



Information **T**echnology & Indigenous **K**nowledge with **I**ntelligence

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Presentation Schedule



Context of ITIKI



Citizen Science Behind ITIKI



ITIKI Implementation



Current & Future Outlook for ITIKI



Indigenous Knowledge Systems (IKS)

- Indigenous knowledge (IK) / local knowledge or traditional knowledge/ folk knowledge, is accumulation of knowledge passing from generation to generation and guides communities in almost every aspect of their interactions with their environment (Mafongoya, 2017)
- Since time immemorial, IKS has been at the heart of the coping mechanisms employed by Africans to adapt to climatic variabilities.
- Solutions for combating climate-related problems must incorporate some implicit elements of the status quo, cultural transfers, and mutual learning
 - Citizen Science?



Religious beliefs, myths and experiences





Season Climate Forecasts (SCFs)

SEASONAL WEATHER FORECAST (MAM 2023)

Seasonal weather forecast (MAM) 2023

Outlook for March-April-May (MAM) 2023

- Below-average rainfall is expected over the Lake Victoria Basin, Highlands West of the Rift Valley, Central Rift Valley, Highlands East of the Rift Valley (including Nairobi County), Coastal region, most of Northeastern and Southeastern Lowlands, and Western parts of Narok. Generally, near-average rainfall is expected over parts of Northwestern (Central and eastern Turkana), parts of South Rift Valley (Eastern Narok), parts of Southeastern lowlands (Kajiado), and the Western parts of Marsabit.



Season Climate Forecasts (SCFs)



Seasonal Climate Watch

March to July 2023

Date issued: Mar 02, 2023

1. Overview

The El Niño-Southern Oscillation (ENSO) is currently in a La Niña state, and forecasts indicate that it will likely return to a neutral state by autumn (Mar-Apr-May). As ENSO remains in a La Niña state, early autumn rainfall remains likely to receive above-normal rainfall over the summer rainfall areas. However, as summer comes to an end so does the typical impact of ENSO and it is to be monitored for the next summer season.

The multi-model rainfall forecast indicates above-normal rainfall for most parts of the country except for the south-western parts during late-autumn (Apr-May-Jun) and early-winter (May-Jun-Jul) which is expected to receive below-normal rainfall.

Minimum and maximum temperatures are expected to be mostly above-normal countrywide for the forecast period.



Can we Prevent Droughts?



Costs of Droughts

Global Maps

Articles

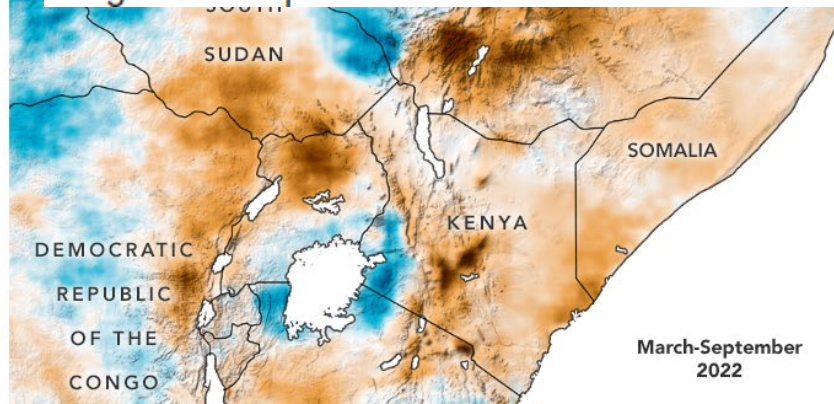
Blogs



earth
observatory

Worst Drought on Record Parches Horn of

On November 7, 2022, a consortium of 16 international organizations **issued a statement** about the deteriorating food security crisis in Somalia, Kenya, and Ethiopia. According to the statement, large-scale loss of food and income over the past two years, due primarily to drought, has led to food insecurity for 21 million people across the region. More than 3 million people face **emergency levels of food insecurity**, which means they regularly go a day or more without eating and have sold their possessions to earn income for survival. In Somalia, the drought has **forced over 1.3 million people** to abandon their farms and migrate to displacement sites.



Instru
Mode

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Food



Costs of Droughts

Time state declared the ravaging drought a national emergency

Monday, February 27, 2023



Guyo Ibrae inspects carcasses of his livestock that died for lack of pasture due to drought at Tigo village, Marsabit County, on February 10.

File | Nation Media Group



By Rashid H. Adankhalif
Disaster and risk management consultant

The number of hungry Kenyans has shot up from 4.2 million to six million with six million requiring humanitarian assistance, showing the impact of the drought on food security in 23 counties in arid and semi-arid lands (Asal).

Costs of Droughts

[Media hub](#) > [Press releases](#) > [Horn of Africa: IFRC Secretary General visits K...](#)

Horn of Africa: IFRC Secretary General visits Kenya as worst drought in 40 years looms for millions

 06/05/2022 | [Press release](#)



IFRC Secretary General, Jagan Chapagain, speaks to communities affected by drought in Marsabit, Kenya during a distribution of food assistance in May 2022

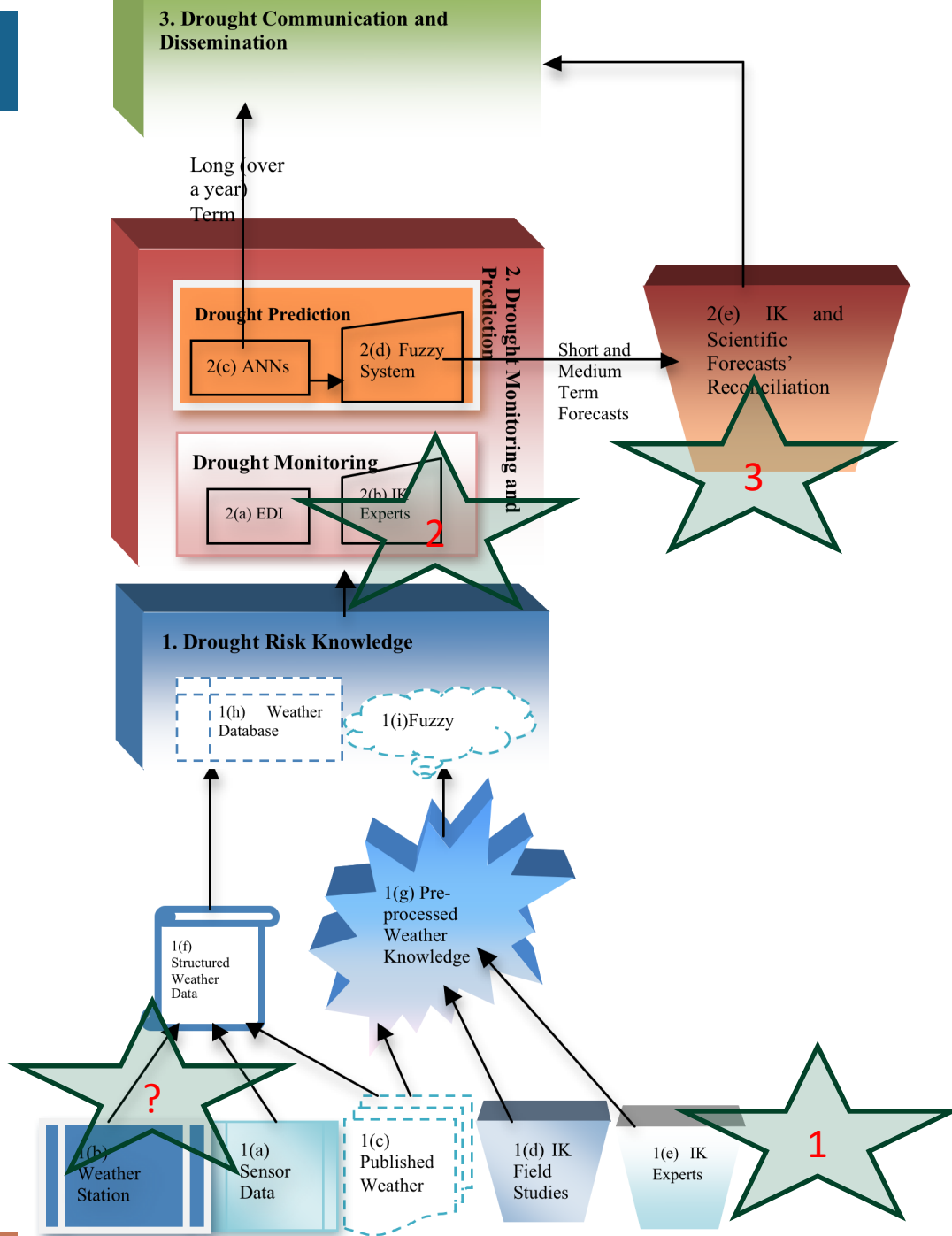
Photo: Kenya Red Cross Society

The Citizen Science Behind ITIKI

ITIKI

INFORMATION TECHNOLOGY AND INDIGENOUS KNOWLEDGE WITH INTELLIGENCE







Original Article | Published: 11 May 2013

Artificial neural networks models for predicting effective drought index: Factoring effects of rainfall variability

Muthoni Masinde

Mitigation and Adaptation Strategies for Global Change 19, 1139–1162 (2014) | Cite this article

858 Accesses | 29 Citations | 7 Altmetric | Metrics

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Open Access Article

Downscaling Africa's Drought Forecasts through Integration of Indigenous and Scientific Drought Forecasts Using Fuzzy Cognitive Maps

by Muthoni Masinde^{1,*}, Mwanjele Mwachaga¹ and Tsegaye Tadesse²

¹ Unit for Research on Informatics for Droughts (URIDA), Central University of Technology, Free State, Private Bag X20539, Bloemfontein 9300, South Africa

² National Drought Mitigation Center, School of Natural Resources (SNR), University of Nebraska

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A Calibration Report for Wireless Sensor-Based Weatherboards

by Muthoni Masinde^{1,*} and Antoine Bagula²

¹ Central University of Technology—Free State, Private Bag X20539, Republic of South Africa

² University of the Western Cape, Robert Sobukwe Road, Bellville 7535, Republic of South Africa

* Author to whom correspondence should be addressed.

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ITIKI Plus: A Mobile Based Application for Integrating Indigenous Knowledge and Scientific Agro-Climate Decision Support for Africa's Small-Scale Farmers

Publisher: IEEE

Cite This

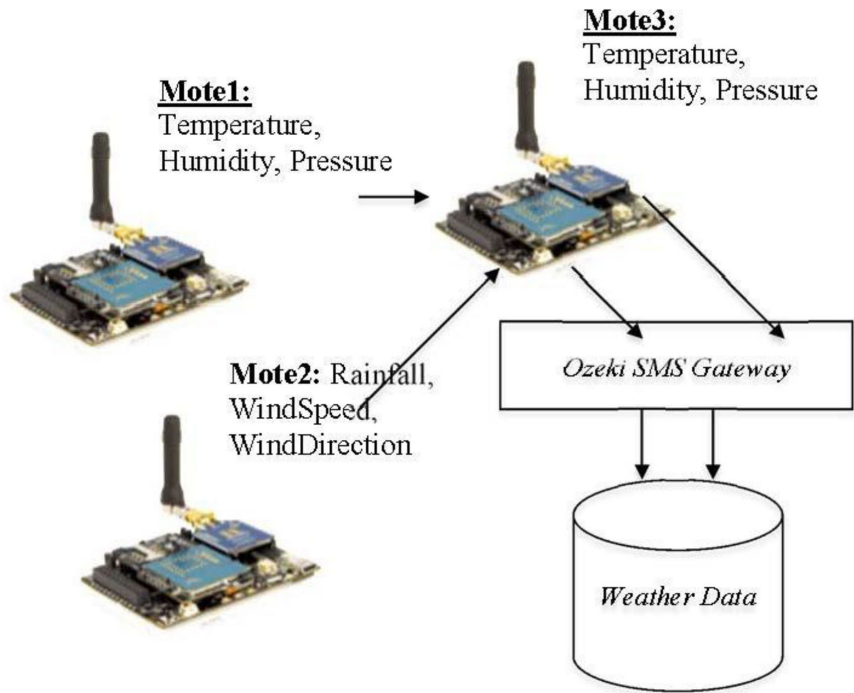
PDF

Muthoni Masinde ; Portia Naledi Thothela All Authors

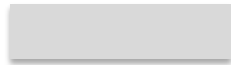
4 Paper Citations

159 Full Text Views



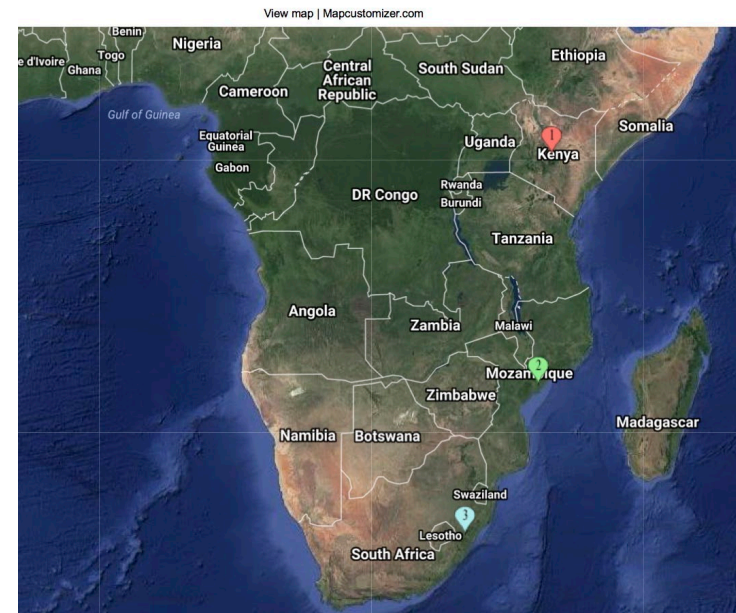


<https://www.youtube.com/watch?v=cb4zmkJsdsQ&t=16s>



Does - ITIKI Work?

- More accurate drought forecast models
– in three countries







Solution – ITIKI

<https://edition.cnn.com/2020/05/29/business/itiki-drought-app-spc-intl/index.html>



So

WEEKLY DEAL

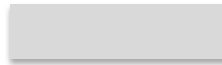
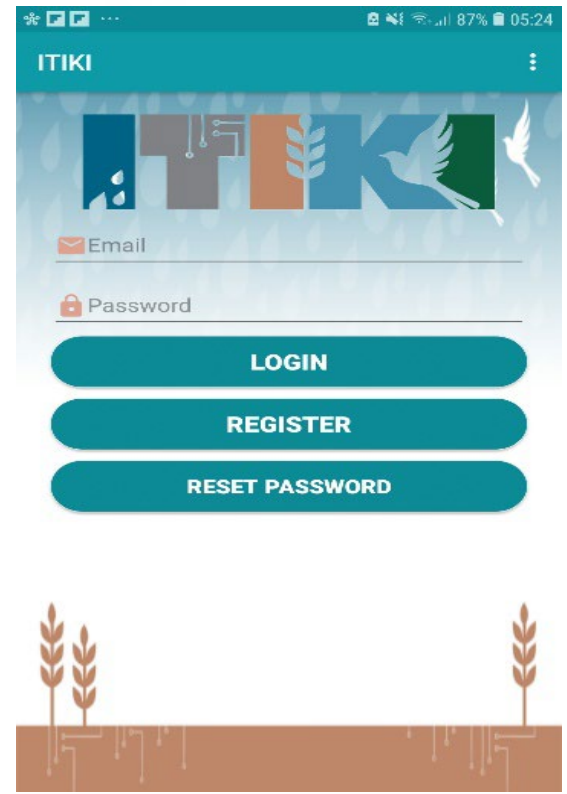
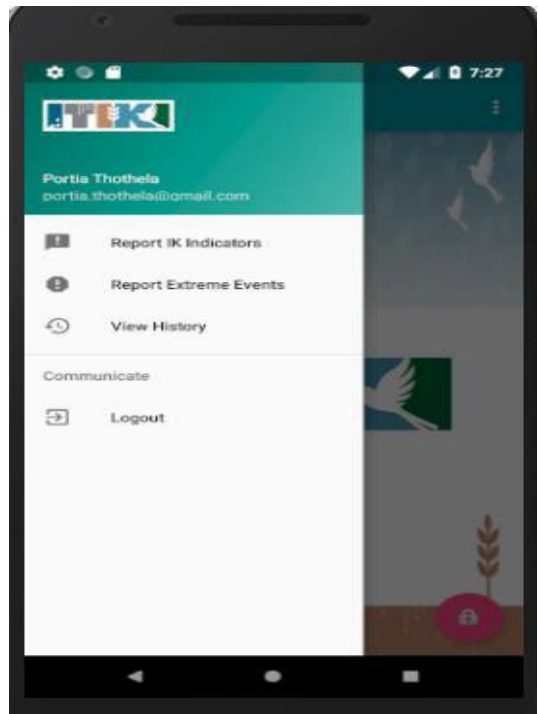


Color Weather Station with Pro 5-in-1 - Wind and Rain (Dark Theme)



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~~\$169.98~~ **\$129.98**





How Does ITIKI Work?



EaDrought Monitor <073-225-0851>



Me: Df;HKEM;2;2

Sent: 1:12PM



EaDrought Monitor: Drought Forecast for: [2012-8](#) in Embu will be: Moderate Drought and Current IK Forecast is: Rains will fall in two weeks

Sent: 1:14PM

To: muthonimasinde@gmail.com

1:14

Drought Forecast for: 2012-8 in Embu will be: Moderate Drought and Current IK Forecast is: Rains wil...



How Does ITIKI Work?



Home About the Project Weather Monitoring Drought Monitoring Past Droughts Related Links Related Publications

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Drought Monitoring

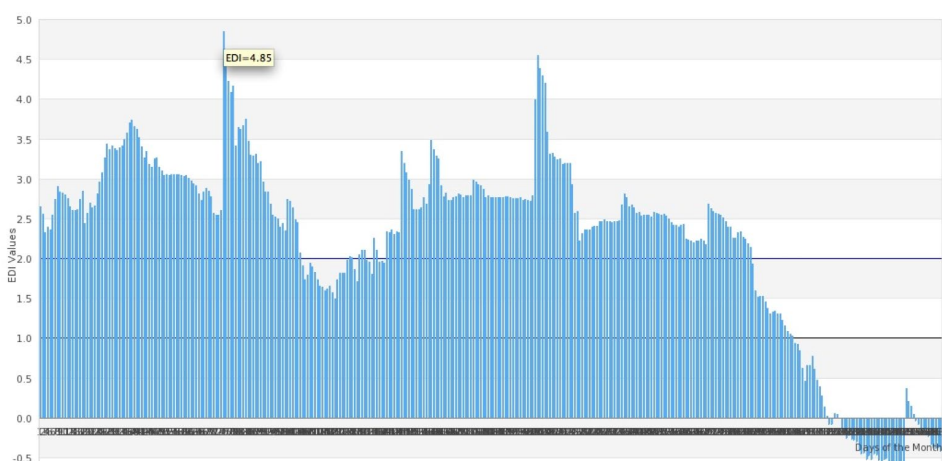
Past Droughts

Related Links

Weather Readings for Makindu [May, 2009]

Date	Precipitation	AWRI	EDI	EDI Class
1-May-2009	0	43.1	-1.59	Severe Drought
2-May-2009	11	53.1	-1.37	Moderate Drought
3-May-2009	0	50.6	-1.44	Moderate Drought
4-May-2009	0	49.1	-1.52	Severe Drought
5-May-2009	0	47.8	-1.51	Severe Drought
6-May-2009	2.1	48.9	-1.51	Severe Drought
7-May-2009	0	47.6	-1.54	Severe Drought
8-May-2009	0	46.6	-1.55	Severe Drought
9-May-2009	0	45.7	-1.62	Severe Drought
		45	-1.62	Severe Drought
		44.2	-1.57	Severe Drought
		43.5	-1.55	Severe Drought

Safari File Edit View History Bookmarks Window Help
 http://localhost:8080/2011/EDISystem/Graphs/EDIGraph.php
 http://localhost:8080/2011/EDISystem/Graphs/EDIGraph.php
 http://localhost:8080/2011/EDIS... Past Droughts



This is a log of your bulk sms outbox.

Filter Messages

Download CSV

Refresh

3601 - 3650

Date	Text	From	To	Cost	Status
<u>October 16, 2020 8:54 AM</u>	Uyu ni uboro wa ITIKI mari na ngwataniro na Embu County: mbura ya mweri wa ikumi ni NINI. Vanda tene and uvande mimera ta muvia (sorghum), nthoroko and mwere 1 message (157 characters)	ITIKI	[REDACTED]	KES 0.80	Success
<u>October 16, 2020 8:54 AM</u>	Uyu ni uboro wa ITIKI mari na ngwataniro na Embu County: mbura ya mweri wa ikumi ni NINI. Vanda tene and uvande mimera ta muvia (sorghum), nthoroko and mwere 1 message (157 characters)	ITIKI	[REDACTED]	KES 0.80	Success
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Quantifying ITIKI Success

– ITIKI Adoption Numbers

	<u>Individuals</u>	<u>Number is Household</u>	<u>Female (70%)</u>
Kenya	3 090	14 533	10 173
Mozambique	1 278	6 200	4 340
South Africa	800	3 200	2 240
Total	5 168	23 933	16 753

– ITIKI impacts: crop yield increase

	<u>Production (Before) in Tonnes</u>	<u>Production After</u>	
Kenya	3 808	4 340	14%
Mozambique	1 364	1 464	7%
Total	5 904	6 536	11%



Conclusion and Outlook

- Extensions and supplementary services of ITIKI have been identified:
 - Market prices platform-based tool
 - ITIKI-Plus - incorporates short- medium- and long-term cropping decision support system
- Multi-hazard climate-linked Early warning system
- Framework extended/enhanced
 - Verification tool for Weather Lore using Machine Vision
 - ITIKI PLUS
 - Pollution monitoring
 - Crop production optimization
 - Prediction of climate-linked diseases such as Malaria

THANK YOU

