

1.1 New varieties

1.1.1. Variety name: **DZ-Cr-497 Bishoftu (በሽፍቱ)**

Pedigree: DZ-Cr-387 X Rosea (RIL-133)

1.1.1.1. Agronomic & morphological characteristics

- Adaptation area: High and optimum tef growing area
- Altitude (m.a.s.l): 1700-2500
- Rain fall (mm): 700-1200
- Seed rate (kg/ha): 10-15
- Spacing (cm): 20 between rows
- Planting method: Both broad casting and row sowing
- Fertilizer rate (kg/ha):
 - P₂O₅: 60 for light soil
60 for black soil
 - N: 40 for light soil
60 for black soil
- Days to heading: 46-60
- Days to maturity: 94-110
- Panicle length (cm): 30-42
- 1000 seed weight (g): 0.28-0.31
- Plant height (cm): 88-110
- Caryopsis color: Very white
- Lemma color: Variegated (Yellow)
- Anther color: Red
- Growth habit: Semi erect
- Panicle form: Very loose
- Crop pest reaction: *
- Grain yield (qt/ha):
 - Research field: 24-32
 - Farmer's field: 20-28
 - Biomass yield 137.8-138.2

1.1.1.2. Year of release: 2020

1.1.1.3. Breeder/ maintainer: Debre Zeit ARC/EIAR/

* *Tolerant to major tef diseases (head smudge and rust)*

1.1.2. Variety name: **Axumawit (Dz-cr-494(RIL.7))**Pedigree: **(Dz-cr-387 x Alba (RIL.7))**

1.1.2.1. Agronomic & morphological characteristics

- Adaptation area: Optimum to high moisture
tef growing areas of Tigray
- Altitude (m.a.s.l): 1957-2100
- Rain fall (mm): -
- Seed rate (kg/ha): 15
- Spacing (cm): 20 between rows
- Planting date: June 28 – July 10
- Fertilizer rate (kg/ha):
 - P₂O₅: 37.5
 - N: 46
- Days to heading: 64
- Days to maturity: 107
- Panicle length (cm): 44
- 1000 seed weight (g): -
- Plant height (cm): 117
- Seed color: Pale white
- Flower color : Yellow
- Panicle color:
- Panicle form:
- Crop pest reaction:*
- Grain yield (qt/ha):
 - Research field: 19.89
 - Farmer's field: -

1.1.2.2. Year of release: 2020

1.1.2.3. Breeder/ maintainer: Axum ARC/TRARI/

* No disease was observed

1.2 Varieties under production

- 1.2.1. Variety name: Washera (353*Key muri)
(RIL 29)
- 1.2.1.1. Year of release: 2019
- 1.2.1.2. Breeder/Maintainer: Adet ARC/ARARI/
- 1.2.2. Variety name: Jitu (Acc. DZ-01-256)
- 1.2.2.1. Year of release: 2019
- 1.2.2.2. Breeder/Maintainer: Bako ARC/ORARI/
- 1.2.3. Variety name: Mena (DZ-01-354 X DZ-
CR-37-131))
- 1.2.3.1. Year of release: 2019
- 1.2.3.2. Breeder/Maintainer: Sirinka ARC/ARARI/
- 1.2.4. Variety name: Bora (DZ-CR-387 X 3774-
13 (RIL No.120B))
- 1.2.4.1. Year of release: 2019
- 1.2.4.2. Breeder/Maintainer: Debre Zeit ARC/EIAR/
- 1.2.5. Variety name: Ebba (Kay muri x 3774-13)
(RIL No.18)
- 1.2.5.1. Year of release: 2019
- 1.2.5.2. Breeder/Maintainer: Debre Zeit ARC/EIAR
- 1.2.6. Variety name: Abay (Acc#225931)
- 1.2.6.1. Year of release: 2018
- 1.2.6.2. Breeder/Maintainer: Adet ARC/ARARI/
- 1.2.7. Variety name: DURSİ (Acc.236952)
- 1.2.7.1. Year of release: 2018
- 1.2.7.2. Breeder/Maintainer: Bako ARC/ORARI/
- 1.2.8. Variety name: Hiber-1
(DZ-01-974* P1222988)
- 1.2.8.1. Year of release: 2017
- 1.2.8.2. Breeder/Maintainer: Adet ARC/ARARI/

2.1 New varieties

2.1.1. Variety name: **Dursa (ETBW 9578)**

Pedigree: NAVJ07/SHORTENED SR26

TRANSLOCATION/3/ATTILA/BAV92//PASTOR)

2.1.1.1. Agronomic & morphological characteristics

- Adaptation area: Low to midland area
 - Altitude (m.a.s.l): 1600– 2100
 - Rain fall (mm): 500 - 800
- Seed rate (kg/ha): 125
- Planting date: Late June to early July
- Fertilizer rate (kg/ha):
 - P₂O₅: 46
 - N: 92
- Days to heading: 59
- Days to maturity: 100
- Plant height (cm): 84
- Growth habit: Erect type
- Ear type: Tapering
- 1000 kernel weight (g): 34
- Hectoliter weight (kg/hl): 71
- Grain color: White
- Crop pest reaction:*
- Quality data:
 - Protein (%): 14.30
 - Wet gluten(%): 48.45
- Grain yield (qt/ha):
 - Research field: 51-62
 - Farmers' field: 42-61

2.1.1.2. Year of release: 2020

2.1.1.3. Breeder/ maintainer: Kulumsa ARC/EIAR/

* Resistant to rust and septoria

2.1.2. Variety name: **Boru (ETBW 9554)**

Pedigree: AUAL/MUTUS/6/CNO79//PF70354/MUS/3/

PASTOR/4/BAV92*2/5/FH6-1-7/7/CNO79// PF70354/

MUS/3/PASTOR/4/BAV92*2/5/FH6-1-7)

2.1.2.1. Agronomic & morphological characteristics

- Adaptation area: Mid to highland
 - Altitude (m.a.s.l): 1900– 2780
 - Rain fall (mm): 700 - 1100
- Seed rate (kg/ha): 125-150
- Planting date: Early to Mid July
- Fertilizer rate (kg/ha):
 - P₂O₅: 46
 - N: 92
- Days to heading: 70
- Days to maturity: 128
- Plant height (cm): 94
- Growth habit: Erect
- Ear type: Tapering
- 1000 kernel weight (g): 43
- Hectoliter weight (kg/hl): 71
- Grain color: White
- Crop pest reaction:*
- Quality data:
 - Protein (%): 13.23
 - Wet gluten(%): 33.30
- Grain yield (qt/ha):
 - Research field: 52-70
 - Farmers' field: 49-53

2.1.2.2. Year of release: 2020

2.1.2.3. Breeder/ maintainer: Kulumsa ARC/EIAR/

*Resistant to rust and septoria

2.1.3. Variety name: **Hachalu (ETB 8260)**Pedgree: **RANA96/SIDS-1**

2.1.3.1. Agronomic & morphological characteristics

- Adaptation area: Highlands of Bale and similar agro ecology
 - Altitude (m.a.s.l): 2000-2500
 - Rain fall (mm): 750-1500
- Seed rate (kg/ha): 150
- Spacing (cm): 20 between rows
- Planting date: Mid June-early September in Bale based on the agro-ecology
- Fertilizer rate (kg/ha):
 - NPS: 100
 - Urea: 50
- Days to heading: 71
- Days to maturity: 143
- Plant height (cm): 103.7
- Growth habit: Erect
- Seed color: Amber
- 1000 seed weight (g): 44
- Crop pest reaction*:
- Quality
 - Protein(%): 11.6
 - HLW(kg/hL 83.1
 - Falling number (sec) 26.3
- Grain yield (qt/ha):
 - Research field: 52.9-63.7
 - Farmer's field: 41.9-51.2

2.1.3.2. Year of release: 2020

2.1.3.3. Breeder/ maintainer: Sinana ARC/OARI

Moderately resistance to yellow rust and stem rust*2.1.4. Variety name: **Adola 1 (ETBW 8408)Pedgree: **TILILA/MUBASHIIR-1**

2.1.4.1. Agronomic & morphological characteristics

- Adaptation area: Lowlands to Midland of Guji and similar agro ecology
 - Altitude (m.a.s.l): 1600 – 2100
 - Rain fall (mm): 792 - 1126
- Seed rate (kg/ha): 150
- Spacing (cm): 20 between rows
- Planting date: First week of September up to last week of September (depending on the onset of rain fall).
- Fertilizer rate (kg/ha):
 - NPS: 121
 - Urea: 50
- Days to heading: 62
- Days to maturity: 103
- Plant height (cm): 75.18
- Growth habit: Erect
- 1000 kernel weight (g): 42.6
- Hectoliter weight (kg/hl): 81.4
- Crop pest reaction: *
- Special merit: Early maturing group
- Seed color: Amber Quality
- Quality
 - Protein(%): 13.83
 - Zeley index (ml) 67.05
 - Grain Gluten (%) 28.50
- Grain yield (qt/ha):
 - Research field: 27-38
 - Farmer's field: 26-30

2.1.4.2. Year of release: 2020

2.1.4.3. Breeder/ maintainer: Bore ARC/ORARI/

**Resistant to leaf, yellow and stem rust*

2.1.5. Variety name: **Netsanet (ገገገ) (ETBW 6753)**

Pedgree: **CROC_1/AE.SQUARROSA (224)//OPATA/4/
TC14/2*HTG//DUCULA/3/PRINIA**

2.1.4.1. Agronomic & morphological characteristics

- Adaptation area: Mid to high land altitude
 - Altitude (m.a.s.l): 2000 – 2800
 - Rain fall (mm): 900 - 1200
- Seed rate (kg/ha): 125-150
- Planting date: End of June to early July
depend on the onset of rainfall
- Fertilizer rate (kg/ha):
 - P₂O₅: 46
 - N: 41
- Days to heading: 72
- Days to maturity: 124
- Plant height (cm): 82
- 1000 kernel weight (g): 43
- Hectoliter weight (kg/hl): 76
- Crop pest reaction: *
- Grain color: White
- Quality
 - Protein(%): 10.5
 - Wet gluten(%): 22.9
 - Starch (%): 62.7
- Grain yield (qt/ha):
 - Research field: 29-36
 - Farmer's field: 24-30

2.1.5.2. Year of release: 2020

2.1.5.3. Breeder/ maintainer: Srinka ARC/ARARI/

* Moderately resistance to Yellow and Stem Rust

2.1.6. Variety name: **Adet-1 (BAJ #1/ALTIGO)**

Pedgree: - **MXI15-16\M27ISEPTON\47**

2.1.4.1. Agronomic & morphological characteristics

- Adaptation area: Mid to high land altitude
 - Altitude (m.a.s.l): 2220 – 2800
 - Rain fall (mm): 1200 - 1600
- Seed rate (kg/ha): 150
- Planting date: End of June to late July
- Fertilizer rate (kg/ha):
 - NPS: 100-225
 - Urea: 161-275
- Days to heading: 70
- Days to maturity: 128
- Plant height (cm): 86.36
- Growth habit: Erect type
- 1000 kernel weight (g): 39
- Hectoliter weight (kg/hl): 74.73
- Crop pest reaction: *
- Grain color: Amber
- Quality
 - Protein(%): 10.38
 - Wet gluten(%): 21.86
 - Starch (%): 66.3
- Grain yield (qt/ha):
 - Research field: 53.8
 - Farmer's field: 40.3

2.1.6.2. Year of release: 2020

2.1.6.3. Breeder/ maintainer: Adet ARC/ARARI/

*Moderately resistant to stem rust, stripe rust & septoria

7. Rice (*Oryza sativa* L. or *Oryza glaberrima*)

Rice is the seed of the monocot plants. As a cereal grain, it is the most important staple food for a large part of the world's human population, especially in East and South Asia, the Middle East, Latin America, and the West Indies. It is the grain with the second-highest worldwide production, after maize (corn).

Since a large portion of maize crops are grown for purposes other than human consumption, rice is the most important grain with regard to human nutrition and caloric intake, providing more than one fifth of the calories consumed worldwide by the human species. As a traditional food plant in Africa, its cultivation declined in colonial times, but its production has the potential to improve nutrition, boost food security, and foster rural development and support sustainable land care.

Rice is an annual short day cereal crop (even though some varieties are long day) and grown widely in tropical countries; it needs about 1,800 mm of precipitation annually. At national level, during **2019/20** cropping season **57,575.72** ha of land is covered by this crop with a total yield estimate of about **1,706,301.01**qt. The highest yield is obtained in warm temperature and soil with high clay silt content. Seeds are sown in nurseries at the rate of 60 kg/ha and transplanted to the field 4-6 plants per hill when seedlings are well grown. It needs 90-200 days to mature depending on varieties.

It is a recently introduced cereal crop into Ethiopia and cultivated in Fogera (South Gondar), Pawe (Northwestern part of Ethiopia), Gambela and Southeastern part of the country (irrigated rice). It is also produced in western parts in a small scale. There is lots of potential rice producing areas in Ethiopia.

7. 1. New varieties

7a.1. Upland type

7a.1.1. Variety name: **Pawe-2 (PARC DAT-V-3-2013)**

7a.1.1.1. Agronomic and morphological characteristics:

- Adaptation area: Pawe, Fogera, Assosa, , Gondar, Maitsebri and similar ecologies
- Altitude(masl): 750-1860
- Rain fall(mm): 1100-1457
- Seed rate (kg/ha): 60
- Planting date: Mid June to early July depending on the onset of rainfall
- Spacing (cm): 25 between rows for row drill planting
- Fertilizer rate (kg/ha) and time of application:
 - P₂O₅: 23 (all at planting)
 - N : 69 (1/3 at planting, 1/3 at tillering and 1/3 at panicle initiation)
- Days to heading: 80
- Days to maturity: 118
- Panicle length (cm): 21.1
- Plant height (cm): 97.5
- Thresh ability: Easy
- Lodging incidence: None
- Shattering: Moderately resistant
- Seed size(mm): Slender shape [length (9.2): width (2.5) =7.14]
- Growth habit: Erect
- No. of grains per panicle: 152
- 1000 seed weight (g): 12.34

- Caryopsis color: White
 - Crop pest reaction: Resistant to major rice disease
 - Grain yield (qt/ha):
 - Research field: 50.59
 - Farmers field: 48.47
- 7a.1.1.2. Year of release: 2020
- 7a.1.1.3. Breeder/maintainer: Pawe ARC/EIAR/

7a. 2 Varieties under production

- 7a.2.1 Variety name: Azmera (ART16-5-9-22-2-1-1-B-1-2)
- 7a.2.1.1 Year of release: 2019
- 7a.2.1.2 Breeder/maintainer: Fogera National Rice Research and Training Center /EIAR
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- 7a.2.2 Variety name: Maitsebri-3 (ARCCU16Bar-9-9-24-4-B-1)
- 7a.2.2.1 Year of release: 2018
- 7a.2.2.2 Breeder/maintainer: Shire-Maitsebri ARC(TARI)
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- 7a.2.3. Variety name: Fogera 1 (ART15-7-16-30-2-B-B)
- 7a.2.3.1 Year of release: 2016
- 7a.2.3.2 Breeder/maintainer: Fogera NRRTC/, EIAR/
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- 7a.2.4 Variety: Maytsebri-2 (ARCCU16 Bar-4-14-2-2-B-1)
- 7a.1.4.1 Year of release: 2016
- 7a.1.4.2 Breeder/maintainer: Shire – Maitsebri ARC /TARI/
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- 7a.2.5 Variety name: ADET (WAB450-1-B-P-462-HB)
- 7a.2.5.1 Year of release: 2014
- 7a.2.5.2 Breeder/maintainer: Adet ARC (ARARI)
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- 7a.2.6 Variety: Maytsebri-1 (NERICA 13)
- 7a.1.6.1 Year of release: 2014
- 7a.1.6.2 Breeder/maintainer: Maitsebri ARC (TARI)
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- 7a.2.7. Variety: NERICA-12 (WAB880-1-38-20-17-P1-HB)
- 7a.2.7.1 Year of release: 2013
- 7a.2.7.2 Breeder/Maintainer: Adet ARC

7b.1 Low land rice**7b.1. New varieties**7b.1.1. Variety name: **Selam (Yungeng 31)**

7b.1.1.1. Agronomic and morphological characteristics:

- Adaptation area: Fogera, Jimma, Dembiya, Shire-maitsebri
 - Altitude(masl): 1350-1810
 - Rain fall(mm): 1296-1561
- Seed rate (kg/ha): 60
- Planting date: Early June to late June depending on the onset of rainfall
- Spacing (cm): 25 between rows for row drill planting
- Fertilizer rate (kg/ha):
 - P₂O₅ 23
 - N 69
- Days to heading: 93
- Days to maturity: 132
- Panicle length (cm): 20
- Plant height (cm): 91
- Threshability: Fair
- Lodging tolerance: Good
- Shattering: Fair
- Seed size: Medium
- Growth habit: Erect
- No. of grains per panicle: 129
- Cold tolerance: Very good
- 1000 seed weight (g): 25
- Caryopsis color: White
- Crop pest reaction: Moderate resistance to major rice diseases
- Grain yield (qt/ha):
 - Research field: 52
 - Farmers field: 48

7b.1.1.2. Year of release: 2020

7b.1.1.3. Breeder/maintainer: Fogera NRR & TC/EIAR/

7b.2. Variety under production

- 7b.2.1 Variety: Abay (ARCC16 Bar-21-5-12-3-1-2-1)
 7b.2.1.1 Year of release: 2017
 7b.2.1.2 Breeder/maintainer: Fogera NRRTC/EIAR/
- 7b.2.2 Variety: Erib (WAB880-1-32-1-2-P1-HB)
 7b.2.2.1 Year of release: 2017
 7b.2.2.2 Breeder/maintainer: Fogera NRRTC/EIAR/
- 7b.2.3 Variety: Shaga (Scrid017-1-4-4-4-1)
 7b.2.3.1 Year of release: 2017
 7b.2.3.2 Breeder/maintainer: Fogera NRRTC/EIAR/
- 7b.2.4 Variety: Wanzaye (Scrid006-3-2-3-2)
 7b.2.4.1 Year of release: 2017
 7b.2.4.2 Breeder/maintainer: Fogera NRRTC/EIAR/
- 7b.2.5 Variety: Fogera2 (KOMBOKA)
 7b.2.5.1 Year of release: 2016
 7b.2.5.2 Breeder/maintainer: Fogera NRRTC/EIAR/
- 7b.2.6 Variety: Hiber (IRGA370-38-1-1F-B1-1)
 7b.2.6.1 Year of release: 2013
 7b.2.6.2 Breeder/maintainer: Adet ARC(AARC)
- 7b.2.7. Variety: Edget (WAB189-B-B-B-8-HB)
 7b.2.7.1 Year of release: 2011
 7b.2.7.2 Breeder/Maintainer: ADARC/ARARI
- 7b.2.8 Variety: VRH 606
 7b.2.8.1 Year of release: 2013
 7b.2.8.2. Breeder/Maintainer: ViBHA Seeds Ethiopia PLC

7b.2.9 Variety: VRH 640
 7b.2.9.1. Year of release: 2013
 7b.2.9.2. Breeder/Maintainer: ViBHA Seeds Ethiopia PLC

7b.2.10 Variety: VRH 654
 7b.2.10.1 Year of release: 2013
 7b.2.10.2 Breeder/Maintainer: ViBHA Seeds Ethiopia PLC

7c. Irrigated rice

- No new variety released in 2020

7c. 2 Varieties under production

7c.2.1 Variety: NERICA-6
 7c.2.1.1 Year of release: 2011
 7c.2.1.2 Breeder/Maintainer: GoPARC/SoRPARI

7c.2.2 Variety: NERICA-15
 7c.2.2.1 Year of release: 2011
 7c.2.2.2 Breeder/Maintainer: GoPARC/SoRPARI

7c.2.3 Variety: Kallafo-1/FOFIFA-3737/
 7c.2.3.1 Year of release: 2010
 7b.2.3.2 Breeder/Maintainer: GoPARC/SoRPARI

7c.2.4 Variety: NERICA-14 (upland type)
 7c.2.4.1 Year of release: 2010
 7c.2.4.2 Breeder/Maintainer: GoPARC/SoRPARI

7c.2.5 Variety: SHEBELLE
 (IR 688059-76-3-3-2)
 7b.2.5.1 Year of release: 2007
 7b.2.5.2 Breeder/Maintainer: GoPARC/SoRPARI

7c.2.6 Variety: GODE-1 (BG-90-2)
 7c.2.6.1 Year of release: 2007
 7c.2.6.2 Breeder/Maintainer: GoPARC/SoRPARI

7c.2.7 Variety: HODEN (MTU-1001)
 7c.2.7.1 Year of release: 2007
 7c.2.7.2 Breeder/Maintainer: GoPARC/SoRPARI

8. Maize (*Zea mays* L.)

Maize originated in Central America and was introduced to West Africa in the early 1500 A.D by the Portuguese traders. It was introduced to Ethiopia in 16th or 17th century. Today maize is one of the most important food crops worldwide. It is grown in most parts of the world over a wide range of environmental conditions, ranging between 50⁰ latitude north and south of equator. It also grows from sea level to over 3000 meters above sea level.

In Ethiopia, maize grows from moisture stress areas to high rainfall areas and from lowlands to the highlands. It is largely produced in Western, Central, Southern and Eastern parts of the country. In **2019/20** cropping season **2,274,305.93** hectares of land was covered with maize with an estimated production not less than **96,357,345.00** quintals.

In our country maize is produced mainly for food, especially, in major maize producing regions particularly for low-income groups, it is also used as staple food. Maize is consumed as "Injera" Porridge, Bread and "Nefro." It is also consumed roasted or boiled as vegetables at green stage. In addition to the above, it is used to prepare local alcoholic drinks known as "Tella" and "Arekie." The leaf and stalk are used for animal feed and also dried stalk & cob are used for fuel. It is also used as industrial raw material for oil & glucose production.

8.1. New variety

8.1.1. Variety name: **MH141 (WE7210)**
CML539/WMB0001/WMA2002

8.1.1.1. Agronomic and morphological characteristics

- Area of adaptation: Recommended to the low land and mid-altitude dry agro ecologies of Ethiopia.
 - Altitude (m.a.s.l): 1000-1800
 - Rainfall (mm) : 500-1000
- Seed rate (kg/ha): 25
- Planting date: Mid June to late june (immediately after on the onset of rany)
- Fertilizer rate (kg)
 - NPS: 46 at melkassa and as recommended for other locations
 - Urea: 64 at Melkassa, and as recommended for other locations
- Days to anthesis: 71.4
- Days to silking: 72
- Days to maturity: 141
- 1000 kernel weight (gm): 384.75
- Ear height (cm): 100
- Plant height (cm): 181
- Seed color: White
- Pollen color: Pale yellow
- Grain type: Semi-flint
- Grain size: Medium
- Crop pest reaction: Resistant to turicum leaf blight (TLB) and common leaf rust.

- Yield (qt/ha)
 - Research field: 92.5
 - Farmers' field: 65
- 8.1.1.2. Year of release: 2020
- 8.1.1.3. Breeder/maintainer: Melkassa ARC/EIAR/

8.1.2. Variety name: **BH520 W1 (Nada)**

8.1.2.1. Agronomic and morphological characteristics

- Area of adaptation: Recommended to the mid-altitude sub-humid agro-ecologies of Ethiopia
 - Altitude (m.a.s.l): 1000-1800
 - Rainfall (mm) : 900-1500
- Seed rate (kg/ha): 25
- Planting date: Mid to late May
(immediately after the onset of the rainy season)
- Fertilizer rate (kg)
 - P₂O₅: 69 at Bako, and as recommended for other locations\
 - N: 138
- Male flowering (tasseling): 88.2
- Female flowering (silking): 89.5
- Days to maturity: 155
- 1000 kernel weight (gm): 370
- Grain size: Medium
- Ear height (cm): 134.1
- Plant height (cm): 237.3
- Seed color: White
- Pollen Color: Pale yellow
- Silk color: Pink
- Grain type: Semi-flint
- Kernel row arrangement: Straight
- Ear number of row of grains: 14-18
- Crop pest reaction*: Resistant to gray leaf spot (GLS), turicum leaf blight (TLB) and common leaf rust

- Yield (qt/ha)
 - Research field: 90-130
 - Farmers' field: 76-100
- 8.1.2.2. Year of release: 2020
- 8.1.2.3. Breeder/maintainer: Bako NMRC/EIAR

8.1.3. Variety name: **BOS20W1 Sweet corn (White)**

8.1.3.1. Agronomic and morphological characteristics

- Area of adaptation: Recommended to the mid-altitude sub-humid and the Rift Valley of Ethiopia.
 - Altitude (m.a.s.l): 1000-1800
 - Rainfall (mm) : 900-1500
- Seed rate (kg/ha): 25
- Spacing(cm): 75 between rows and 30 between plants
- Planting date
 - (immediately after the onset of the rainy season)
- Fertilizer rate (kg)
 - P₂O₅: 69 at Bako, and as recommended for other locations\
 - N: 138
- Male flowering (tasselling): 69.3
- Female flowering (silking): 71.1
- Days to maturity: 140
- Grain Size: Medium
- Ear height (cm): 112
- Plant height (cm): 220
- Seed color: Yellow
- Pollen Color: Pale yellow
- Silk color: Largely white
- Grain type: Shriveled when dry
- Total sugar % (fresh) : 6.49
- Total sugar % (dry): 34.33
- Kernel row arrangement: Straight
- Crop pest reaction*: Resistant to gray leaf spot (GLS), turicum leaf blight

	(TLB) and common leaf rust
▪ Yield (qt/ha)	
○ Research field:	51.1 (at immature stage, depend on how early harvested at dough growth stage)
○ Farmers' field:	-
8.1.3.2. Year of registration:	2020
8.1.3.3. Breeder/maintainer:	Bako NMRC/EIAR

8.1.4. Variety name: **BOS20Y1 Sweet corn (Yellow)**

8.1.4.1. Agronomic and morphological characteristics

▪ Area of adaptation:	Recommended to the mid-altitude sub-humid and the Rift Valley of Ethiopia.
○ Altitude (m.a.s.l):	1000-1800
○ Rainfall (mm) :	900-1500
▪ Seed rate (kg/ha):	25
▪ Spacing(cm):	75 between rows and 30 between plants
▪ Planting date	Mid to late May (immediately after the onset of the rainy season)
▪ Fertilizer rate (kg)	
○ P ₂ O ₅ :	69 at Bako, and as recommended for other locations\
○ N:	138
▪ Male flowering (tasselling):	68.9
▪ Female flowering (silking):	71.2
▪ Days to maturity:	140
▪ Grain size:	Medium
▪ Ear height (cm):	104
▪ Plant height (cm):	212
▪ Seed color:	Yellow
▪ Pollen Color:	Pale yellow
▪ Silk color:	Largely white
▪ Grain type:	Shriveled when dry
▪ Total sugar % (fresh) :	6.45
▪ Total sugar % (dry):	34.11
▪ Crop pest reaction*:	Resistant to gray leaf spot (GLS), turicum leaf blight (TLB) and common leaf rust

- Yield (qt/ha)

- Research field: 57.4 (at immature stage, depend on how early harvested at dough growth stage)

- Farmers' field: -

8.1.4.2. Year of registration: 2020

8.1.4.3. Breeder/maintainer: Bako NMRC/EIAR

8.2. Varieties under production

8.2 1. Variety: DK7500
 8.2.1.1. Year of registration: 2019
 8.2.1.2. Breeder/maintainer: Bayer Life Science Ethiopia PLC

8.2 2. Variety: CP.201 (IQT5024 X FIF3)
 8.2.2.1. Year of release: 2019
 8.2.2.2. Breeder/maintainer: CPP.Seeds PLC

8.2 3. Variety: CP.838 (SKQPP422 X IFF3)
 8.2.3.1. Year of release: 2019
 8.2.3.2. Breeder/maintainer: CPP.Seeds PLC

8.2 4. Variety: Kortu (P2809W)
 8.2.4.1. Year of registration: 2017
 8.2.4.2. Breeder/maintainer: Dupont Pioneer Hi-Bred Seeds Ethiopia

8.2 5. Variety: BH549 Ilu እሉ (BKL4/ BKL003)
 8.2.5.1. Year of release: 2017
 8.2.5.2. Breeder/maintainer: Bako National Maize Research Program/ EIAR

8.2 6. Variety: Afran Qalloo (HrU 28)
 8.2.6.1. Year of release: 2017
 8.2.6.2. Breeder/maintainer: Haramaya University

8.2 7. Variety: Baate (HrU 22)
 8.2.7.1. Year of release: 2017
 8.2.7.2. Breeder/maintainer: Haramaya University

8.2 8. Variety: DK008
 8.2.8.2. Year of registration: 2017
 8.2.8.3. Breeder/maintainer: Bayer Life Science Ethiopia PLC

9. Sorghum (*Sorghum bicolor*)

S. bicolor is the cultivated species of sorghum; its wild relatives make up the botanical genus *Sorghum*. It is cultivated for its edible grain. Sorghum originated in northern Africa, and is now cultivated widely in tropical and subtropical regions. *S. bicolor* is typically an annual, but some cultivars are perennial. It grows in clumps that may reach over 4 meters high. The grain is small, ranging from 3 to 4 mm in diameter. Sweet sorghums are sorghum cultivars that are primarily grown for foliage; they are shorter than those grown for grain.

The species can grow in arid soils and withstand prolonged droughts. It has four features which make it one of the most drought resistant crops of all i.e., i) it has a very large root-to-leaf surface area ii) in times of drought it will roll its leaves to lessen water-loss by transpiration iii) if drought continues, it will go into dormancy rather than dying and iv) its leaves are protected by a waxy cuticle.

Sorghum is one of the major crops produced in Ethiopia, and it is the fourth important crop in terms of area coverage and volume of production. It is adapted to a wide range of environment, and hence can be produced in the high lands, medium altitude and low land areas. It is widely produced more than any other crops, in the areas where there is moisture stress. In **2019/20** cropping season, sorghum is produced on about **1,828,182.49** ha of land from which **52,655,800.59** quintals of yield are obtained.

Sorghum is used in various ways in our country. The grains are used for human foods such as Porridge, “Nefro,” infant food, syrup, and local beverages known as “Tella” and “Arekie”. Also the leaf and stalk are used for animal feed and further the stalks are also used for construction of houses and fences, and as fuel wood.

9.1. New variety

9.1.1. Variety name: **Marara [ETSL 101371 (Acc.212642)]**

9.1.1.1. Agronomic and morphological characteristics

- Adaptation area: Western Oromia (Bako, Gute, Uke, Billo Bosh and similar agro ecologies)
 - Altitude (masl): 1200-1950
 - Rainfall(mm): 950-1250
- Seed rate (kg/ha): 12
- Spacing(cm): 75 between rows and 15 between plants
- Planting date: early to mid may
- Fertilizer rate(kg/ha):
 - NPS: 100 all at planting
 - Urea: 100 Split Application (half at planting , half 35 days after emergence)
- Days to flowering: 99
- Days to maturity: 156
- Plant height(cm): 366.5
- 1000 seed weight (g): 26.5
- Seed color: Red
- Growth habit: Erect
- Panicle type: Semi compact
- Crop pest reaction*:
- Grain yield (qt/ha):
 - Research station: 46-53.5
 - Farmers' field: 39-51

9.1.1.2. Year of release: 2020

9.1.1.3. Breeder/ maintainer: Bako ARC/ORARI/

**Tolerant to major sorghum diseases (Leaf, Head disease),
Tolerant to Bird attack*

9.1.2. Variety name: **Beletew (ICSR24005)**

9.1.2.1. Agronomic and morphological characteristics

- Adaptation Area: Debrebirhan (Shewarobit, Ataye, Merhabete), Kobo (Sirinka), Tach Armachiho (Gondar) and similar agroecology
 - Altitude (masl): 1200-1500
 - Rainfall(mm): 800-1100
- Seed rate (kg/ha): 10-13 for row sowing
15-20 for broadcasting
- Spacing (cm): 75 between rows; 15 between plants
- Planting date: First and second week of July
- Fertilizer rate(kg/ha):
 - NPS: 121
 - Urea: 90
- Days to heding : 73
- Days to maturity: 127
- Plant height(cm): 144
- 1000 seed weight (g): 23
- Inflorescence compactness and shape: Semi-compact; oval
- Seed color: White
- Crop pest reaction*:
- Grain yield (qt/ha):
 - Research station: 43
 - Farmers'' field: -

9.1.2.2. Year of release: 2020

9.1.2.3. Breeder/ maintainer: Debrebrehan ARC/ARARI/

* Resistant to sorghum midge insect pest, and free from Anthracnose disease

9.1.3. Variety name: **Sadii (SLRC-046)**

9.1.3.1. Agronomic and morphological characteristics

- Adaptation area: Kellem Wollega, West Wollega zones and similar agro-ecologies
 - Altitude (masl): 1400-1900
 - Rainfall(mm): 1000-2100
- Seed rate (kg/ha): 10 for row sowing
- Spacing(cm): 75 between rows
15 between plants
- Planting date: Late May to to early June
- Fertilizer rate(kg/ha):
 - NPS: 100 at planting time
 - Urea : 100 half at planting and half at knee stage
- Days to flowering: 131
- Days to maturity: 183
- Plant height(cm): 344
- 1000 seed weight (g): 32.48
- Seed color: Gray
- Inflorescence compactness: Semi Compact
- Crop pest reaction*:
- Grain yield (qt/ha):
 - Research station: 50.17
 - Farmers'' field: 48.3

9.1.3.2. Year of release: 2020

9.1.3.3. Breeder/ maintainer: Haro sebu ARC/ORARI

* Tolerant to major pest of sorghum (Stem borer, Anthracnose leaf blight, leaf spot, die back etc.

10.1 New variety10.1.1. Variety name: **Metekili (Acc. 005pw-2012)**

10.1.1.1. Agronomic and morphological characteristics

- Adaptation Area: Western part of Ethiopia, (Awi and Metekel Zone) & similar agro ecologies.
 - Altitude (masl): 1000-2000
 - Rainfall(mm): 1200-1700
- Seed rate(kg/ha): 8 for row planting and 15 for broad casting
- Spacing (cm): 40 btween rows & 10 between plants
- Planting date: Early June
- Fertilizer rate(kg/ha):
 - DAP: 100 all at planting time
 - Urea: 50 (half at planting, half 30 days after emergence)
- Days to heading: 105
- Days to maturity : 155
- 1000 seed weight(g): 3
- Plant height(cm): 93.7
- Finger length(Cm) : 11.4
- Finger per ear: 8.8
- Finger type: Semi loose with double strand
- Seed color: Brown red
- Growth habit: Erect
- Crop pest reaction*:
- Yield (qt/ha):
 - Research field: 28-38
 - Farmers" field: 25.5- 30

10.1.1.2. Year of release: 2020

10.1.1.3. Breeder/Maintainer: Pawe ARC/EIAR/

*Resistant to Blast diseases under natural condition

10.2 Varieties under production

- 10.2.1. Variety: Kumsa [BKFM 0063 (1)]
- 10.2.1.1. Year of release: 2019
- 10.2.1.2. Breeder/Maintainer: Shire-MaitsebribARC (TARI)
- 10.2.2. Variety: Jabi (ጃቢ) (PGRC/E Acc. 229626)
- 10.2.2.1. Year of release: 2019
- 10.2.2.2. Breeder/Maintainer: Adet ARC/ARARI
- 10.2.3. Variety: Tekeze-1 (SMARC coll.60)
- 10.2.3.1. Year of release: 2018
- 10.2.3.2. Breeder/Maintainer: Shire-MaitsebribARC (TARI)
- 10.2.4. Variety: Diga-2 (Acc.BKFM0010)
- 10.2.4.1. Year of release: 2018
- 10.2.4.2. Breeder/Maintainer: Bako ARC/ORARI
- 10.2.5. Variety: Bako-09 (Acc.214995)
- 10.2.5.1. Year of release: 2017
- 10.2.5.2. Breeder/Maintainer: Bako ARC/ORARI
- 10.2.6. Variety: መባ (GBK- 011119A)
- 10.2.6.1. Year of release: 2016
- 10.2.6.2. Breeder/Maintainer: Melkassa ARC/EIAR
- 10.2.7. Variety: አክሱም (ACC #229355)
- 10.2.7.1. Year of release: 2016
- 10.2.7.2. Breeder/maintainer: Melkassa ARC/EIAR
- 10.2.8. Variety: Diga-1 (ACC. 216036)
- 10.2.8.1. Year of release: 2016
- 10.2.8.2. Breeder/Maintainer: BakoARC (OARI)

13. Food barley (*Hordeum vulgare*)

Barley belongs to the genus *Hordeum* L. in the tribe Triticeae of the family Poaceae. The earliest cultivation of barley is believed to have begun some 8,000 to 10,000 years ago in the area of the Middle East known as the Fertile Crescent. The crop is now grown worldwide with greater concentration in temperate areas and high altitudes of the tropics and subtropics. The greatest diversity of barley in terms of morphological types, genetic races, disease-resistant lines, and endemic morphotypes exists in Ethiopia.

Barley has been produced in Ethiopia, since ancient times. Barley is one of the most important staple food crops in the highlands of Ethiopia. It has great importance in social and food habit of the people. Both food and malting barley are produced in the country. At the national level in **2019/20** cropping season, **950,742.01** ha of land is covered by food and malt barley and over **23,780,102.92** quintals are produced. It is used to prepare various types of food and local and industrial beverages.

Barley is cropped twice a year. The main season, locally known as Meher, relies on June to September rainfall. The major barley producing regions are Oromiya, Amhara, Tigray, and Southern Nations, which account for about 99.5% of the total annual barley production. Currently, barley grain is used for the preparation of different foodstuffs, such as injera, porridge, kolo, and local drinks, such as tela, horde, and beer. The straw is used as animal feed, especially during the dry season. It is also useful for thatching roofs and as bedding.

13.1 New varieties

13.1.1. Variety name: **Negele (LMON IBYT-MRA 12-11)**

13.1.2.1. Agronomic and morphological characteristics

- Adaptation Areas: Low land Areas of Arsi, West Arsi and Similar areas
 - Altitude (m.a.s.l): 1500-2400
 - Rainfall(mm): >500
 - Soil type: Well drained reddish brown
- Seed rate(kg/ha): 125
- Planting date : Mid June to early July
- Fertilizer rate (kg/ha):
 - N: 18
 - P₂O₅: 46
- Days to heading : 58
- Days to maturity : 98
- Plant height (cm) : 74
- Growth habit: Erect
- 1000 seed weight(gm): 43.7
- Seed color: Cream white
- Row type : Six row
- Crop pest reaction:*
- Yield (qt/ha);
 - Research field : 19.19 (in serious moisture stress condition)
54.35 (optimum moisture)
 - Farmer's field: -

13.1.2.2. Year of release: 2020

13.1.2.3. Breeder/maintainer: Kulumsa ARC/EIAR

**Resistant to scald and net blotch*

14. Malt barley (*Hordeum distichon*.)

Malt barley is characterized as two-rowed and six rowed barley in which only the middle spiklet of each three produces seed, the other two being sterile or male. Malt is the major (90%) raw material for beer production. Modern malting in Ethiopia started in 1974 at St. George brewery. Assela Malt factory was established in 1984 with the aim of supplying malt to local breweries.

Malting is a process in which the grain is germinated and the very young seedlings are then dried to produce malt for brewing beer. Malt contains enzymes, which converts starch to fermentable sugars. A by-product of brewing is yeast, which is used in baking and for the production of vitamin-rich yeast extracts.

Arsi and Bale are the major producing regions of malt barley. Highlands of Shewa and similar areas are also producing larger quantities of malt barley. As the crop has been cultivated since ancient times many types of varieties are produced in our country. Malt barley has double purposes in Ethiopia; it is used for food (bread, and several traditional dishes) and also for malting. Consequently, there are different competing alternative channels for the crop making it sustainable source of income for smallholder farmers in the country.

14. 1 New Variety

14.1.1. Variety name: **Iftuu (Mn Brite)**

14.1.1.1. Agronomic and morphological characteristics

- Adaptation Areas: High land Areas of Arsi, Central Shoa and Similar areas
- Altitude (m.a.s.l): 2300-2800
- Rainfall(mm): >700
- Seed rate(kg/ha): 100
- Planting date : Mid June to end July
- Fertilizer rate (kg/ha): As per recommendation to the specific growing areas with due consideration to Nitrogen fertilization not to increase the grain protein above 11.5%
- Days to heading : 80
- Days to maturity : 143
- Plant height (cm) : 97.7
- Growth habit: Erect type
- Seed color: Cream white
- Row type: Two-row
- Crop pest reaction:*
- Grain and malt quality
 - Protein (%): 10.32
 - Extract(%): 80.82
 - HLW (kg/hl): -
 - Screening Recovery (%) = $(2.5 + 2.8) / 2.2$ mm: -
- 1000 kernel weight(g): 51
- Yield (qt/ha);
 - Research field : 49.38- 64.65
 - Farmer's field: -

14.1.1.2. Year of release: 2020

14.1.1.3. Breeder/maintainer: Kulumsa ARC/EIAR

*Resistant to Scald and net blotch