

REPORT KADI Version1

TASK

WP2 Task 2.4: Pilot on lessons learned from existing long-term atmospheric and ecosystem observations:

Focused on atmospheric observations and on Kenya, with contributions from other countries Côte d'Ivoire, Tanzania, and South Africa.

1. Find out when KMD can start minting of WIGOS identifiers for registrations of non-KMD stations
2. To define a scheme to delegate this task to the individual organizations concerned.
3. To collect information from stakeholders on past, and existing observation networks,
4. Develop a template for a survey in conjunction with WPI
5. ACT: Identify organizations to be contacted (ALL, January 2023)
6. ACT: Develop template to collect key information on projects/activities, rationale, available lessons learnt from these, networks, stations/observations (ALL; March 2023)
7. ACT: Decide if template can/should be integrated with template from WP1 and whether the survey will be web-based (March 2023)
8. ACT: Setup survey (Jörg, Thiong'o, Patricia; April 2023), collect responses (Thiong'o, Patricia; July 2023)
9. ACT: Register networks, stations, observations in OSCAR/Surface (beginning in October 2023, complete mainly by mid-2024 (Addressees of survey, Thiong'o, Jörg) Examples: • KMD meteorological, agricultural and climatological network(s) • UNEP PM2.5, PM10 instruments deployed in Nairobi • Mobile AQ lab at KMD • Taita research station • Tahmos network
10. ACT: Support KMD with creating the WIGOS metadata XML files for upload to OSCAR/Surface, based on electronic information available at KMD (Thiong'o to collect, Jörg to analyze and prototype; beginning March 2023)
11. Next steps include Stocktake of existing observations in the country starting from 2000, identify and map stakeholders and identify gaps. Avail KMD station MetaData to Jörg by January 2023 ACT: Patricia

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1. Find out when KMD can start minting of WIGOS identifiers for registrations of non-KMD stations

KMD can immediately start the process of minting of WIGOS identifiers for registrations of non-KMD stations. This will be realised by first identifying the location of all non-KMD stations.

I have done a background status of WIGOS Registered Station in KMD

Introduction

The WMO Integrated Global Observing System (WIGOS) is a global framework for integrating all WMO and Co-sponsored observing systems under a common regulatory and management framework. It became operational from mid-2020 onwards. Its purpose is to assist WMO Members provide and gain access to more and better observational data at reduced cost by taking an integrated approach. The Regional WIGOS Centers provide critical support functions for WMO Members (NMHSs) to help translate the global WIGOS concepts into regional and national action plans. The Regional WIGOS Centers-Kenya and Tanzania Meteorological Agency (TMA) are operating on a distributed pilot mode since March 2020 and will be audited by end of 2022 to transition to operational mode.

WMO encourages strong involvement from Members, e.g. to implement WIGOS at national level & Regional level is necessary and is already happening at KMD through the establishment/upgrading of our manned Synoptic stations to GBON status. The GBON observing network requires a station to be reporting to the GTS on hourly basis for Wind (Zonal and meridional), RH (2m), Temp (2m), Surface pressure and precipitation in some cases.

Among the WMO Members, WIGOS is implemented through the integration and increased interoperability of observing systems; Sharing internationally more data and metadata that is reported on the WIGOS Data Quality Management system (WDQMS) and OSCAR-Surface web tools for monitoring and updating by the WDQMS and OSCAR-Surface National Focal points respectively on a continuous basis. The Members are also required to offer leadership and planning of enhanced National Observing Strategy and WIGOS Implementation Plans. A culture of partnership, cooperation and compliance with regards to the WMO Technical Regulations is highly encouraged

KMD Data Collection Platforms

KMD Stations as at 2022 were thirty Nine (39) Surface land stations that are registered in OSCAR/Surface portal. The following Tables 1, 2, 3 and figure 1 outline the distribution of the 39 stations. However only 14 stations exchange data internationally and report to the WDQMS.

Table 1: Stations registered in OSCAR/Surface under 0 – 20000 for KMD

S/No.	Country Code ISO Alpha-2	Number of Stations
1.	KE	37

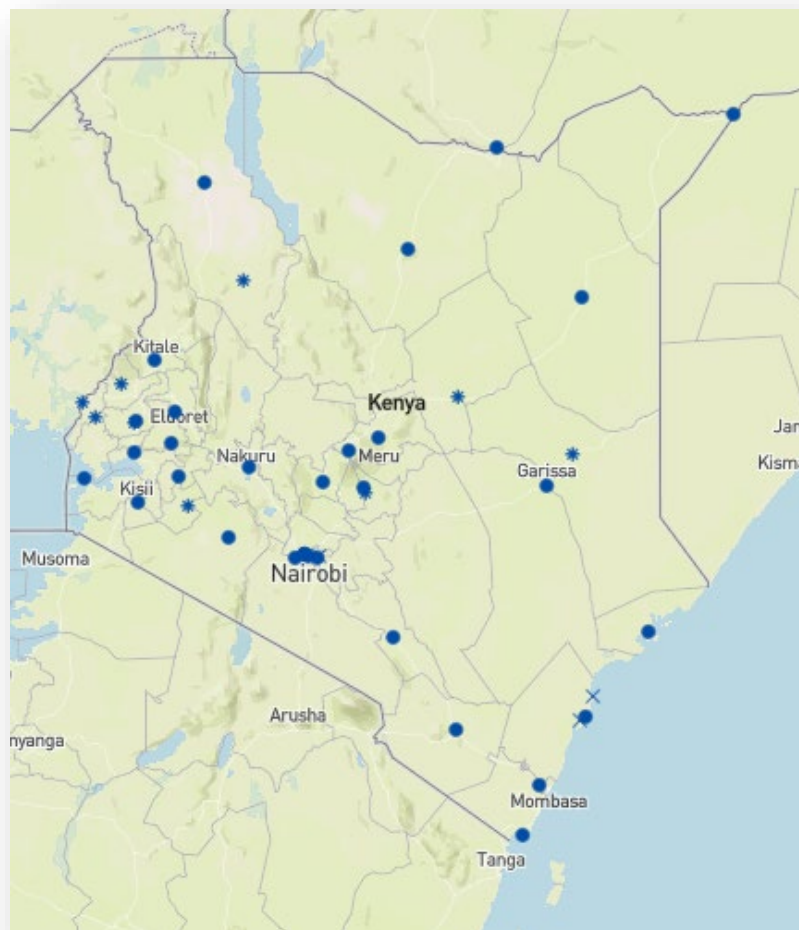


Figure 1: KMD Stations registered on the OSCAR-Surface WMO Web portal

Table 2: Stations registered in OSCAR/Surface under ISO 3166-1 numeric (three digits)

S/No.	Country Code	UN Code	Number of Stations
1.	KE	404	2

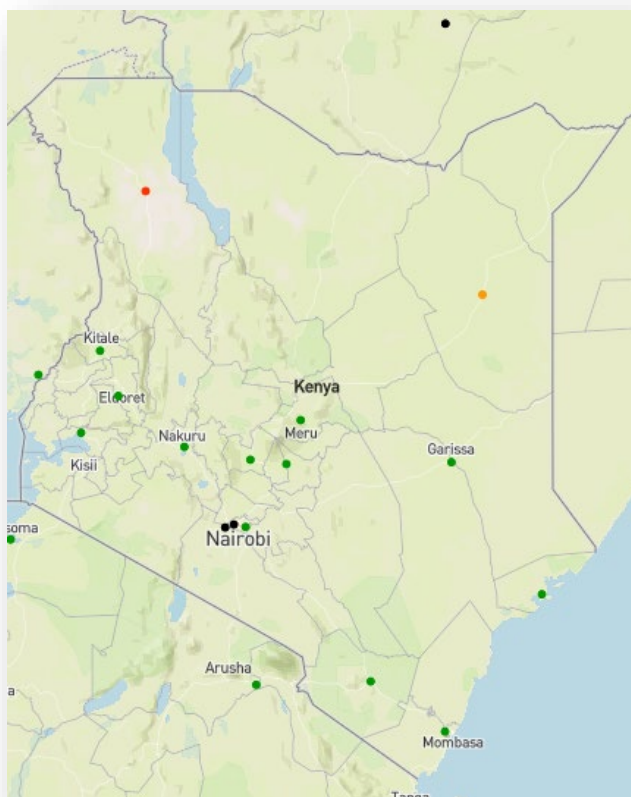


Figure 2: KMD WIGOS Station for international data Exchange registered on the WIGOS Data Quality Monitoring system (WDQMS)

Table 3: Upper air land Stations registered in OSCAR/Surface under 0 – 20000 in Kenya

S/No.	Country Code ISO Alpha-2	Number of Stations

1.	KE	2

Two (2) Upper – air land stations are registered in OSCAR/Surface for KMD (Dagoretti and Lodwar). Currently only Dagoretti Upper air station, is performing one sounding every 24 hours instead of the WMO recommended two soundings and exchanging data internationally. Lodwar upper air station has been down due to lack of radiosondes and sounding balloons.

Table 4 indicates WIGOS Station identifies for 37 synoptic stations and two AWS's

Table 4: WSI for synoptic stations and two AWS's

S/No	WMO	ICAO	WSI	NAME
1	63135	HKNR	0-20000-0-63135	NYAHURURU
2	63612	HKLO	0-20000-0-63612	LODWAR
3	63619	HKMY	0-20000-0-63619	MOYALE
4	63624	HKMA	0-20000-0-63624	MANDERA
5	63641	HKMB	0-20000-0-63641	MARSIBIT
6	63661	HKKT	0-20000-0-63661	KITALE
7	63671	HKWJ	0-20000-0-63671	WAJIR
8	63686	HKEL	0-20000-0-63686	ELDORET KAPSOYA
9	63687	HKKG	0-20000-0-63687	KAKAMEGA
10	63688	HKEK	0-20000-0-63688	ELDORET INT AIRPORT
11	63694	HKNY	0-20000-0-63694	LAKIPIA AIRBASE
12	63695	HKME	0-20000-0-63695	MERU
13	63708	HKKI	0-20000-0-63708	KISUMU AIRPORT
14	63709	HKKS	0-20000-0-63709	KISII
15	63710	HKKR	0-20000-0-63710	KERICHO
16	63711	HKSU	0-20000-0-63711	SUBA
17	63714	HKNK	0-20000-0-63714	NAKURU
18	63715	HKKA	0-20000-0-63715	KABARAK
19	63717	HKNI	0-20000-0-63717	NYERI
20	63720	HKEM	0-20000-0-63720	EMBU
21	63723	HKGA	0-20000-0-63723	GARISSA
22	63737	HKNO	0-20000-0-63737	NAROK
23	63739	HKRE	0-20000-0-63739	EASTELIGH AIR BASE
24	63740	HKJK	0-20000-0-63740	JOMO KENYATTA INT. AIRPRORT
25	63741	HKNC	0-20000-0-63741	DAGORETTI CORNER

26	63742	HKNW	0-20000-0-63742	WILSON AIRPORT
27	63743	HKNG	0-20000-0-63743	NGONG
28	63744	HKKB	0-20000-0-63744	KABETE
29	63745	HKMK	0-20000-0-63745	KATUMANI AGROMET
30	63746	HKTH	0-20000-0-63746	THIKA
31	63766	HKMU	0-20000-0-63766	MAKINDU
32	63772	HKLU	0-20000-0-63772	LAMU
33	63793	HKVO	0-20000-0-63793	VOI
34	63797	HKMP	0-20000-0-63797	MTAPA
35	63798	HKMS	0-20000-0-63798	MSABAHA
36	63799	HKML	0-20000-0-63799	MALINDI
37	63820	HKMO	0-20000-0-63820	MOI INT. AIRPORT (MOMBASA)
TWO AWS				
	63747	HKND	0-404-300-472781389AS63747	DAGORETTI CORNER AWS
	63738	HKGO	0-404-300-341830914AS63738	NGONG AWS

KMD automatic weather station have been issued with WSI as indicated in table 5.

Table 5: WSI for KMD AWS's

S/N o	Name	Latitude	Longitude	Altitude	WSI
1	Enkorika Secondary School	-1.96608	36.92328	1770	0-404-300-341840918AS00001
2	PJ Dave Flora farm (Agromet)	-1.41449	36.52755	1658	0-404-300-341850921AS00002
3	Mashuru DCC's compound	2.06222	37.07888	1375	0-404-300-341850925AS00003
4	Enkijape Primary school	-2.32784	37.31647	1236	0-404-300-341870932AS00005
5	PCEA Isara High School Station	-2.16176	37.27669	1189	0-404-300-341850924AS00004
6	Olkirimatiani health center	-1.52334	36.0887	651	0-404-300-341860928AS00006
7	Machakos Agriculture Training Centre	-1.545517	37.24022	1615	0-404-300-160810399AS00008
8	Iliyuni Secondary School	-1.68705	37.33153	1646.4	0-404-300-160810398AS00009
9	South Eastern University of Kenya	-1.3084	37.7557	1229	0-404-300-150710352AS00119
10	Masinga Boys Secondary School	-0.96455	37.62403	1139	0-404-300-160750372AS00010

11	Kenya Meat Training Institute	-1.44475	36.98535	1490	0-404-300-160800394AS00007
12	KALRO Bachuma Livestock	-3.69345	38.97638	435	0-404-300-060260128AS00044
13	Kasigau Girls Sec Sch	-3.8333	38.69787	550	0-404-300-060260129AS00045
14	Manoa dispensary	-3.594983	38.33308	913	0-404-300-060250123AS00046
15	Gicheha Farm	-3.26575	37.76405	932	0-404-300-060230111AS00047
16	Chepalungu boys high school	-1.002967	35.25492	1715	0-404-300-361950974AS00015
17	Ndenai boys high school	-0.8268833	35.09772	1887	0-404-300-361940966AS00014
18	Ndoinet forest stattion	0.4098	35.5417	2499	0-404-300-361980989AS00120
19	Siret Secondary School	-0.2118	35.40958	1976	0-404-300-351890942AS00020
20	Kipsitet Day Secondary School	-0.2241	35.173	1394	0-404-300-351930965AS00017
21	Laliat Secondary School	-0.2604167	35.26392	1673	0-404-300-351900945AS00016
22	Muhoroni Sugar Company	-0.154183	35.18168	1254	0-404-300-422431215AS00031
23	KALRO Kibos	-0.066	34.813	1182	0-404-300-422381186AS00032
24	Maseno Veterinary Farm, Maseno	0.000883	34.598	1555	0-404-300-422391195AS00027
25	Nyajuok	- 0.03511667	34.27817	1222	0-404-300-412341168AS00041
26	Mary's Yala Secondary School	0.09503333	34.53422	1448	0-404-300-412351172AS00042
27	Oyude Chief's Camp	-0.1207333	34.38215	1252	0-404-300-412371182AS00039
28	Usenge High School	- 0.07193333	34.05122	1151	0-404-300-412361175AS00040
29	Mudhiero Sec School	0.167164	34.432511	1340	0-404-300-412321160AS00043
30	Dept. of Agriculture Ikolomani	0.188167	34.75873	1571	0-404-300-372101048AS00026
31	Dept of Agriculture Khwisero	0.165567	34.59605	1386	0-404-300-372081037AS00024
32	Dept of Agriculture Navakholo	0.413	34.68272	1522	0-404-300-372031019AS00022
33	Dept of Agriculture Likuyani	0.78265	35.13187	1889	0-404-300-372000999AS00025
34	Samia DCC, Funyula	0.2717	34.09102	1193	0-404-300-

					402301149AS00034
35	Butula DCC	0.3400833	34.33735	1287	0-404-300-402291146AS00033
36	St Paul's Elwanikha Girls Sec Sch	0.4797667	34.3615	1241	0-404-300-402271135AS00037
37	Busia ATC (Agromet)	0.4584167	34.11588	1227	0-404-300-402281141AS00036
38	Bishop Sulumeti Ang'urai	0.6921	34.35717	1421	0-404-300-402251125AS00038
39	St Paul's Amukura Boys	0.5695333	34.27348	1291	0-404-300-402261131AS00035
40	Turbo Girls High School	0.6214333	35.0466	1837	0-404-300-271460730AS00048
41	Ainabkoi KCC Plant	0.1600667	35.52042	2635	0-404-300-271440721AS00049
42	Komool Farm	0.6874333	35.23965	2015	0-404-300-271410712AS00051
43	Kaptagat Forest	0.4361833	35.48877	2440	0-404-300-271440720AS00050
44	Timboroa Forest Station	0.06846667	35.53987	2734	0-404-300-271460730AS00052
45	University of Eldoret (Agromet)	0.58015	35.29977	2147	0-404-300-271430718AS00053
46	Nasukuta LIC AWS (Agromet)	1.361367	35.19627	1638	0-404-300-1320657AS00062
47	Kaibichbich Agricultural Office	1.202633	35.28673	2613	0-404-300-241320659AS00061
48	Kacheliba DCC AWS	1.491467	35.0102	1315	0-404-300-241310651AS00060
49	St Catherine Chepnyal	1.605133	35.28978	1987	0-404-300-241290646AS00059
50	Alale Girls AWS	2.2668	35.02478		0-404-300-241310656AS00058
51	Sigor Agricultural Office	1.483667	35.47013	978	0-404-300-241300650AS00063
52	Metkei DO'S office	0.2016333	35.56998	2602	0-404-300-281500750AS00054
53	Kapcherop Nyayo Tea Zone	1.041067	35.32523	2279	0-404-300-281480736AS00055
54	Kapyego Police Station	1.145933	35.47788	3024	0-404-300-281470731AS00056
55	Arror Irrigation scheme (Agromet)	0.9387667	35.62502	1034	0-404-300-281480740AS00057
56	Bartolimo Boys High School	0.6814167	35.81887	1980	0-404-300-301580790AS00071
57	AIC Churo Girls High School	0.7667833	36.4056	1798	0-404-300-301570787AS00074

58	Koibatek ATC (Agromet)	0.05191667	35.7805	1939	0-404-300-301620809AS00072
59	Baringo High School	0.03925	35.72693	2175	0-404-300-301620807AS00073
60	Ng'oron High School	1.291267	35.78693	1010	0-404-300-301570781AS00070
61	Ng'enyilel Mixed Sec Sch	0.2513667	36.28473	2071	0-404-300-301600800AS00075
62	KFS Ol Kalou	-0.2688833	36.3788	2360	0-404-300-180910456AS00066
63	Wanjohi Girls High Sch	-0.3096333	36.49028	2378	0-404-300-180900449AS00067
64	Magumu Boys High Sch (Agromet)	-0.8529333	36.56168	2740	0-404-300-180890448AS00069
65	Shamata Girls High Sch	-0.1962	36.49967	2752	0-404-300-180930465AS00064
66	Ndaragwa Boys high School	- 0.06166667	36.45365	2484	0-404-300-180930464AS00065
67	KFS Gita Station	-0.4725167	36.60588	2591	0-404-300-180900451AS00068
68	Kinamba Agriculture office(Agromet)	0.4209167	36.32183	2093	0-404-300-311630813AS00080
69	Survey Secondary School station	0.5785167	36.5613	1904	0-404-300-311630822AS00079
70	Kimanjo Primary School station	0.4837667	37.01168	1762	0-404-300-311650824AS00083
71	Lokusero Secondary School station	0.3119667	37.29668	1930	0-404-300-311650825AS00084
72	Tigithi Boys High School station	- 0.05658333	36.94648	1838	0-404-300-311640818AS00082
73	Ngobit Police Station	- 0.06248333	36.80098	1953	0-404-300-311640818AS00081
74	Githima chief's camp	-0.1254	37.03002	1972	0-404-300-190950476AS00099
75	Munyu police post	-0.2476667	37.07442	2065	0-404-300-190950475AS00098
76	Kiawara police station	-0.1985167	36.81787	2088	0-404-300-190990492AS00100
77	Gakanga Sec Sch	-0.3182333	36.74232	2764	0-404-300-190950473AS00101
78	Karundas chief's camp	-0.3563333	37.0142333	1771	0-404-300-190950474AS00097
79	Thuchi Barrier	-0.39	37.86	744	0-404-300130610305AS00092
80	Materi Girls High School/Center	-0.19278	37.81117	869	0-404-300-130620309AS00095
81	Kaanyaga Primary School	-0.15815	37.9074	686	0-404-300-

					130620310AS00094
82	Tharaka University College(Agromet)	0.09197	37.988	659	0-404-300-130620310AS00091
83	Nkondi Primary South	-0.0416	37.95963	751	0-404-300-130620310AS00093
84	Meru National Park – Eastern gate(Ura-gate)	0.02457	38.06535	664	0-404-300-130620306AS00096
85	Dakabaricha/Lutheran church	2.33485	38.003083	1318	0-404-300-100470235AS00114
86	Maikona AWS	2.9466	37.635283	386	0-404-300-100460229AS00115
87	Sololo AWS/Dr Guracha Memorial Girls	3.543333	38.643983	710	0-404-300-100450222AS00116
88	Manyatta AWS	3.51442	39.0661	1027	0-404-300-100450223AS00117
89	Laisamis AWS	1.58247	37.79863	575	0-404-300-100480240AS00118
90	Maalimin Dispensary	0.387	39.34433333	266	0-404-300-070290143AS00104
91	Saka Primary School (Agromet)	-0.14295	39.32915	177	0-404-300-070280138AS00103
92	MODIKA BPU	-0.357016	39.70755	238	0-404-300-070300151AS00102
93	Shant Abaq DO's Office	0.4604667	39.7416166	167	0-404-300-070290142AS00105
94	Ijaara Police Station	-1.59175	40.50763333	57	0-404-300-070320160AS00106
95	Hara Dispensary	-1.8506333	40.22855	63	0-404-300-070320150AS00107
96	Bangale police station	-0.7252167	39.0165	379	0-404-300-040200098AS00112
97	NDMA (Agromet)	-1.4947667	40.02958333	64	0-404-300--04-0190094AS00108
98	Waldena Health Centre	-1.6111167	39.02501667	294	0-404-300-040190095AS00111
99	Ozi Dispensary	-2.5118	40.45531667	5	0-404-300-040180086AS00110
100	Balambala chiefs office	-0.0975333	39.04505	233	0-404-300-040200100AS00113
101	Manda Airbase	-2.1629667	40.89393333	10	0-404-300-050220106AS00085
102	NYS HINDI	-2.01765	40.77918333	7	0-404-300-050220106AS00086
103	NYS WITU	-2.3818167	40.4559	21	0-404-300-050220109AS00087
104	NYS Lake Kenyatta(Agromet)	-2.4054	40.68083333	12	0-404-300-050220110AS00088

105	Dept of Fisheries, Livestock & Co-operation Development	-2.28045	40.90733333	6	0-404-300- 050220106AS00089
106	Faza Sec School	-2.06125	41.10658333	6	0-404-300- 050210101AS00090
107	Dept. of Agriculture Shinyalu	0.2386	34.8025		0-404-300- 372091043AS00023
108	Embomos secondary school	0.32 19 S	35.2139E		0-404-300- 361980990AS00011
109	Mogogosiek tea factory	-0.37522	35.16413	1981	0-404-300- 361980988AS00012
110	Kaplong girls secondary school	-0.6786167	35.1377	1840	0-404-300- 361940967AS00013
111	Kebeneti secondary school (agromet)	-0.448	37.079		0-404-300- 351930962AS00018
112	Ielu secondary school	- 0.134	35.41		0-404-300- 351890941AS00019
113	Sosioti Girls Sec Sch	-0.367	35.18		0-404-300- 351920957AS00021
114	Kit Mikayi mixed sec. sch	-0.11054	34.5497		0-404-300- 422411204AS00029
115	KENGEN Sondu-Miriu Power Stn	-0.340033	34.85175	1196	0-404-300- 422441219AS00030
116	Kipsing Dispensary	0.5985333	37.2417	1042	0-404-300- 110490247AS00076
117	Burat Ekeeunos Farmers' cooperative	0.1653	37.3238		0-404-300- 110490246AS00077
118	Sericho Police post	1.13205	39.11143	233	0-404-300- 110500250AS00078
119	Danisa / Galana Ranch	-3.06632	39.33023		0-404-300- 040170083AS00109