



# **Updated 2012 HARITA Initial End of Season Assessment**

*Release 2.0.0*

**IRI, Earth Institute, Columbia University**

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# UPDATED INITIAL SEASON ASSESSMENT

## 1.1 Overview

This report is the Initial end of Season Assessment report deliverable for ETH 002 /13: General IRI Technical Support for HARITA Micro-Insurance. It provides an early, exploratory assessment of the 2012 rainfall season for the HARITA in Ethiopia in terms of satellite rainfall estimates and their implication for the 2012 indexes. It provides a recap of the indexes and processes to help educate project partners about the season. It is not an official calculation of index payouts. The accuracy and correctness of calculations and data for the index payouts are the responsibility of the financial partners in the HARITA project. Please notify us of any errors found in this report or in accompanying datasets.

This report has been updated based on analysis from project partners. An error in the late Kihen Extra Dry index table has been corrected.

For any questions about this report, please contact Daniel Osgood, [deo@iri.columbia.edu](mailto:deo@iri.columbia.edu)

## 1.2 Assessment of 2012 Season

### 1.2.1 Summary

For the first part of the season, in most places the year appears to have had fairly typical rainfall amounts, close to average, with many tabias experiencing substantially above average rainfall and only a few tabias experiencing rainfall deficits that were as low as the one in four or worse event.

However, there does appear to have been a meaningful, relatively widespread rainfall deficit near the end of the rainy season, when crops are likely to be flowering and in need of rainfall. This deficit coincides with initial reports from the field. For the entire set of indexes, this is an event that is about the worst year out of three, however, for many villages, it is substantially more of an outlier. According to our informal calculations, it appears that many of the indexes would have been triggered, some reaching their full value.

## 1.3 Data Notes

### 1.3.1 Transition from ARC to ARC2

It is important to note that the official source of the Satellite rainfall estimates has been updated. The NOAA-ARC product has been updated this year to the NOAA-ARC2 version. The two versions of the dataset use the identical parameters, operational satellite observations and calculation methods. These two versions produce identical rainfall estimates from 2006 on, including for 2012 and into the future. Because they are identical in terms of ongoing, operational estimates, ARC is no longer being updated, with ARC2 being the source of new data.

For 2013 indexes, since ARC is no longer available, and ARC2 is an improved dataset, we intend to use ARC2, taking advantage of its much longer data series for improved calibration. For 2012 index calculations, ARC2 is the appropriate datasource, since it provides identical realtime estimates of rainfall as ARC.

The differences between the datasets are below. We have verified this information directly with the personnel at NOAA responsible for calculation of the ARC/ARC2 datasets.

1. There is a slightly different data format for ARC2. For example, some missing data is represented as -999 instead of simply being missing. This is important for those directly querying the data source. We have worked to update our scripts to address formatting issues, and are continuing to crosscheck and verify that we have addressed all artifacts that might be caused by the formatting changes.
2. The ARC2 dataset has a greatly expanded historical database. The satellite measurement archive prior to 2006 has been augmented with newly analyzed data from old satellites. Therefore ARC2 now provides satellite rainfall estimates beyond 1995 (the limit for ARC) back much further to 1983.
3. The web link for downloading the ARC2 dataset is different than that for ARC. Below is information from the NCEP ftp site that is the official provider of the dataset.

The last ARC1 data file made available at the NCEP ftp server was data for March 14, 2012. In a “readme” file dated April 4, 2012 in the ARC2 ftp directory there is this note:

UPDATES: As of March, 2012. The ARC dataset has been extended back to 1983 and is labeled as ARC2. The former ARC dataset (ARC1) from 1995-present is listed under:

[ftp://ftp.cpc.ncep.noaa.gov/fews/AFR\\_CLIM/ARC1/](ftp://ftp.cpc.ncep.noaa.gov/fews/AFR_CLIM/ARC1/)

This data will eventually be removed. Please see following .pdf and weblink for ARC22 documentation:

[http://www.cpc.ncep.noaa.gov/products/fews/AFR\\_CLIM/AMS\\_ARC2a.pdf](http://www.cpc.ncep.noaa.gov/products/fews/AFR_CLIM/AMS_ARC2a.pdf)

[http://www.cpc.ncep.noaa.gov/products/fews/AFR\\_CLIM/afr\\_clim.shtml](http://www.cpc.ncep.noaa.gov/products/fews/AFR_CLIM/afr_clim.shtml)

### 1.3.2 Initially available sources of information

At the release of the report, the only information available is satellite estimates of rainfall and informal reporting of rainfall conditions from on-the-ground project partners. This soon after the close of the windows, ground based measurements of rainfall are not yet available, and the vegetation has not had time to respond sufficiently to rainfall to allow us to use our satellite measures of vegetation to assess the season.

We eagerly await additional information from rainfall measurements, satellite vegetation observations, crop assessments, and reports from the field, so that we can build a better understanding of the 2012 season for our final report.

Because there has been so little time since the close of the windows, we have not had much time for analysis. We present the intend to cross-check and update our analysis as we have more time, and additional information becomes available. We have been able to perform initial comparisons with the only other source of information currently available, the TAMSAT/ENACT satellite rainfall estimates developed by TAMSAT and the Ethiopian NMA. Comparisons during the contract windows of the relative severity of 2012 is quite similar to that reflected in the ARC2 calculations presented in this document. We intend to proceed further on this analysis and present the results in our final report.

## 1.4 Index calculations for initial 2012 assessment

Below we provide our initial summaries of 2012 for the Dry and Extra Dry indexes. The Dry and Extra Dry options, calculation methods and data sources are described in later sections.

In these tables EarlyAdjRain and LateAdjRain presents our calculation of the adjusted rainfall for the Early and Late windows of the indexes. EarlyRank and LateRank provide an approximate relative Ranking of the year, with 1 being the wettest on record 0.5 being the median year, and lower numbers being drier. The EarlyPay and LatePay columns provide our informal index calculations for the Early and Late windows in percent of maximum, and PaySum is simply a sum of the EarlyPay and LatePay columns.

Table 1.1: 2012 Summary for Dry Indexes

	EarlyAdjRain	LateAdjRain	EarlyRank	LateRank	EarlyPay	LatePay	SumPay
Bethans	12	60	0.43	0.3	0	5	5
DebreGenetA	11	59	0.4	0.37	0	0	0
EndaBagerima	13	60	0.53	0.33	0	0	0
Gendebta	13	60	0.53	0.33	0	0	0
MariamShewito	11	59	0.4	0.37	0	0	0
Seloda	12	60	0.43	0.3	0	5	5
TahtayLegomti	11	59	0.4	0.37	0	0	0
Wedikeshi	12	60	0.43	0.3	0	5	5
Adiyikoro	36	58	0.73	0.43	0	0	0
Adizata	36	58	0.73	0.43	0	0	0
Betgebez	22	50	0.43	0.37	0	0	0
LaelayMegariaTsemri	38	55	0.77	0.3	0	5	5
Maysuru	34	36	0.73	0.13	0	43	43
Sero	34	36	0.73	0.13	0	43	43
TahtayDaeroka	36	58	0.73	0.43	0	0	0
TahtayMegariaTsebri	34	55	0.73	0.3	0	5	5
Gerjale	33	34	0.63	0.17	0	74	74
KuluGizeLemlem	21	34	0.23	0.23	0	70	70
LaelayDayu	33	34	0.63	0.17	0	74	74
Limaat	38	53	0.7	0.17	0	100	100
SelamBekalsi	38	34	0.7	0.23	0	70	70
SelenWuha	38	53	0.7	0.17	0	100	100
BarkaAdiswha	44	29	0.57	0.13	0	76	76
FelegeWayane	25	31	0.37	0.17	0	79	79
Golgolemalee	25	31	0.2	0.17	0	79	79
Habees	44	29	0.57	0.13	0	76	76
RubaFelege	25	31	0.2	0.17	0	79	79
AbrahaAtsbaha	45	36	0.57	0.1	0	100	100
AdiKisandid	39	28	0.63	0.2	0	52	52
Aynalem	45	28	0.57	0.17	0	45	45
Genfel	39	28	0.63	0.2	0	52	52
Kihen	47	20	0.67	0.03	0	93	93
MahbereWeyane	42	28	0.6	0.13	0	65	65
Mesanu	47	20	0.67	0.03	0	93	93
Nagash	12	30	0.17	0.27	89	53	142
AdiHa	39	53	0.6	0.2	0	4	4
Atakilti	6	53	0.27	0.2	21	1	22
AwetBikalsi	39	53	0.6	0.2	0	4	4

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Table 1.1 – continued from previous page

	EarlyAdjRain	LateAdjRain	EarlyRank	LateRank	EarlyPay	LatePay	SumPay
Begashek	25	59	0.23	0.33	36	0	36
DebreGenetK	29	59	0.4	0.33	0	0	0
Endabano	15	28	0.37	0.23	0	0	0
GetskiMilesiley	31	28	0.5	0.2	0	0	0
Menji	6	53	0.27	0.2	21	1	22
Werkamba	15	28	0.37	0.23	0	0	0
AdisKigni	38	34	0.77	0.23	0	70	70
Bala	21	34	0.43	0.23	0	70	70
Ebo	29	17	0.6	0.13	0	80	80
Geneti	32	8	0.67	0.1	0	65	65
HadeAlga	38	13	0.63	0.03	0	100	100
Hawelti	32	31	0.67	0.2	0	39	39
Korme	33	34	0.63	0.17	0	74	74
Mechare	35	29	0.63	0.2	0	57	57
Tsigea	32	31	0.67	0.2	0	39	39
Ulaga	13	31	0.37	0.2	0	77	77
Agazi	31	28	0.43	0.17	0	46	46
Asmena	40	28	0.7	0.17	0	37	37
GuemseAgamet	24	25	0.37	0.1	0	77	77
HadushAdi	46	28	0.77	0.17	0	63	63
HadushHiwet	40	28	0.7	0.17	0	57	57
Hangoda	31	28	0.43	0.17	0	46	46
Sendada	24	25	0.37	0.13	0	54	54
Sinkata	24	25	0.37	0.13	0	54	54
AdekeAla	16	50	0.43	0.57	0	0	0
AdisAlemS	16	50	0.43	0.57	0	0	0
AmdiWeyane	16	50	0.43	0.57	0	0	0
HintsaWaza	16	50	0.43	0.57	0	0	0
MayTeklia	16	50	0.43	0.57	0	0	0
MetkelLemat	13	50	0.5	0.57	0	0	0
Agbe	43	29	0.33	0.33	0	0	0
Gera	31	57	0.33	0.47	0	0	0
ImbaRufael	41	57	0.27	0.47	7	0	7
Lemlem	16	50	0.27	0.3	0	0	0
Mearey	16	50	0.27	0.3	0	0	0
Shekatekli	50	28	0.37	0.2	0	0	0
AdisAlemW	44	54	0.83	0.37	0	0	0
Endachiwa	21	59	0.5	0.47	0	0	0
Endagahamus	20	56	0.47	0.53	0	0	0
Maekelawi	20	56	0.47	0.53	0	0	0
MaekelSegli	16	53	0.3	0.27	0	1	1
Selam	17	58	0.37	0.33	0	0	0
Zongi	17	33	0.37	0.3	0	0	0
Golba	44	132	0.33	0.83	0	22	22
Haleku	45	130	0.37	0.83	0	28	28



Table 1.2: 2012 Summary for Extra Dry Indexes

	EarlyAdjRain	LateAdjRain	EarlyRank	LateRank	EarlyPay	LatePay	SumPay
Bethans	37	60	0.7	0.3	0	0	0
DebreGenetA	36	59	0.63	0.37	0	0	0
EndaBagerima	38	60	0.7	0.33	0	0	0
Gendebta	38	60	0.7	0.33	0	0	0
MariamShewito	36	59	0.63	0.37	0	0	0
Seloda	37	60	0.7	0.3	0	0	0
TahtayLegomti	36	59	0.63	0.37	0	0	0
Wedikeshi	37	60	0.7	0.3	0	0	0
Adiyikoro	61	58	0.83	0.43	0	0	0
Adizata	61	58	0.83	0.43	0	0	0
Betgebez	22	50	0.43	0.37	0	0	0
LaelayMegariaTsemri	63	55	0.83	0.3	0	0	0
Maysuru	59	36	0.83	0.13	0	0	0
Sero	59	36	0.83	0.13	0	0	0
TahtayDaeroka	61	58	0.83	0.43	0	0	0
TahtayMegariaTsebri	63	55	0.83	0.3	0	0	0
Gerjale	33	34	0.63	0.17	0	40	40
KuluGizeLemlem	21	34	0.23	0.23	0	1	1
LaelayDayu	33	34	0.63	0.17	0	40	40
Limaat	38	53	0.7	0.17	0	32	32
SelamBekalsi	38	34	0.7	0.23	0	1	1
SelenWuha	38	53	0.7	0.17	0	32	32
BarkaAdiswha	44	29	0.57	0.13	0	0	0
FelegeWayane	25	31	0.2	0.17	0	0	0
Golgolemalee	25	31	0.2	0.17	0	0	0
Habees	44	29	0.57	0.13	0	0	0
RubaFelege	25	31	0.2	0.17	0	0	0
AbrahaAtsbaha	45	36	0.57	0.1	0	78	78
AdiKisandid	39	28	0.63	0.2	0	0	0
Aynalem	45	28	0.57	0.17	0	21	21
Genfel	39	28	0.63	0.2	0	0	0
Kihen	47	20	0.67	0.03	0	61	61
MahbereWeyane	42	28	0.6	0.13	0	11	11
Mesanu	47	20	0.67	0.03	0	61	61
Nagash	37	30	0.17	0.27	39	0	39
AdiHa	39	53	0.6	0.2	0	0	0
Atakilti	6	53	0.2	0.2	41	0	41
AwetBikalsi	39	53	0.6	0.2	0	0	0
Begashek	25	59	0.23	0.33	0	0	0
DebreGenetK	29	59	0.4	0.33	0	0	0
Endabano	15	28	0.37	0.23	0	0	0
GetskiMilesiley	31	28	0.5	0.2	0	0	0
Menji	6	53	0.2	0.2	41	0	41
Werkamba	15	28	0.37	0.23	0	0	0
AdisKigni	38	34	0.77	0.23	0	1	1
Bala	21	34	0.23	0.23	0	1	1
Ebo	29	17	0.6	0.13	0	44	44
Geneti	32	8	0.63	0.1	0	56	56

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	EarlyAdjRain	LateAdjRain	EarlyRank	LateRank	EarlyPay	LatePay	SumPay
HadeAlga	38	9	0.63	0.03	0	100	100
Hawelti	32	31	0.63	0.2	0	8	8
Korme	33	34	0.63	0.17	0	40	40
Mechare	35	29	0.63	0.2	0	22	22
Tsigea	32	31	0.63	0.2	0	8	8
Ulaga	21	31	0.23	0.2	0	26	26
Agazi	31	28	0.43	0.17	0	27	27
Asmena	40	28	0.7	0.17	0	20	20
GuemseAgamet	24	25	0.37	0.1	0	55	55
HadushAdi	46	28	0.77	0.17	0	53	53
HadushHiwet	40	28	0.7	0.17	0	48	48
Hangoda	31	28	0.43	0.17	0	27	27
Sendada	24	25	0.37	0.13	0	44	44
Sinkata	24	25	0.37	0.13	0	44	44
AdekeAla	16	50	0.43	0.57	0	0	0
AdisAlemS	16	50	0.43	0.57	0	0	0
AmdiWeyane	16	50	0.43	0.57	0	0	0
Hintsawaza	16	50	0.43	0.57	0	0	0
MayTeklia	16	50	0.43	0.57	0	0	0
MetkelLemat	13	50	0.5	0.57	0	0	0
Agbe	43	29	0.33	0.33	0	0	0
Gera	31	57	0.33	0.47	0	0	0
ImbaRufael	41	57	0.27	0.47	0	0	0
Lemlem	16	50	0.27	0.3	0	0	0
Mearey	16	50	0.27	0.3	0	0	0
Shekatekli	50	28	0.37	0.2	0	0	0
AdisAlemW	92	54	0.9	0.37	0	0	0
Endachiwa	46	59	0.63	0.47	0	0	0
Endaghamus	45	56	0.7	0.53	0	0	0
Maekelawi	45	56	0.7	0.53	0	0	0
MaekelSegli	16	53	0.23	0.27	0	0	0
Selam	17	58	0.3	0.33	0	0	0
Zongi	17	33	0.3	0.3	0	0	0
Golba	44	132	0.33	0.83	0	0	0
Haleku	45	130	0.37	0.83	0	0	0

# INDEX STRUCTURE AND PROCESS

Below is a brief recap of the index structures and process for the 2012 HARITA project.

Two drought perils have been identified that dominate other drought risks. 1. weak or late onset of rainfall, impacts sowing, establishment of long cycle crops

2. weak or early end of rainfall, impacts flowering, filling of all crops

Some crops are vulnerable to both perils, while some crops are only vulnerable to the second peril.

Focusing on the two dominant perils, a standardized index is calibrated to the rainfall patterns and cropping calendar for each village. The index structure is based on the successful previous indexes and has been optimized to provide the best protection for each village and crop while being as standardized and homogeneous as possible.

The index is triggered using the NOAA ARC satellite estimates of rainfall, freely available from IRI or NOAA. For each village, the satellite information used is for the 10km x 10km pixel reflecting the rainfall for that village. As mentioned above, the ARC satellite product is now available as the updated ARC2 release. The only differences between ARC and ARC 2 are only that the historical datasources for rainfall estimation have been improved and extended further back in time for ARC2. Data sources since 2005 are identical between ARC2 and ARC, as are all algorithms and parameters.

To address the dominant perils, two separate indexes have been developed. Each contract is a single window. The exact structure of the index is described in the supplementary information section of this brief.

1. Early Index: targets the drought peril due to late or weak onset of rainy season
2. Late Index: targets the late season drought peril due to early or weak end to rainy season

Farmers may purchase both indexes or the late index alone, depending on the crop they grow.

- Farmers growing a crop that is vulnerable to both perils (eg long cycle sorghum, Maize, or Wheat/Barley) will be allowed to purchase both indexes.
- Farmers growing crops that are only vulnerable to the second peril (eg Teff) will only be allowed to purchase the second index.

For each village, index 1 and index 2 are each calibrated to the crop calendars and rainfall amounts in the village. The start and end of each index is set by local experts through discussions with the farmer design team in each village.

For the Dry indexes, the triggers and exits are calibrated with a full loss calibrated to the worst rainfall event observed. A payout event is calibrated to have a meaningful payout for the worst year out of five in the historical dataset.

For the Extra Dry indexes, a full payout is calibrated as 80% of the worst year observed and the trigger is calibrated to have a meaningful payout for the worst year out of ten in the historical dataset. Because Extra Dry indexes must be able to distinguish between dry years and extremely dry years, it was necessary to extend the windows in some of the tabias to include more of the rainfall season. This was primarily the case when there were multiple bad years which had only trace amounts of rainfall at the beginning or end of the season. To determine which of these years were worse, it was valuable to see if there were additional problems further into the season.

The anticipated contract would allow a farmers to purchase one or more units of insurance, up to a maximum of five units, which would be a maximum liability of 50% of the value of the farmer's crops.

We have explored the performance of the indexes using the set of criteria below. We are in the process of upgrading the exploratory analysis techniques and subjective discussions into a formalized process for future years. 1. Agreement of payout with farmer design team reported "bad years", at individual village level and at regional level summaries of farmer design reports

2. If there would have been a payout in the severe regional drought years
3. Agreement in index with national met office datasets such as the new Ethiopian NMA ENACT blended satellite/raingauge dataset
4. Agreement in index with satellite greenness at end of growing season (experimental)
5. Local feedback, customer satisfaction surveys, Regional Level yield data

The parameters for an index are: start dekad, end dekad, cap, trigger, and exit.

Each index consists of a single window of consecutive dekads in the calendar presented in available Calendar Translations tables.

The satellite rainfall estimate for each dekad is totaled. If any dekad has a rainfall total above the cap, that dekad's rainfall is set to the index cap. The capped rainfall of all of the dekads in the index window are added to arrive at the Capped Rainfall Sum. The formula below determines the payout for any maximum liability.

$$\text{Payout} = (1 - ((\text{Capped Rainfall Sum} - \text{Exit}) / (\text{Trigger} - \text{Exit}))) * \text{Max Liability}$$

## 2012 INDEX PARAMETERS

For convenience, we summarize the parameters for the 2012 indexes below. Note that the dates for the start and end of each window is presented in the Roman Calendar, followed by the Ethiopian Calendar equivalent, with the relevant dekad number in parentheses.

Table 3.1: 2012 Parameters for Dry Indexes

	<b>Name</b>	<b>Woreda</b>	<b>Timing</b>	<b>Trig</b>	<b>Exit</b>	<b>First</b>	<b>Last</b>
1	Bethans	Adwa	Early	6	0	11-May/3-May (14)	20-Jun/13-Jun (17)
2	Bethans	Adwa	Late	61	39	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
3	DebreGenetA	Adwa	Early	5	0	11-May/3-May (14)	20-Jun/13-Jun (17)
4	DebreGenetA	Adwa	Late	54	38	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
5	EndaBagerima	Adwa	Early	4	0	11-May/3-May (14)	20-Jun/13-Jun (17)
6	EndaBagerima	Adwa	Late	59	40	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
7	Gendebta	Adwa	Early	4	0	11-May/3-May (14)	20-Jun/13-Jun (17)
8	Gendebta	Adwa	Late	59	40	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
9	MariamShewito	Adwa	Early	5	0	11-May/3-May (14)	20-Jun/13-Jun (17)
10	MariamShewito	Adwa	Late	54	38	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
11	Seloda	Adwa	Early	6	0	11-May/3-May (14)	20-Jun/13-Jun (17)
12	Seloda	Adwa	Late	61	39	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
13	TahtayLegomti	Adwa	Early	5	0	11-May/3-May (14)	20-Jun/13-Jun (17)
14	TahtayLegomti	Adwa	Late	54	38	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
15	Wedikeshi	Adwa	Early	6	0	11-May/3-May (14)	20-Jun/13-Jun (17)
16	Wedikeshi	Adwa	Late	61	39	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
17	Adiyikoro	Ahferom	Early	8	0	1-May/23-Apr (13)	20-Jun/13-Jun (17)
18	Adiyikoro	Ahferom	Late	53	33	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
19	Adizata	Ahferom	Early	8	0	1-May/23-Apr (13)	20-Jun/13-Jun (17)
20	Adizata	Ahferom	Late	53	33	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
21	Betgebez	Ahferom	Early	7	0	21-Apr/13-Apr (12)	10-Jun/3-Jun (16)
22	Betgebez	Ahferom	Late	49	15	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
23	LalayMegariaTsemri	Ahferom	Early	8	0	1-May/23-Apr (13)	20-Jun/13-Jun (17)
24	LalayMegariaTsemri	Ahferom	Late	57	20	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
25	Maysuru	Ahferom	Early	7	0	1-May/23-Apr (13)	20-Jun/13-Jun (17)
26	Maysuru	Ahferom	Late	50	18	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
27	Sero	Ahferom	Early	7	0	1-May/23-Apr (13)	20-Jun/13-Jun (17)
28	Sero	Ahferom	Late	50	18	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
29	TahtayDaeroka	Ahferom	Early	8	0	1-May/23-Apr (13)	20-Jun/13-Jun (17)
30	TahtayDaeroka	Ahferom	Late	53	33	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
31	TahtayMegariaTsebri	Ahferom	Early	5	0	1-May/23-Apr (13)	10-Jun/3-Jun (16)

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Table 3.1 – continued from previous page

	Name	Woreda	Timing	Trig	Exit	First	Last
32	TahtayMegariaTsebri	Ahferom	Late	57	20	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
33	Gerjale	Alamata	Early	6	0	21-Apr/13-Apr (12)	10-Jun/3-Jun (16)
34	Gerjale	Alamata	Late	54	27	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
35	KuluGizeLemlem	Alamata	Early	16	5	1-May/23-Apr (13)	10-Jul/3-Jul (19)
36	KuluGizeLemlem	Alamata	Late	45	29	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
37	LaelayDayu	Alamata	Early	6	0	21-Apr/13-Apr (12)	10-Jun/3-Jun (16)
38	LaelayDayu	Alamata	Late	54	27	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
39	Limaat	Alamata	Early	12	0	21-Apr/13-Apr (12)	10-Jun/3-Jun (16)
40	Limaat	Alamata	Late	68	54	11-Aug/5-Aug (23)	30-Sep/20-Sep (27)
41	SelamBekalsi	Alamata	Early	12	0	21-Apr/13-Apr (12)	10-Jun/3-Jun (16)
42	SelamBekalsi	Alamata	Late	45	29	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
43	SelenWuha	Alamata	Early	12	0	21-Apr/13-Apr (12)	10-Jun/3-Jun (16)
44	SelenWuha	Alamata	Late	68	54	11-Aug/5-Aug (23)	30-Sep/20-Sep (27)
45	BarkaAdiswha	Atsbi	Early	24	11	11-Jun/4-Jun (17)	20-Jul/13-Jul (20)
46	BarkaAdiswha	Atsbi	Late	46	24	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
47	FelegeWayane	Atsbi	Early	6	0	11-May/3-May (14)	10-Jul/3-Jul (19)
48	FelegeWayane	Atsbi	Late	52	25	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
49	Golgolemalee	Atsbi	Early	18	14	21-May/13-May (15)	20-Jul/13-Jul (20)
50	Golgolemalee	Atsbi	Late	52	25	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
51	Habees	Atsbi	Early	24	11	11-Jun/4-Jun (17)	20-Jul/13-Jul (20)
52	Habees	Atsbi	Late	46	24	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
53	RubaFelege	Atsbi	Early	18	14	21-May/13-May (15)	20-Jul/13-Jul (20)
54	RubaFelege	Atsbi	Late	52	25	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
55	AbrahaAtsbaha	KinteAwelo	Early	31	12	21-Jun/14-Jun (18)	20-Jul/13-Jul (20)
56	AbrahaAtsbaha	KinteAwelo	Late	64	39	11-Aug/5-Aug (23)	20-Sep/10-Sep (26)
57	AdiKisandid	KinteAwelo	Early	24	9	21-Jun/14-Jun (18)	20-Jul/13-Jul (20)
58	AdiKisandid	KinteAwelo	Late	38	18	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
59	Aynalem	KinteAwelo	Early	31	12	21-Jun/14-Jun (18)	20-Jul/13-Jul (20)
60	Aynalem	KinteAwelo	Late	39	14	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
61	Genfel	KinteAwelo	Early	24	9	21-Jun/14-Jun (18)	20-Jul/13-Jul (20)
62	Genfel	KinteAwelo	Late	38	18	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
63	Kihen	KinteAwelo	Early	19	4	21-Jun/14-Jun (18)	20-Jul/13-Jul (20)
64	Kihen	KinteAwelo	Late	39	19	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
65	MahbereWeyane	KinteAwelo	Early	25	6	21-Jun/14-Jun (18)	20-Jul/13-Jul (20)
66	MahbereWeyane	KinteAwelo	Late	40	21	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
67	Mesanu	KinteAwelo	Early	19	4	21-Jun/14-Jun (18)	20-Jul/13-Jul (20)
68	Mesanu	KinteAwelo	Late	39	19	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
69	Nagash	KinteAwelo	Early	21	11	21-Jun/14-Jun (18)	20-Jul/13-Jul (20)
70	Nagash	KinteAwelo	Late	44	17	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
71	AdiHa	KolaTembien	Early	17	7	1-May/23-Apr (13)	30-Jun/23-Jun (18)
72	AdiHa	KolaTembien	Late	54	26	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
73	Atakilti	KolaTembien	Early	8	0	1-May/23-Apr (13)	10-Jun/3-Jun (16)
74	Atakilti	KolaTembien	Late	53	30	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
75	AwetBikalsi	KolaTembien	Early	17	7	1-May/23-Apr (13)	30-Jun/23-Jun (18)
76	AwetBikalsi	KolaTembien	Late	54	26	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
77	Begashek	KolaTembien	Early	29	18	21-May/13-May (15)	30-Jun/23-Jun (18)
78	Begashek	KolaTembien	Late	55	29	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
79	DebreGenetK	KolaTembien	Early	19	9	11-May/3-May (14)	30-Jun/23-Jun (18)
80	DebreGenetK	KolaTembien	Late	54	23	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)

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Table 3.1 – continued from previous page

	Name	Woreda	Timing	Trig	Exit	First	Last
81	Endabano	KolaTembien	Early	10	0	1-May/23-Apr (13)	20-Jun/13-Jun (17)
82	Endabano	KolaTembien	Late	26	9	1-Sep/26-Aug (25)	30-Sep/20-Sep (27)
83	GetskiMilesiley	KolaTembien	Early	20	3	21-May/13-May (15)	30-Jun/23-Jun (18)
84	GetskiMilesiley	KolaTembien	Late	26	8	1-Sep/26-Aug (25)	30-Sep/20-Sep (27)
85	Menji	KolaTembien	Early	8	0	1-May/23-Apr (13)	10-Jun/3-Jun (16)
86	Menji	KolaTembien	Late	53	30	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
87	Werkamba	KolaTembien	Early	10	0	1-May/23-Apr (13)	20-Jun/13-Jun (17)
88	Werkamba	KolaTembien	Late	26	9	1-Sep/26-Aug (25)	30-Sep/20-Sep (27)
89	AdisKigni	RayaAzebo	Early	10	0	21-Apr/13-Apr (12)	31-May/23-May (15)
90	AdisKigni	RayaAzebo	Late	45	29	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
91	Bala	RayaAzebo	Early	4	0	1-May/23-Apr (13)	30-Jun/23-Jun (18)
92	Bala	RayaAzebo	Late	45	29	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
93	Ebo	RayaAzebo	Early	6	0	21-Apr/13-Apr (12)	10-Jun/3-Jun (16)
94	Ebo	RayaAzebo	Late	45	10	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
95	Geneti	RayaAzebo	Early	6	0	21-Apr/13-Apr (12)	31-May/23-May (15)
96	Geneti	RayaAzebo	Late	24	0	1-Sep/26-Aug (25)	10-Oct/30-Sep (28)
97	HadeAlga	RayaAzebo	Early	13	0	21-Apr/13-Apr (12)	31-May/23-May (15)
98	HadeAlga	RayaAzebo	Late	31	15	1-Sep/26-Aug (25)	20-Oct/10-Oct (29)
99	Hawelti	RayaAzebo	Early	6	0	21-Apr/13-Apr (12)	31-May/23-May (15)
100	Hawelti	RayaAzebo	Late	43	13	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
101	Korme	RayaAzebo	Early	6	0	21-Apr/13-Apr (12)	10-Jun/3-Jun (16)
102	Korme	RayaAzebo	Late	54	27	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
103	Mechare	RayaAzebo	Early	8	0	21-Apr/13-Apr (12)	10-Jun/3-Jun (16)
104	Mechare	RayaAzebo	Late	49	13	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
105	Tsigea	RayaAzebo	Early	6	0	21-Apr/13-Apr (12)	31-May/23-May (15)
106	Tsigea	RayaAzebo	Late	43	13	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
107	Ulaga	RayaAzebo	Early	6	0	1-May/23-Apr (13)	10-Jun/3-Jun (16)
108	Ulaga	RayaAzebo	Late	49	26	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
109	Agazi	SaesiTsaedaemba	Early	28	4	11-Jun/4-Jun (17)	20-Jul/13-Jul (20)
110	Agazi	SaesiTsaedaemba	Late	41	12	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
111	Asmena	SaesiTsaedaemba	Early	16	5	11-Jun/4-Jun (17)	20-Jul/13-Jul (20)
112	Asmena	SaesiTsaedaemba	Late	39	8	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
113	GuemseAgamet	SaesiTsaedaemba	Early	23	5	11-Jun/4-Jun (17)	20-Jul/13-Jul (20)
114	GuemseAgamet	SaesiTsaedaemba	Late	48	18	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
115	HadushAdi	SaesiTsaedaemba	Early	17	3	21-Jun/14-Jun (18)	20-Jul/13-Jul (20)
116	HadushAdi	SaesiTsaedaemba	Late	47	16	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
117	HadushHiwet	SaesiTsaedaemba	Early	16	5	11-Jun/4-Jun (17)	20-Jul/13-Jul (20)
118	HadushHiwet	SaesiTsaedaemba	Late	47	13	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
119	Hangoda	SaesiTsaedaemba	Early	28	4	11-Jun/4-Jun (17)	20-Jul/13-Jul (20)
120	Hangoda	SaesiTsaedaemba	Late	41	12	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
121	Sendada	SaesiTsaedaemba	Early	23	5	11-Jun/4-Jun (17)	20-Jul/13-Jul (20)
122	Sendada	SaesiTsaedaemba	Late	40	12	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
123	Sinkata	SaesiTsaedaemba	Early	23	5	11-Jun/4-Jun (17)	20-Jul/13-Jul (20)
124	Sinkata	SaesiTsaedaemba	Late	40	12	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
125	AdekeAla	Samre	Early	4	0	1-May/23-Apr (13)	20-Jun/13-Jun (17)
126	AdekeAla	Samre	Late	39	19	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
127	AdisAlemS	Samre	Early	4	0	1-May/23-Apr (13)	20-Jun/13-Jun (17)
128	AdisAlemS	Samre	Late	39	19	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
129	AmdiWeyane	Samre	Early	4	0	1-May/23-Apr (13)	20-Jun/13-Jun (17)

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Table 3.1 – continued from previous page

	Name	Woreda	Timing	Trig	Exit	First	Last
130	AmdiWeyane	Samre	Late	39	19	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
131	Hintsawaza	Samre	Early	4	0	1-May/23-Apr (13)	20-Jun/13-Jun (17)
132	Hintsawaza	Samre	Late	39	19	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
133	MayTeklia	Samre	Early	4	0	1-May/23-Apr (13)	20-Jun/13-Jun (17)
134	MayTeklia	Samre	Late	39	19	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
135	MetkelLemat	Samre	Early	5	0	1-May/23-Apr (13)	10-Jun/3-Jun (16)
136	MetkelLemat	Samre	Late	39	20	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
137	Agbe	TanquaAbergele	Early	31	25	11-May/3-May (14)	10-Jul/3-Jul (19)
138	Agbe	TanquaAbergele	Late	24	7	1-Sep/26-Aug (25)	30-Sep/20-Sep (27)
139	Gera	TanquaAbergele	Early	31	5	1-May/23-Apr (13)	30-Jun/23-Jun (18)
140	Gera	TanquaAbergele	Late	51	31	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
141	ImbaRufael	TanquaAbergele	Early	42	30	11-May/3-May (14)	10-Jul/3-Jul (19)
142	ImbaRufael	TanquaAbergele	Late	51	31	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
143	Lemlem	TanquaAbergele	Early	14	1	11-May/3-May (14)	30-Jun/23-Jun (18)
144	Lemlem	TanquaAbergele	Late	50	29	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
145	Mearey	TanquaAbergele	Early	14	1	11-May/3-May (14)	30-Jun/23-Jun (18)
146	Mearey	TanquaAbergele	Late	50	29	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
147	Shekatekli	TanquaAbergele	Early	49	28	11-May/3-May (14)	10-Jul/3-Jul (19)
148	Shekatekli	TanquaAbergele	Late	24	7	1-Sep/26-Aug (25)	30-Sep/20-Sep (27)
149	AdisAlemW	WiereLahe	Early	4	0	1-May/23-Apr (13)	10-Jun/3-Jun (16)
150	AdisAlemW	WiereLahe	Late	50	18	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
151	Endachiwa	WiereLahe	Early	7	0	1-May/23-Apr (13)	20-Jun/13-Jun (17)
152	Endachiwa	WiereLahe	Late	54	32	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
153	Endagahamus	WiereLahe	Early	4	0	1-May/23-Apr (13)	20-Jun/13-Jun (17)
154	Endagahamus	WiereLahe	Late	50	18	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
155	Maekelawi	WiereLahe	Early	4	0	1-May/23-Apr (13)	20-Jun/13-Jun (17)
156	Maekelawi	WiereLahe	Late	50	18	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
157	MaekelSegli	WiereLahe	Early	11	3	21-Apr/13-Apr (12)	10-Jun/3-Jun (16)
158	MaekelSegli	WiereLahe	Late	53	37	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
159	Selam	WiereLahe	Early	6	0	21-Apr/13-Apr (12)	31-May/23-May (15)
160	Selam	WiereLahe	Late	51	40	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
161	Zongi	WiereLahe	Early	6	0	21-Apr/13-Apr (12)	31-May/23-May (15)
162	Zongi	WiereLahe	Late	26	20	1-Sep/26-Aug (25)	30-Sep/20-Sep (27)
163	Golba	Ziway	Early	12	0	21-Apr/13-Apr (12)	31-May/23-May (15)
164	Golba	Ziway	Late	138	109	1-Jul/24-Jun (19)	31-Aug/25-Aug (24)
165	Haleku	Ziway	Early	12	0	21-Apr/13-Apr (12)	31-May/23-May (15)
166	Haleku	Ziway	Late	138	109	1-Jul/24-Jun (19)	31-Aug/25-Aug (24)

Table 3.2: 2012 Parameters for Extra Dry Indexes

	Name	Woreda	Timing	Trig	Exit	First	Last
1	Bethans	Adwa	Early	15	3	11-May/3-May (14)	30-Jun/23-Jun (18)
2	Bethans	Adwa	Late	52	31	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
3	DebreGenetA	Adwa	Early	15	3	11-May/3-May (14)	30-Jun/23-Jun (18)
4	DebreGenetA	Adwa	Late	52	30	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
5	EndaBagerima	Adwa	Early	17	0	11-May/3-May (14)	30-Jun/23-Jun (18)
6	EndaBagerima	Adwa	Late	49	32	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
7	Gendebta	Adwa	Early	17	0	11-May/3-May (14)	30-Jun/23-Jun (18)
8	Gendebta	Adwa	Late	49	32	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)

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	Name	Woreda	Timing	Trig	Exit	First	Last
9	MariamShewito	Adwa	Early	15	3	11-May/3-May (14)	30-Jun/23-Jun (18)
10	MariamShewito	Adwa	Late	52	30	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
11	Seloda	Adwa	Early	15	3	11-May/3-May (14)	30-Jun/23-Jun (18)
12	Seloda	Adwa	Late	52	31	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
13	TahtayLegomti	Adwa	Early	15	3	11-May/3-May (14)	30-Jun/23-Jun (18)
14	TahtayLegomti	Adwa	Late	52	30	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
15	Wedikeshi	Adwa	Early	15	3	11-May/3-May (14)	30-Jun/23-Jun (18)
16	Wedikeshi	Adwa	Late	52	31	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
17	Adiyikoro	Ahferom	Early	12	0	1-May/23-Apr (13)	30-Jun/23-Jun (18)
18	Adiyikoro	Ahferom	Late	51	26	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
19	Adizata	Ahferom	Early	12	0	1-May/23-Apr (13)	30-Jun/23-Jun (18)
20	Adizata	Ahferom	Late	51	26	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
21	Betgebez	Ahferom	Early	6	0	21-Apr/13-Apr (12)	10-Jun/3-Jun (16)
22	Betgebez	Ahferom	Late	36	12	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
23	LalayMegariaTsemri	Ahferom	Early	13	6	1-May/23-Apr (13)	30-Jun/23-Jun (18)
24	LalayMegariaTsemri	Ahferom	Late	53	16	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
25	Maysuru	Ahferom	Early	8	1	1-May/23-Apr (13)	30-Jun/23-Jun (18)
26	Maysuru	Ahferom	Late	36	14	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
27	Sero	Ahferom	Early	8	1	1-May/23-Apr (13)	30-Jun/23-Jun (18)
28	Sero	Ahferom	Late	36	14	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
29	TahtayDaeroka	Ahferom	Early	12	0	1-May/23-Apr (13)	30-Jun/23-Jun (18)
30	TahtayDaeroka	Ahferom	Late	51	26	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
31	TahtayMegariaTsebri	Ahferom	Early	13	6	1-May/23-Apr (13)	30-Jun/23-Jun (18)
32	TahtayMegariaTsebri	Ahferom	Late	53	16	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
33	Gerjale	Alamata	Early	4	0	21-Apr/13-Apr (12)	10-Jun/3-Jun (16)
34	Gerjale	Alamata	Late	42	22	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
35	KuluGizeLemlem	Alamata	Early	12	4	1-May/23-Apr (13)	10-Jul/3-Jul (19)
36	KuluGizeLemlem	Alamata	Late	34	23	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
37	LalayDayu	Alamata	Early	4	0	21-Apr/13-Apr (12)	10-Jun/3-Jun (16)
38	LalayDayu	Alamata	Late	42	22	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
39	Limaat	Alamata	Early	5	0	21-Apr/13-Apr (12)	10-Jun/3-Jun (16)
40	Limaat	Alamata	Late	58	43	11-Aug/5-Aug (23)	30-Sep/20-Sep (27)
41	SelamBekalsi	Alamata	Early	5	0	21-Apr/13-Apr (12)	10-Jun/3-Jun (16)
42	SelamBekalsi	Alamata	Late	34	23	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
43	SelenWuha	Alamata	Early	5	0	21-Apr/13-Apr (12)	10-Jun/3-Jun (16)
44	SelenWuha	Alamata	Late	58	43	11-Aug/5-Aug (23)	30-Sep/20-Sep (27)
45	BarkaAdiswha	Atsbi	Early	14	9	11-Jun/4-Jun (17)	20-Jul/13-Jul (20)
46	BarkaAdiswha	Atsbi	Late	29	19	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
47	FelegeWayane	Atsbi	Early	16	11	11-May/3-May (14)	20-Jul/13-Jul (20)
48	FelegeWayane	Atsbi	Late	25	20	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
49	Golgolemalee	Atsbi	Early	16	11	21-May/13-May (15)	20-Jul/13-Jul (20)
50	Golgolemalee	Atsbi	Late	25	20	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
51	Habees	Atsbi	Early	14	9	11-Jun/4-Jun (17)	20-Jul/13-Jul (20)
52	Habees	Atsbi	Late	29	19	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
53	RubaFelege	Atsbi	Early	16	11	21-May/13-May (15)	20-Jul/13-Jul (20)
54	RubaFelege	Atsbi	Late	25	20	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
55	AbrahaAtsbaha	KinteAwelo	Early	18	10	21-Jun/14-Jun (18)	20-Jul/13-Jul (20)
56	AbrahaAtsbaha	KinteAwelo	Late	54	31	11-Aug/5-Aug (23)	20-Sep/10-Sep (26)
57	AdiKisandid	KinteAwelo	Early	16	7	21-Jun/14-Jun (18)	20-Jul/13-Jul (20)

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	Name	Woreda	Timing	Trig	Exit	First	Last
58	AdiKisandid	KinteAwelo	Late	24	14	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
59	Aynalem	KinteAwelo	Early	18	10	21-Jun/14-Jun (18)	20-Jul/13-Jul (20)
60	Aynalem	KinteAwelo	Late	32	11	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
61	Genfel	KinteAwelo	Early	16	7	21-Jun/14-Jun (18)	20-Jul/13-Jul (20)
62	Genfel	KinteAwelo	Late	24	14	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
63	Kihen	KinteAwelo	Early	12	4	21-Jun/14-Jun (18)	20-Jul/13-Jul (20)
64	Kihen	KinteAwelo	Late	29	15	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
65	MahbereWeyane	KinteAwelo	Early	16	5	21-Jun/14-Jun (18)	20-Jul/13-Jul (20)
66	MahbereWeyane	KinteAwelo	Late	29	17	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
67	Mesanu	KinteAwelo	Early	12	4	21-Jun/14-Jun (18)	20-Jul/13-Jul (20)
68	Mesanu	KinteAwelo	Late	29	15	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
69	Nagash	KinteAwelo	Early	46	23	11-Jun/4-Jun (17)	31-Jul/24-Jul (21)
70	Nagash	KinteAwelo	Late	24	14	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
71	AdiHa	KolaTembien	Early	12	6	1-May/23-Apr (13)	30-Jun/23-Jun (18)
72	AdiHa	KolaTembien	Late	38	20	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
73	Atakilti	KolaTembien	Early	10	1	1-May/23-Apr (13)	20-Jun/13-Jun (17)
74	Atakilti	KolaTembien	Late	46	24	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
75	AwetBikalsi	KolaTembien	Early	12	6	1-May/23-Apr (13)	30-Jun/23-Jun (18)
76	AwetBikalsi	KolaTembien	Late	38	20	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
77	Begashek	KolaTembien	Early	25	15	21-May/13-May (15)	30-Jun/23-Jun (18)
78	Begashek	KolaTembien	Late	49	24	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
79	DebreGenetK	KolaTembien	Early	11	8	11-May/3-May (14)	30-Jun/23-Jun (18)
80	DebreGenetK	KolaTembien	Late	46	18	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
81	Endabano	KolaTembien	Early	5	0	1-May/23-Apr (13)	20-Jun/13-Jun (17)
82	Endabano	KolaTembien	Late	21	7	1-Sep/26-Aug (25)	30-Sep/20-Sep (27)
83	GetskiMilesiley	KolaTembien	Early	4	3	21-May/13-May (15)	30-Jun/23-Jun (18)
84	GetskiMilesiley	KolaTembien	Late	17	7	1-Sep/26-Aug (25)	30-Sep/20-Sep (27)
85	Menji	KolaTembien	Early	10	1	1-May/23-Apr (13)	20-Jun/13-Jun (17)
86	Menji	KolaTembien	Late	46	24	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
87	Werkamba	KolaTembien	Early	5	0	1-May/23-Apr (13)	20-Jun/13-Jun (17)
88	Werkamba	KolaTembien	Late	21	7	1-Sep/26-Aug (25)	30-Sep/20-Sep (27)
89	AdisKigni	RayaAzebo	Early	5	0	21-Apr/13-Apr (12)	31-May/23-May (15)
90	AdisKigni	RayaAzebo	Late	34	23	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
91	Bala	RayaAzebo	Early	12	4	1-May/23-Apr (13)	10-Jul/3-Jul (19)
92	Bala	RayaAzebo	Late	34	23	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
93	Ebo	RayaAzebo	Early	3	0	21-Apr/13-Apr (12)	20-Jun/13-Jun (17)
94	Ebo	RayaAzebo	Late	24	8	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
95	Geneti	RayaAzebo	Early	4	0	21-Apr/13-Apr (12)	10-Jun/3-Jun (16)
96	Geneti	RayaAzebo	Late	18	0	1-Sep/26-Aug (25)	10-Oct/30-Sep (28)
97	HadeAlga	RayaAzebo	Early	7	0	21-Apr/13-Apr (12)	31-May/23-May (15)
98	HadeAlga	RayaAzebo	Late	24	12	1-Sep/26-Aug (25)	20-Oct/10-Oct (29)
99	Hawelti	RayaAzebo	Early	4	0	21-Apr/13-Apr (12)	10-Jun/3-Jun (16)
100	Hawelti	RayaAzebo	Late	33	11	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
101	Korme	RayaAzebo	Early	4	0	21-Apr/13-Apr (12)	10-Jun/3-Jun (16)
102	Korme	RayaAzebo	Late	42	22	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
103	Mechare	RayaAzebo	Early	6	0	21-Apr/13-Apr (12)	10-Jun/3-Jun (16)
104	Mechare	RayaAzebo	Late	34	10	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
105	Tsigea	RayaAzebo	Early	4	0	21-Apr/13-Apr (12)	10-Jun/3-Jun (16)
106	Tsigea	RayaAzebo	Late	33	11	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)

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	Name	Woreda	Timing	Trig	Exit	First	Last
107	Ulaga	RayaAzebo	Early	9	4	1-May/23-Apr (13)	10-Jul/3-Jul (19)
108	Ulaga	RayaAzebo	Late	35	21	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
109	Agazi	SaesiTsaedaemba	Early	15	3	11-Jun/4-Jun (17)	20-Jul/13-Jul (20)
110	Agazi	SaesiTsaedaemba	Late	34	10	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
111	Asmena	SaesiTsaedaemba	Early	8	4	11-Jun/4-Jun (17)	20-Jul/13-Jul (20)
112	Asmena	SaesiTsaedaemba	Late	33	6	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
113	GuemseAgamet	SaesiTsaedaemba	Early	17	4	11-Jun/4-Jun (17)	20-Jul/13-Jul (20)
114	GuemseAgamet	SaesiTsaedaemba	Late	37	15	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
115	HadushAdi	SaesiTsaedaemba	Early	11	2	21-Jun/14-Jun (18)	20-Jul/13-Jul (20)
116	HadushAdi	SaesiTsaedaemba	Late	44	13	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
117	HadushHiwet	SaesiTsaedaemba	Early	8	4	11-Jun/4-Jun (17)	20-Jul/13-Jul (20)
118	HadushHiwet	SaesiTsaedaemba	Late	44	10	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
119	Hangoda	SaesiTsaedaemba	Early	15	3	11-Jun/4-Jun (17)	20-Jul/13-Jul (20)
120	Hangoda	SaesiTsaedaemba	Late	34	10	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
121	Sendada	SaesiTsaedaemba	Early	17	4	11-Jun/4-Jun (17)	20-Jul/13-Jul (20)
122	Sendada	SaesiTsaedaemba	Late	37	10	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
123	Sinkata	SaesiTsaedaemba	Early	17	4	11-Jun/4-Jun (17)	20-Jul/13-Jul (20)
124	Sinkata	SaesiTsaedaemba	Late	37	10	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
125	AdekeAla	Samre	Early	4	0	1-May/23-Apr (13)	20-Jun/13-Jun (17)
126	AdekeAla	Samre	Late	26	15	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
127	AdisAlemS	Samre	Early	4	0	1-May/23-Apr (13)	20-Jun/13-Jun (17)
128	AdisAlemS	Samre	Late	26	15	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
129	AmdiWeyane	Samre	Early	4	0	1-May/23-Apr (13)	20-Jun/13-Jun (17)
130	AmdiWeyane	Samre	Late	26	15	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
131	Hintsawaza	Samre	Early	4	0	1-May/23-Apr (13)	20-Jun/13-Jun (17)
132	Hintsawaza	Samre	Late	26	15	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
133	MayTeklia	Samre	Early	4	0	1-May/23-Apr (13)	20-Jun/13-Jun (17)
134	MayTeklia	Samre	Late	26	15	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
135	MetkelLemat	Samre	Early	5	0	1-May/23-Apr (13)	10-Jun/3-Jun (16)
136	MetkelLemat	Samre	Late	30	16	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
137	Agbe	TanquaAbergele	Early	27	20	11-May/3-May (14)	10-Jul/3-Jul (19)
138	Agbe	TanquaAbergele	Late	12	6	1-Sep/26-Aug (25)	30-Sep/20-Sep (27)
139	Gera	TanquaAbergele	Early	20	4	1-May/23-Apr (13)	30-Jun/23-Jun (18)
140	Gera	TanquaAbergele	Late	41	25	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
141	ImbaRufael	TanquaAbergele	Early	39	24	11-May/3-May (14)	10-Jul/3-Jul (19)
142	ImbaRufael	TanquaAbergele	Late	41	25	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
143	Lemlem	TanquaAbergele	Early	10	1	11-May/3-May (14)	30-Jun/23-Jun (18)
144	Lemlem	TanquaAbergele	Late	49	23	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
145	Mearey	TanquaAbergele	Early	10	1	11-May/3-May (14)	30-Jun/23-Jun (18)
146	Mearey	TanquaAbergele	Late	49	23	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
147	Shekatekli	TanquaAbergele	Early	38	22	11-May/3-May (14)	10-Jul/3-Jul (19)
148	Shekatekli	TanquaAbergele	Late	18	5	1-Sep/26-Aug (25)	30-Sep/20-Sep (27)
149	AdisAlemW	WiereLahe	Early	20	8	1-May/23-Apr (13)	10-Jul/3-Jul (19)
150	AdisAlemW	WiereLahe	Late	45	15	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
151	Endachiwa	WiereLahe	Early	15	3	1-May/23-Apr (13)	30-Jun/23-Jun (18)
152	Endachiwa	WiereLahe	Late	51	25	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
153	Endagahamus	WiereLahe	Early	9	5	1-May/23-Apr (13)	30-Jun/23-Jun (18)
154	Endagahamus	WiereLahe	Late	44	15	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
155	Maekelawi	WiereLahe	Early	9	5	1-May/23-Apr (13)	30-Jun/23-Jun (18)

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	Name	Woreda	Timing	Trig	Exit	First	Last
156	Maekelawi	WiereLahe	Late	44	15	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
157	MaekelSegli	WiereLahe	Early	4	2	21-Apr/13-Apr (12)	20-Jun/13-Jun (17)
158	MaekelSegli	WiereLahe	Late	50	30	21-Aug/15-Aug (24)	20-Sep/10-Sep (26)
159	Selam	WiereLahe	Early	6	0	21-Apr/13-Apr (12)	10-Jun/3-Jun (16)
160	Selam	WiereLahe	Late	47	32	21-Aug/15-Aug (24)	30-Sep/20-Sep (27)
161	Zongi	WiereLahe	Early	6	0	21-Apr/13-Apr (12)	10-Jun/3-Jun (16)
162	Zongi	WiereLahe	Late	22	16	1-Sep/26-Aug (25)	30-Sep/20-Sep (27)
163	Golba	Ziway	Early	7	0	21-Apr/13-Apr (12)	31-May/23-May (15)
164	Golba	Ziway	Late	126	88	1-Jul/24-Jun (19)	31-Aug/25-Aug (24)
165	Haleku	Ziway	Early	7	0	21-Apr/13-Apr (12)	31-May/23-May (15)
166	Haleku	Ziway	Late	126	88	1-Jul/24-Jun (19)	31-Aug/25-Aug (24)