events. It focuses on consolidating available forecasting information and putting plans in place to make sure institutions act when a warning is at hand. "Early action, also known as anticipatory action or forecast-based action, means taking steps to protect people before a disaster strike based on early warning or forecasts. To be effective, it must involve meaningful engagement with at-risk communities." Anticipatory action refers to actions we can take before a predicted hazard hits to prevent or reduce its potential impacts. Examples of these actions include early evacuation, reinforcing homes, distributing health protection kits or distributing cash.

EWEA through IARP Project has enabled KRCS in partnership with government and other agencies to deliver; **cost-effective**, **targeted and timely action** for the most vulnerable people facing climate-related disasters



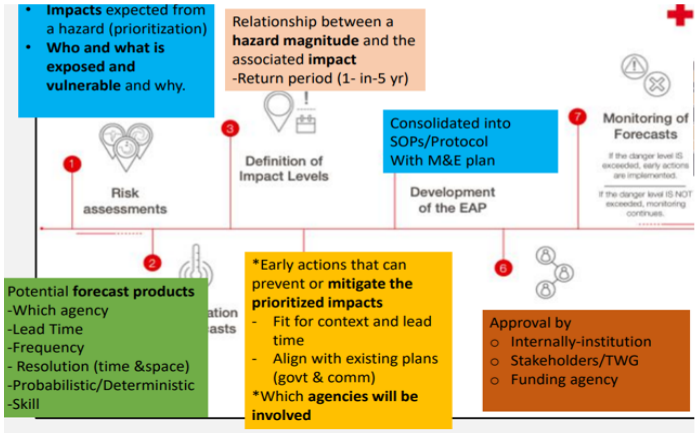
Forecast based Action for Preparedness

What is Forecast based Action? Why is it needed?

- Better to act in **ADVANCE** of a hazard event…
  …than to respond **AFTER** the event
- Possible due to advances in climate science.

Early Action Protocols (EAPs)

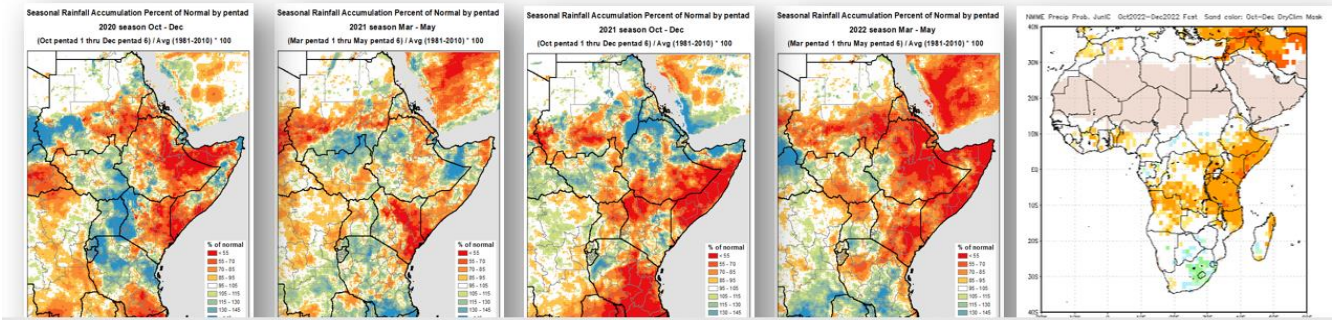
Early Action Protocols are formal plans produced by National Societies. They outline the early actions they need to take when a specific hazard is forecasted to impact communities.



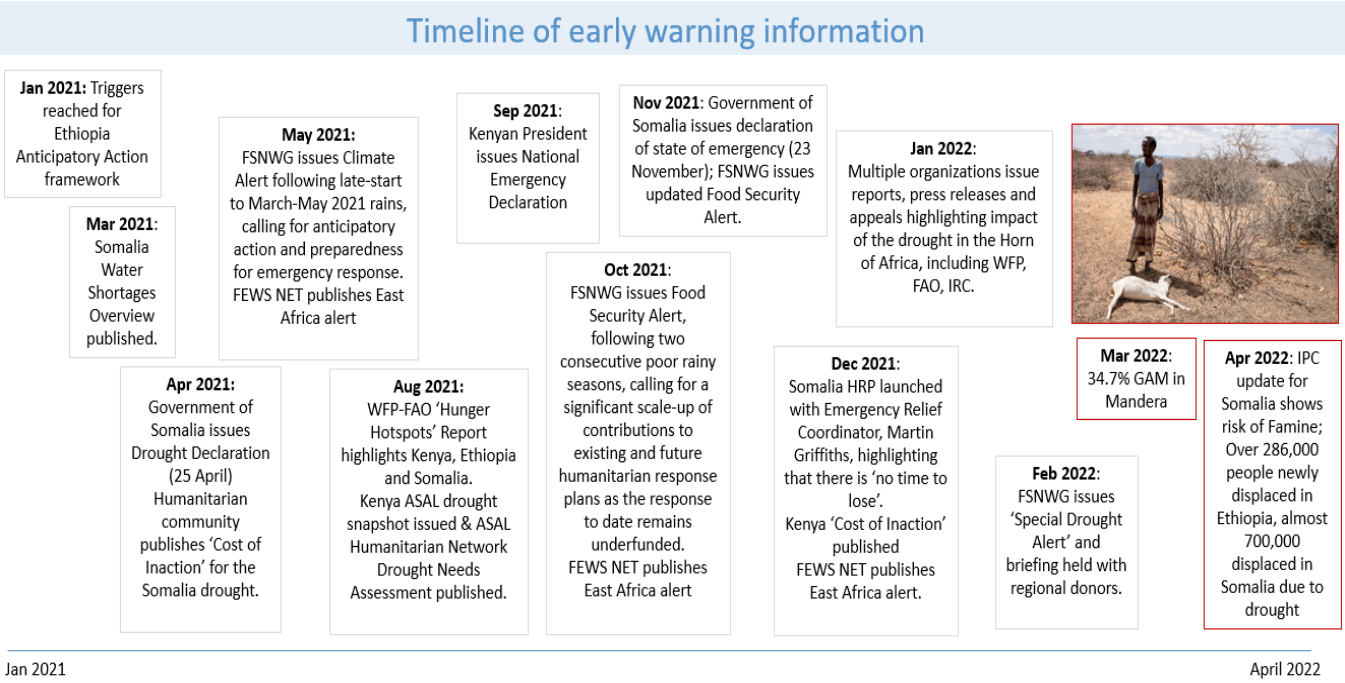
- Pre-positioning of the stock for early actions
- Readiness activities so the National Society is prepared and on standby to respond
- Pre-agreed early action activities designed to save lives

Examples: Current drought has been extremely intense, repetitive, extensive and hot

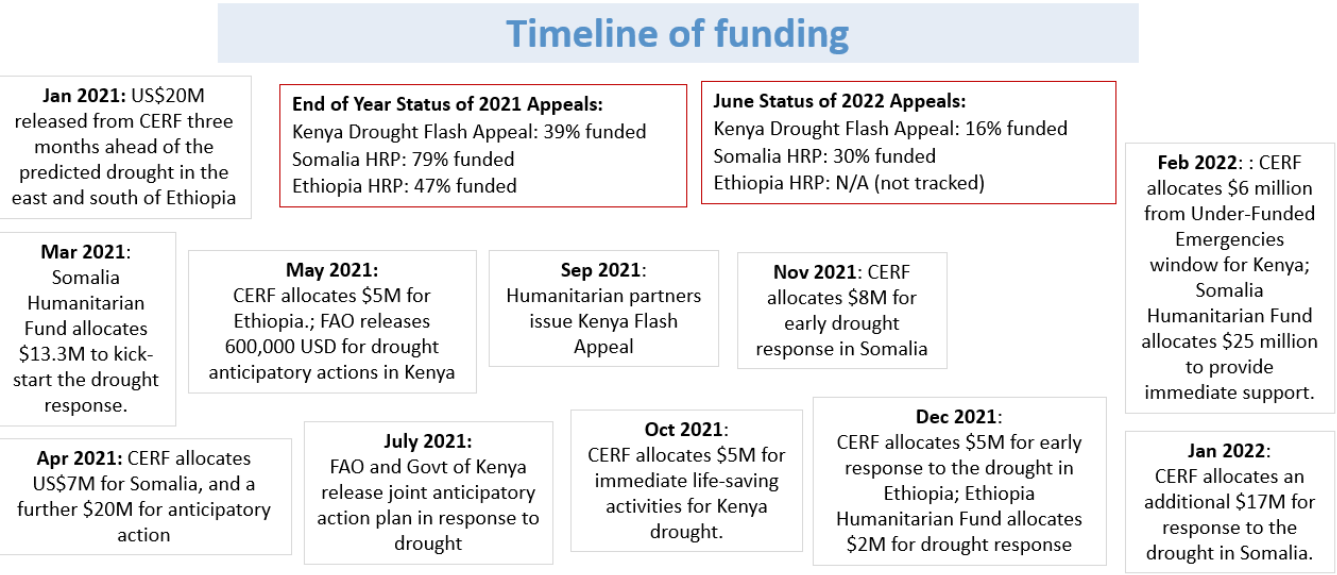
- The 2022 MAM is the one of the most severe droughts in the last 70 years
- Drought is comparable to the very poor 1984 and 2011 MAM seasons – years of widespread famine
- A 4-season sequence of below-normal rains has not been seen in at least the last 40 years
- > 80% of the eastern Horn of Africa received low rainfall amounts; worse than signature drought years (1984 and 2011)
- Expectations of a fifth below-average rainy season between October and December.



Awareness in Terms of Early Warning



Preparedness in terms of Funding



Challenges facing anticipatory action during current drought

Difficulties raising attention to the drought given competing priorities (at both the regional and global levels) and donor fatigue (e.g., feeling that East Africa is always facing drought)

Differences in definitions relating to anticipatory action between agencies drove inconsistent messaging

Uncertainty about forecasts (forecasts generally converged for 2021 OND season but there was significant uncertainty/lack of convergence for 2022 MAM season).

SESSION 9: CONCLUSION AND RECOMMENDATIONS

Conclusion

The workshop was carried out in accordance with the scheduled program, and the overall objectives were met. Participants benefited from the training, and were ready to contribute to supporting the implementation and practices of the Africa Regional Strategy For- Disaster Risk Reduction (ARS-DRR) (promoting Early Warning and Disaster Risk Reduction.

It was noted that the above group discussion on the way forward for promoting the implementation of the ARS-DRR will be discussed with the authorities at the regional level where decisions will be made for future planning.

The facilitator thanked participants for their enthusiasm and persistence, and most importantly for their response to attend the workshop irrespective of the tight timings. She noted that AU-AIBAR brings commitments with support where they can and they are open to collaboration for possible situations. Everybody has certainly learnt important lessons through the event, hopefully to the benefit of the entire workshop program and continued official information exchange in the region.

Recommendations

The following recommendations are considered for the next step of action. They include:

- Extending sensitisation on the training on the implementation and practices of the Africa Regional for Disaster Risk Reduction in terms of early warning and Disaster Risk Reduction to the regional level; SADC, ECOWAS, UMA, ECCAS and IGAD member states. Training in a specific country is highly recommended.
- Establishment of Early Warning Systems and strengthening the existing Early Warning Systems in regional economic blocs and member states in the context of pastoral rangelands. IGAD Early Warning Tools (EWT), AFBS, PET and PLEWS.
- Strengthening of Early Warning Early Action Protocols within Africa Economic block; SADC, ECOWAS, UMA, ECCAS AND IGAD. This includes; synergies between awareness of early warning information and preparedness to disaster risks. Forecast based Action (FbA) and Forecast based Financing (FbF).
- Capacity building and capacity strengthening to the officers of SADC, ECOWAS, UMA, ECCAS and IGAD member states on the use of Earth Observation (EO), Remote Sensing, Geographic Information System (GIS) on forage monitoring in rangelands.

Appendix 1: Participants List

AFRICAN UNION
INTERAFRICAN BUREAU FOR ANIMAL RESOURCES

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REGIONAL TRAINING WORKSHOP ON SUPPORTING THE IMPLEMENTATION AND PRACTICES OF THE AFRICA REGIONAL STRATEGY FOR -DISASTER RISK REDUCTION FOR PROMOTING EARLY WARNING AND DISASTER RISK REDUCTION IN ECCAS, ECOWAS, IGAD, SADC AND UMA

NAIVASHA, KENYA 4-8 JULY 2022.

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Appendix 2: Workshop Program

AFRICAN UNION
INTERAFRICAN BUREAU FOR ANIMAL RESOURCES

LiVe²Africa

EUROPEAN UNION

TENTATIVE AGENDA

REGIONAL TRAINING WORKSHOP ON SUPPORTING THE IMPLEMENTATION AND PRACTICES OF THE AFRICA REGIONAL STRATEGY FOR- DISASTER RISK REDUCTION (ARS-DRR) (PROMOTING EARLY WARNING AND DISASTER RISK REDUCTION IN ECCAS, ECOWAS, IGAD, SADC AND UMA)

4th to 8th July 2022 Naivasha, Kenya

DAY 1: 4th July 2022		
TIME	**AGENDA ITEM**	**PRESENTER/ MODERATOR**
08.30 – 09:00	Arrival & Registration	AU-IBAR
Session 1: Opening Ceremony		
09:00 – 10:00	Participants self-introduction Opening remarks, RECS Opening remarks, AU-IBAR Opening remarks, Republic of Kenya	Mr. Ken Otieno RECs Representative Dr. Annie Lewa TBD
Session 2: Setting the Scene		
10:00 – 10:30	Workshop Objectives & Programme Outline, and Adoption of Agenda	Mr. Ken Otieno
10:30 – 11.00	***Group photo and health Break***	ALL
11:00 – 11:30	Introduction on the ARS-DRR	Mr. Ken. Otieno
Session 3: Sustainable Rangeland Management for Disaster Risk Reduction		
11:30 – 12:15	Sustainable management of rangeland resources to cope with cyclic and emerging disasters.	Mr. Fredrick Oloo
12:15 – 13:00	Group Discussion: - Guiding Q&A - TOR - Actions to minimize losses due to disasters (draught, floods, disease, conflicts, etc.) - Mitigation practices in place (policies, technical, inputs, etc.). - Strategies for sustainable rangeland management to cope with disasters - The way forward for sustainable management to cope with disasters.	Mr. Fredrick Oloo All
13:00 – 14:00	***Lunch***	ALL

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TIME	AGENDA ITEM	PRESENTER/ MODERATOR
14:00 – 15:00	Group work presentations and Plenary Discussion	Group Rapporteurs All
	Session 4: Disaster- Based Transboundary Surveillance	
15:00 – 16:00	Disaster- Based Transboundary Surveillance for Disease control in relation to DRR	Dr. Annie Lewa
16:00 – 17:00	Group Discussion: Guiding Q & A - TOR	Dr. Annie Lewa
17:00	***Tea/Coffee Break and End of Day 1***	ALL

Day 2: 5th July 2022		
TIME	**AGENDA ITEM**	**PRESENTER/ MODERATOR**
08:30 – 09:30	Group work presentations and Plenary Discussion	Group Rapporteurs All
	Session 5: Early Warning Tools	
09:30 – 10:30	Successful examples of EW tools from IGAD: 1. Animal Feed Balance Sheets (AFBS) What is AFBS, methodologies for generations	Dr. Janet Muthusi
10:30 – 11:00	***Tea/Coffee Break***	All
11:00 – 12:00	Hands-on interaction with the AFBS tool	Dr. Janet Muthusi All
12:00 – 13:00	2.Predictive Livestock early Warning System (PLEWS) - Modelling Component – Balance Model - Water balance and Phygrow	Mr. Clinton Ouma.
13:00 – 14:00	***Lunch***	
14:00 – 15:00	Hands-on training (Land PKS and Epi-Collect)	Mr. Clinton Ouma
15:00 – 16:00	3. Pictorial Evaluation Tool (PET) 3.1. PET Livestock	Mr. Clinton Ouma Dr. Janet Muthusi
16:00 – 17:00	3.2. PET Forage	Mr. Clinton Ouma Dr. Janet Muthusi
17:00	***Tea/Coffee Break and end of day 2***	

Day 3: 6th July 2022		
TIME	**AGENDA ITEM**	**PRESENTER/ MODERATOR**
08:30 – 10:30	PET Field Exercise for data collection	Mr. Clinton Ouma Dr. Janet Muthusi
10:30 – 11:00	***Tea/Coffee Break***	All
11:00 – 13:00	Hands-on training on data analysis (PET).	Mr. Clinton Ouma Dr. Janet Muthusi
13:00-14:00	***Lunch***	All
14:00-14:30	East Africa Hazard Watch by ICPAC.	Mr. Clinton Ouma Dr. Janet Muthusi
	Session 6: Indigenous Knowledge Practices	
14:30-15:30	Application of Evidence-based Indigenous Knowledge Practices (IKPs) for disaster risk management/reduction	Ken. Otieno Tumal Orto All

TIME	AGENDA ITEM	PRESENTER/ MODERATOR
15:30 – 16:15	Group Discussion: - Guiding Q&A - TOR - Application of IKPs for DRR.	Ken Otieno All
16:15 – 17:00	Group work presentations and Plenary Discussion	ALL
17:00	***Tea/Coffee break and End of Day 3***	All

Day 4: 7th July 2022		
TIME	**AGENDA ITEM**	**PRESENTER/ MODERATOR**
	Session 7: DRM information system	
08:30 – 09:30	DRM information system: Case Study: Draught Risk management-Kenya (collection, analysis, interpretation, dissemination, and sharing system; and feedback relay).	Mr. Clinton Ouma
09:30-10:30	Group Discussion: - Guiding Q & A – TOR - Applicable steps in draught management under different regions/communities.	Mr. Clinton All
10:30-11:00	***Tea/Coffee Break***	All
11:00 – 12:00	Group work presentations and Plenary Discussion	Group Rapporteurs ALL
12:00-13:00	Overview on the Disaster Risk Management Information System Structure and Work Flow.	Mrs. Patricia Lumba
13:00 – 14:00	***Lunch***	
14:00 – 15:00	AU-IBAR data modules and potential applications for DRR information System	Mr. Philippe Ouedraogo
15:00 – 15:30	Plenary Discussion: DRR Data Management Modules and applications.	All
15:30 – 17:00	Applications of Animal Health Surveillance – Case studies: Kenya	Dr. Georg Njoroge
17:00	***Tea/Coffee Break and End of Day 4***	

Day 5: 8th July 2022		
TIME	**AGENDA ITEM**	**PRESENTER/ MODERATOR**
08:30 – 9:00	Recap	
	Session 8: Awareness and Preparedness	
09:00 – 10:00	Awareness and preparedness (in an anticipatory approach) for promoting the implementation of ARS-DRR in rangeland and pastoral communities. - Success stories & key success factors, enablers for success and partnership. - Forecasting-Based Actions (FBAs) - Interventions/technology - Potential funding and financing - Strengthening the existing EW systems and tools, and their sustainability.	Mr. Clinton Ouma
10:00 – 10:30	Group Discussion: Guiding Q & A - TOR	Mr. Clinton Ouma All
10:30 – 11:00	***Tea/Coffee***	ALL

TIME	AGENDA ITEM	PRESENTER/ MODERATOR
11:00 – 11:30	Continue group discussion	Mr. Clinton Ouma All
11:30 – 13:00	Group work presentations and Plenary Discussion	Group Rapporteurs ALL
13:00 – 14:00	***Lunch***	
	Session 9: Conclusion and Closing	
14:00 – 15:30	The Way forward for promoting the implementation of the ARS-DRR.	Facilitation Team All
15:30 – 16:00	Training Workshop Evaluation	AU-IBAR / Facilitation Team
16:00 – 16:30	Closing Remarks: RECs AU-IBAR The Republic of Kenya	 RECs Representative Dr. Annie Lewa TBD
16:30 – 17:00	***Tea/Coffee Break***	All
17:00	***End of the Training Workshop and Departure***	