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 variety

10.1.1. 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 srand
- 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 condtion*

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 collL.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: **መላ** (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
  - P_2O_5: 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)2.2mm: -
- 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*

1. 1. New varieties

1.1.1 Variety name**: Chalew (EH060088-1)**

1.1.1.1. Agronomic and morphological characteristics

- Adaptation Area: For water logging vertisol areas such as Adadi, Enewari, Arsi-Robe, Sagure, Ambo, Sinja and similar agro-ecologies.
  - Altitude (m.a.s.l) : 1800-2800
  - Rain fall (mm) : 700-1100
- Seed rate (kg/ha) : 185
- Planting date : Mid of June to Early July
- Fertilizer rate (kg/ha):
  - P2O5 : 100
  - N: 18
- Days to flowering : 53
- Days to maturity : 136
- Plant height (cm) : 120
- Growth habit : Indeterminate
- 1000 seed weight (gm) : 736
- Seed color : Light green
- Flower color: White with black spot
- Cotyledon Color: Ceramic
- Pod color: Green
- Crop pest reaction: *
- Yield (qt/ha) :
  - Research field : 25-45
  - Farmers‟ field : 22-35

1.1.1.2 Year of Release: 2020

1.1.1.3 Breeder/Maintainer: Holetta ARC/EIAR

* *Moderately resistant to root rot and chocolate spot rust.*

1.2 Varieties under production

1.2.1 Variety: EH011088-3
Moybon (ሞይቦን)

1.2.1.1 Year of Release: 2019

1.2.1.2 Breeder/Maintainer: Sinana ARC/ORARI

1.2.2 Variety: EH00021-1 Tosha (ቶሻ)

1.2.2.1 Year of Release: 2019

1.2.2.2 Breeder/Maintainer: Sinana ARC/ORARI

1.2.3 Variety: Mugulat (Sell.98Lat.11135)

1.2.3.1 Year of Release: 2017

1.2.3.2 Breeder/Maintainer: Mekelle ARC/TRARI

1.2.4 Variety: Alloshe (አሎሼ) (EH03043-1)

1.2.4.1 Year of Release: 2017

1.2.4.2 Breeder/Maintainer: Sinana ARC/ORARI

1.2.5 Variety: Numan (ኑማን) EH 06007-2

1.2.5.1 Year of Release: 2016

1.2.5.2 Breeder/Maintainer: KARC/EIAR

1.2.6 Variety: ASHEBEKA (አሸበቃ) (EH01075-4)

1.2.6.1 Year of Release: 2015

1.2.6.2 Breeder/Maintainer: KARC/EIAR

1.2.7 Variety: HASHENGE (ILB 4358

1.2.7.1 Year of release: 2015

1.2.7.2 Breeder/Maintainer: Alamata ARC/TARI

4. Chickpea (*Cicer arietinum*)

Chickpea was first produced in the Middle East about 7, 000 years ago. At present, it is produced in over 40 countries represented in all continents. However, the most important chickpea producing countries are India, Turkey, Pakistan, Iran, Mexico, Australia, Ethiopia, Myanmar, and Canada. About 95% of chickpea cultivation and consumption is in the developing countries. In Ethiopia, the earliest finding of chickpea is reported in 1520 BC. Ethiopia is the largest producer of chickpea in Africa accounting for about 46% of the continent‟s production during 1994-2006. It is also the seventh largest producer worldwide and contributes about 2% to the total world chickpea production

There are two types of chickpea produced globally, namely *desi* and *kabuli* chickpeas. *Kabuli* chickpeas have a larger cream-colored seed with a thin seed coat whereas the *desi* type has a smaller, reddish brown-colored seed with a thick seed coat. On average, world production consists of about 75% of *desi* and 25% of *kabuli* types. Although *Kabuli* types can be profitably adapted in the country, Ethiopia traditionally produces largely the *desi* types. Morphologically, *desi* types have pink flowers while the *Kabuli* types are characterized by white flowers. It is grown at the end of the main rainy season using residual soil moisture. This allows farmers to practice double cropping, which in turn increases productivity of scarce land resource and serves as an additional source of income.

Chickpea is one of the major highland pulse crop widely grown in the highland and semi-highland regions of Ethiopia mainly on clay soil and fixes atmospheric nitrogen in soils and thus improves soil fertility and saves fertilizer costs in subsequent crops. In **2019/20** cropping season, **208,837.91** hectares of land was covered with chickpea and the production was estimated at about **4,351,932.14** quintals. Because of its multiple importances, the crop is widely produced by the Ethiopian farmers. Chickpea is widely used for food for its high protein content. Apart from this, because of its ability to fix nitrogen it is used in crop rotation with the nationally important cereal crops like wheat, tef and barley.

4a. Dessi Type

4a.1. New varieties

4a.1.1 Variety name: **Eshete (DZ-2012 CK-0254/ICCV-10515/)**

4a.1.1.1 Agronomic and morphological characteristics

- Adaptation areas: Low to mid altitude areas of the country like Aris Negelle, Alem Tena, Minjar, Debre Zeit, Kokate and similar environments
  - Altitude (m.a.s.l): 700-1900
  - Rain fall (mm) 500-1000
- Seed rate (kg/ha) Ranges over 60 -95 Kg depending on HSW
- Plating date: Mid of August to early September
- Fertilizer rate (kg/ha):
  - P_2O_5: No
  - N: No
- Days to flowering: 50-60
- Days to maturity: 119-138
- Plant height (cm): 42-65
- Growth habit: Erect
- 1000 seed weight (g) 19-29 on average 17
- Seed coat color: Light brown
- Flower color: Purple
- Garin size: Small seed size
- Crop pest reaction*:
- Yield (qt/ha)
  - Research field 10-18
  - Farmers‟ field 10-14

4a.1.1.2 Year of release 2020

4a.1.1.3 Breeder/ Maintainer: D/ziet ARC (EIAR)

* *Resistance to fusarium wilt root rot complex and Ascochyta blight (1st of its kind in desi types)*

5. Cowpea (*Vigna ungulculata*.)

Cowpea has been cultivated for many centuries in the developing world and well adapted to the stressful growing condition of the tropics and has excellent nutritional qualities. It is a grain legume, which can be grown in relatively infertile sandy soils with a minimum annual rainfall of 200mm. It is a fast growing, drought resistant crop, which also improves soil fertility by fixing atmospheric nitrogen. Cowpea grain typically contains 230-250g/kg crude protein (CP) and 500-670 g/kg starch on a dry matter (DM) basis and cowpea forage, i.e. the crop residue after harvesting grain, 210g CP and 600g digestible dry matter per kg DM.

The forage is used as a ruminant feed by smallholder farmers in West Africa, Asia and South America and therefore offers potential for use in the drier regions of Ethiopia. Under such conditions cowpea forage is usually superior to other forage legumes in terms of both quantity and quality. Cowpea crop is grown as a green manure and also a cover crop to increase soil fertility, retain moisture and reduce soil erosion.

Cowpea is primarily used in the form of dry seed cooked as a pulse in a large variety of dishes. Green beans or cut green pods used as a vegetable are of secondary importance. In some areas of semi humid tropics the cowpea provides more than half the plant protein in human diets. Sometimes cowpea is also grown for forage and as a cover crop.

5.1 New varieties

5.1.1 Variety name: **Jergade (NLLP_CPC-145-21)**

5.1.1.1Agronomic and morphological characteristics

- Adaptation areas: Lowland areas of the country like Melkassa, Meisso, Babile, Jinka, Kobo and similar agro -ecologies
  - Altitude (m.a.s.l): 1100-1600
  - Rain fall (mm) 450-800
- Seed rate (kg/ha) 25-30 (for raw planting)
- Spacing (Cm): 60 between row X 20 between plants)
- Plating date: At lowland areas like rift valley, early July
- Fertilizer rate (kg/ha):
  - DAP/NPS: 100
  - UREA 50 (if not inoculated by rhizobia)
- Days to flowering: 48
- Days to maturity: 81
- Plant height (cm): 70
- Growth habit: Determinate
- 100 seed weight (g) 14.17
- Seed color: Cream
- Flower color: Pink
- Number of seeds per pod: 11.3
- Number of pods per plant: 19.3
- Cooking quality:
  - Percent non-soakers (%): 0.53
  - Cooking time (minute): 21.3
- Crop pest reaction*:
- Yield (qt/ha)
  - Research field 19.7-28
  - Farmers‟ field 18-25

5.1.1.2 Year of release 2020

5.1.1.3 Breeder/ Maintainer: Melkassa ARC (EIAR)

* *Resistance to bacterial blight diseases*

5.1.2 Variety name: **Kechene (NLLP_CPC-103B)**

5.1.2.1Agronomic and morphological characteristics

- Adaptation areas: Lowland areas of the country like Melkassa, Meisso, Babile, Jinka, Kobo and similar agro -ecologies
  - Altitude (m.a.s.l): 1100-1600
  - Rain fall (mm) 450-800
- Seed rate (kg/ha) 25-30
- Spacing (cm): 60 between row x 20 between plants)
- Plating date: At lowland areas like rift valley, early July
- Fertilizer rate (kg/ha):
  - DAP/NPS: 100
  - UREA 50 (if not inoculated by rhizobia)
- Days to flowering: 48
- Days to maturity: 98
- Plant height (cm): 74.7
- Growth habit: Determinate/erect
- 100 seed weight (g) 16.17
- Seed color: Pink
- Flower color: Pink
- Number of seeds per pod: 11.17
- Number of pods per plant: 16.83
- Cooking quality:
  - Percent non-soakers (%): 0.4
  - Cooking time (minute): 23.2
- Crop pest reaction*:
- Yield (qt/ha)
  - Research field 17.8-30
  - Farmers‟ field 16-23

5.1.2.2 Year of release 2020

5.1.2.3 Breeder/ Maintainer: Melkassa ARC (EIAR)

* *Resistance to bacterial blight diseases*

5.2 Varieties under production

5.2.1 Variety: Keti (IT99K-1122)
5.2.1.1 Year of release: 2012
5.2.1.2 Breeder/ Maintainer: MARC /EIAR

5.2.2 Variety: 82D-889
5.2.2.1 Year of release: 2008
5.2.2.2 Breeder/ Maintainer: MARC /EIAR

5.2.3 Variety: Bole (85D-3517-2)
5.2.3.1 Year of Release: 2006
5.2.3.2 Breeder/ Maintainer: MARC /EIAR

5.2.4 Variety: IT (98k-131-2)
5.2.4.1 Year of Release: 2006
5.2.4.2 Breeder/ Maintainer: AwARC/SRARI

5.2.5 Variety: Asrat (ITS 92KD-279-3)
5.2.5.1 Year of Release: 2001
5.2.5.2 Breeder/ Maintainer: SRARC/ARARI

5.2.6 Variety: Bekur (838 689 4)
5.2.6.1 Year of Release: 2001
5.2.6.2 Breeder/ Maintainer: SRARC/ARARI

7.1 New varieties

7.1.1 Variety name: **Mi'oftu (DAB-410)**

7.1.1.1Agronomic and morphological characteristics

- Adaptation areas: East & West Hararghe and similar agro-ecologies
  - Altitude (m.a.s.l): 1500-2200
  - Rain fall (mm) 500-1200
- Planting date: Mid of June to mid July
- Spacing (cm): 40 between rows
  10 between plants
- Seed rate (kg/ha)
  - Row planting 118.30
  - Broadcasting: 125-130
- Fertilizer rate (kg/ha)
  - DAP: 100
  - Urea: -
- Days to flowering 43
- Days to maturity 96
- Plant height (cm): 31.8
- Growth habit: Type IIa(Indeterminate bush)
- Flower color: White
- 100 seed weight (g) 46.4
- Seed color: Red speckled
- Seed market class: Speckled
- Pods per plant : 8-9
- Seeds per pods: 4-5
- Leaf color: Light green
- Crop pest reaction *
- Yield (q/ha)
  - Research field 24-37 at high potential areas (Haramaya & Hirna)
    12-15 at Babile & Fedis
  - Farmers" field 10-24

7.1.1.2 Year of release 2020

7.1.1.3 Breeder/ Maintainer: Haramaya University

***** *Resistant to Rust, Anthracnose, Halo blight, CBB and ALS*

7.2 Varieties under production

7.2.1. Variety:	Haro Sabu-1 (SCR33) Small Red Bean
7.2.1.1 Year of release:	2019
7.2.1.2 Breeder/Maintainer:	Haro Sabu ARC/ORARI
7.2.2. Variety:	(Dumala) /ዱማል/ DAB-437 Speckled bean
7.2.2.1 Year of release:	2019
7.2.2.2 Breeder/Maintainer:	Sinana ARC/ORARI
7.2.3. Variety:	(Hundaf) (ሁንዳፍ) DAB 277 Red Mottled
7.2.3.1. Year of release:	2019
7.2.3.2. Breeder/Maintainer:	Sinana ARC/ORARI
7.2.4. Variety:	NUA 517 (Keye Bure Metene) Large mottled
7.2.4.1 Year of release:	2019
7.2.4.2 Breeder/Maintainer:	Melkassa ARC/EIAR/
7.2.5. Variety:	SCR15 (Keyyo) Small Red Bean
7.2.5.1 Year of release:	2019
7.2.5.2 Breeder/Maintainer:	Melkassa ARC/EIAR/
7.2.6. Variety:	SCN-11 (Awash Tikure) Small black bean
7.2.6.1. Year of release:	2019
7.2.6.2. Breeder/Maintainer:	Melkassa ARC/EIAR/
7.2.7. Variety:	RAZ-42 (Nekeze ayfere) Small white bean
7.2.7.1. Year of release:	2019
7.2.7.2. Breeder/Maintainer:	Melkassa ARC/EIRA

8. Soybean (*Glycine max*)

Soybean (U.S.) or soya bean (UK) (Glycine max) is a species of legume native to East Asia. The plant is classed as an oilseed and pulse. Fat-free (defatted) soybean meal is a primary, low-cost, source of protein for animal feeds and most prepackaged meals; soy vegetable oil is another valuable product of processing the soybean crop. Soybeans can produce at least twice as much protein per hectare as any other major vegetable or grain crop, 5 to 10 times more protein per acre than land set aside for grazing animals to make milk, and up to 15 times more protein per acre than land set aside for meat production

Soybean is an internationally known important pulse crop. It is used for different purposes. In the **2019/20** cropping season, this crop covers about **54,543.26** hectares of land with an estimated production not less than **1,256,232.03** quintals. Since the oil content is high (16% and above) it is used for edible oil production. The by-product is cheap and an important source of protein for both human consumption & animal feed. It can also be used as Soya milk and Soya meat.

In Ethiopia FAFA Food Factory has imported and used soybeans to prepare balanced food for infants and adults. Recently the factory is trying to improve the food value of other food types by mixing with Soya bean flour. This indicates that the importance of Soybean in the market is increasing gradually.

8.1 New varieties

8.1.1. Varety name**: Pawe-78 (Tgx-1990-21F)**

8.1.1.1. Agronomic and morphological characteristics

- Adaptation area: Pawe, Assossa, Metema, Sirinka,Humera, and similar agroecological areas.
  - Altitude (m.a.s.l): 650-1300
  - Rainfall (mm): 450-1586
- Seed rate (kg ha^{-1}): 60-70
- Spacing(cm):
  - Between rows: 40
  - Between plants: 5
- Planting date: 2rd July to last week of July
- Fertilizer rate (kg ha-1):
  - DAP: 100
  - UREA --
- Days to 50% flowering: 63
- Days to 95% maturity: 105
- Plant height(cm): 80.5
- Growth habit: Determinate
- Seed coat color: Yellowish white
- Seed shape: Flattened
- Pubescence color: Brown
- Hilum color: Brown
- Flower color: Pink
- Leaf shape: Triangular
- 100 seed weight (g): 13.96
- Oil content (%): 22.37
- Protein content (%): 36.9
- Maturity group: Early set
- Disease reaction*:
- Yield (q/ha-1):
  - Research field: 24.1-28.4
  - Farmers field: 19.1-23.3

8.1.1.2 Year of release/register: 2020

8.1.1.3 Breeder/Maintainer: Pawe ARC/EIAR

***** *Tolerant to frog eye leaf spot and resistant to bacterial blight, brown leaf spot, leaf blotch and rust*

8.1.2. Varety name**: Tana Beles (Tgx-1990-59F)**

8.1.2.1. Agronomic and morphological characteristics

- Adaptation area: Pawe, Assossa, Bako, Areka,Jimma, and similar agroecological areas.
  - Altitude (m.a.s.l): 800-1860
  - Rainfall (mm): 800-1586
- Seed rate (kg ha^{-1}): 60-70
- Spacing(cm):
  - Between rows: 60
  - Between plants: 5
- Planting date: 2rd June to last week of June
- Fertilizer rate (kg ha^{-1}):
  - DAP: 100
  - UREA --
- Days to 50% flowering: 69
- Days to 95% maturity: 128
- Plant height(cm): 80.8
- Growth habit: Semi-determinate
- Seed coat color: Yellowish white
- Seed shape: Round
- Pubescence color: Brown
- Hilum color: Brown
- Flower color: Pink
- Leaf shape: Pointed ovate
- 100 seed weight (g): 14.8
- Oil content (%): 22.7
- Protein content (%): 39.4
- Maturity group: Late set
- Disease reaction*:
- Yield (q/ha^{-1}):
  - Research field: 27.1-35.6
  - Farmers field: 16-25.3

8.1.2.2 Year of release/register: 2020

8.1.2.3 Breeder/Maintainer: Pawe ARC/EIAR

* *Tolerant to frog eye leaf spot and resistant to bacterial blight, brown spot, leaf blotch and rust*

8.1.3. Varety name**: Gute (PM-12-3)**

8.1.3.1. Agronomic and morphological characteristics

- Adaptation area: -.
  - Altitude (m.a.s.l): 1650-1900
  - Rainfall (mm): 1000-1200
- Seed rate (kg ha^{-1}): 60-70
- Spacing(cm):
  - Between rows: 60
  - Between plants: 10
- Planting date: Mid June
- Fertilizer rate (kg ha-1):
  - NPS: 100 at planting
  - UREA --
- Days to 50% flowering: 74
- Days to 95% maturity: 141
- Plant height(cm): -
- Growth habit: Indetrminate
- Seed coat color: Light yellow
- Seed shape: Round
- Seed size: Medium
- Seed coat luster: Dull
- Number of pods plant-1: 81
- Number of seeds pod-1: 3
- Hilum color: White
- Leaf size : Large
- 100 seed weight (g): 20
- Oil content (%): 22.3
- Protein content (%): 39.4
- Disease reaction*:
- Yield (q/ha-1):
  - Research field: 18-27
  - Farmers field: 15-24

8.1.3.2 Year of release/register: 2020

8.1.3.3 Breeder/Maintainer: Bako ARC/ ORARI

* *Tolerant to* Bacterial blight *frog* Bacterial pustule and rust

8.1.4. Varety name**: Billo (PM-12-37)**

8.1.4.1. Agronomic and morphological characteristics

- Adaptation area: -.
  - Altitude (m.a.s.l): 1650-1900
  - Rainfall (mm): 1000-1200
- Seed rate (kg ha^{-1}): 60-70
- Spacing(cm):
  - Between rows: 60
  - Between plants: 10
- Planting date: Mid June
- Fertilizer rate (kg ha^{-1}):
  - NPS: 100 at planting
  - UREA --
- Days to 50% flowering: 65
- Days to 95% maturity: 131
- Plant height(cm): -
- Growth habit: Indetrminate
- Seed coat color: Yellow
- Seed shape: Oval
- Seed size: Medium
- Seed coat luster: Dull
- Number of pods $plant^{-1}$: 80
- Number of seeds pod^{-1} 3
- Hilum color: White
- Leaf size : Large
- 100 seed weight (g): 18
- Oil content (%): 24.7
- Protein content (%): 33.4
- Disease reaction*:
- Yield (q/ha^{-1}):
  - Research field: 18-24
  - Farmers field: 15-19

8.1.4.2 Year of release/register: 2020

8.1.4.3 Breeder/Maintainer: Bako ARC/ ORARI

* *Tolerant to Bacterial blight, frog Bacterial pustule and rust*

8.1.5. Varety name**: Melko Bonsa -1 (JM-CLK/CRFD-15-SD)**

8.1.5.1. Agronomic and morphological characteristics

- Adaptation area: Jima, Bedele, Metu, Tepi, Asosa and similar agro ecology
  - Altitude (m.a.s.l): 650-1800
  - Rainfall (mm): 450-1500
- Seed rate (kg ha^{-1}): 60-70
- Spacing(cm):
  - Between rows: 60
  - Between plants: 5
- Planting date: end of May to mid June
- Fertilizer rate (kg ha^{-1}):
  - NPSB: 121
  - UREA --
- Days to 50% flowering: 63
- Days to 95% maturity: 118
- Plant height(cm): 64.5
- Growth habit: Determinate
- Seed coat color: Yellow
- Seed shape: Round
- Pubescence color: Gray
- Hilum color: Buff
- Flower color: Purple
- Leaf shape: Intermediate
- 100 seed weight (g): 18.8
- Oil content (%): 21.82
- Protein content (%): 35.65
- Maturity group: Medium maturing
- Disease reaction*:
- Yield (q/ha^{-1}):
  - Research field: 25-35
  - Farmers field: 18-25

8.1.5.2 Year of release/register: 2020

8.1.5.3 Breeder/Maintainer: Jimma ARC/EIAR

* *Tolerant to soybean rust, bacterial blight, bacterial pustule*

6. Sunflower (*Helianthus annuus*)

Sunflower is native to the Central America. The evidence thus far is that it was first domesticated in Mesoamerica, present day Mexico, about 2600 BC. Sunflower belongs to the family *Compositae*. It is an annual, erect and an herbaceous plant growing to a height of 1.5 to 6.0 meters. The crop requires a cool climate during germination and seedling growth. Seedlings tolerate frosts moderately well until they reach the four to six leaf stage of development. Sunflower can be grown on a wide range of soils and tolerates a moderate pH range and some salinity.

Sunflower oil, extracted from the seeds, is used for cooking, as carrier oil and to produce margarine and bio-diesel, as it is cheaper than olive oil. A range of sunflower varieties exist with differing fatty acid compositions; some 'high oleic' types contain a higher level of healthy monounsaturated fats in their oil than even olive oil. Sunflower oil is also a rich source (64%) of linoleic acid, which helps in washing out cholesterol deposition in the coronary arteries of the heart and good for heart patients. One of the most common and severe diseases of sunflower is rust caused by *Puccinia helianthi.*

Some recently developed cultivars have drooping heads. These cultivars are less attractive to gardeners growing the flowers as ornamental plants, but appeal to farmers, because they reduce bird damage and losses from some plant diseases.

According to Central Statistics Agency **2019/20** report, the total area under production was **7,560.56** hectares and the production was estimated to be over **95,707.49** quintals.

6.1 New varieties

6.1.1. Variety name: **Uke - PAN7057**

6.1.1.1. Agronomic and morphological characters

- Adaption area: Holleta,Bir, Ayehu, Ambo, D/Zeit, Finoteselam, Kulumsa, Adadi, Arsi Negele and Similar agro-ecology of north western and western Ethiopia
  - Altitude (masl): 800-2300
  - Rainfall: >1000
- Seed rate(kg/ha): 8-12
- Planting date: Mid-June to Mid-July
- Fertilizer rate (kg /ha):
  - NPS: 100
  - Urea: 50
- Days to flowering: 95
- Days to maturity: 157
- 1000seed weight: 47.8
- Plant height (cm): 183
- Seed color: Black with no strip
- Seed size: Medium
- Flower color: Yellow
- Oil content(%) 40
- Crop pest reaction: Moderate
- Yield (q/ha)
  - Research field: 27
  - Farmers field: 21

6.1.1.2 Year of registration: 2020

6.1.1.3 Breeder/ Maintainer: Corteva/Pioneer Hi -Bred Seeds Ethiopia

Group IV. Tubers, Roots and Vegetables

1. Irish potato (*Solanum tuberosum*)

The potato is one of mankind's most valuable food crops. In volume of production it ranks fourth in the world after maize, rice, and wheat. Among root crops, potato ranks first in volume produced and consumed, followed by cassava, sweet potato, and yam. The relatively high carbohydrate and low fat content of the potato makes it an excellent energy source for human consumption. The tuber is known to supply carbohydrate, high quality protein, and a substantial amount of essential vitamins, minerals, and trace elements. Potato is said to be one of the most efficient crops in converting natural resources, labor, and capital into a high quality food with wide consumer acceptance.

The cultivated potato belongs to the family *Solanaceae*; it is originated in the high lands of South America and was first cultivated in the vicinity of lake Titicaca near the border of Peru and Bolivia. It was introduced to Ethiopia in 1858 and since then it has become an important crop in many parts of the country. Ethiopia has suitable edaphic and climatic conditions for the production of high quality ware and seed potatoes. About 70% of the available agricultural land is located at an altitude of 1800-2500 m.a.s.l and receives an annual rain fall of more than 600 mm, which is suitable for potato production. However, in **2019/20** Meher cropping season, the total area under production reaches **70,362.22** hectares and the production is estimated to be **9,245,283.61** quintals.

A number of production problems that account for the small area cropped with potato and the low national yield have been identified. The major ones are the concentration of potato cultivation in the highlands, unavailability and high cost of seed tubers, non optimal agronomic practices, the prevalence of diseases and insect pests, and inadequate storage, transportation, and marketing facilities.

1.1 New Variety:

1.1.1 Variety name**: Feyissa (CIP-395017.242)**

1.1.1.1 Agronomic and Morphological Characteristics

- Adaptation Area: Central highlands and similar areas
  - Altitude (m.a.s.l): 1500-2800
  - Rainfall(mm): 500-1000
  - Soil type: Sandy loam
- Seeding rate(tubers/ha): 20qt/ha (44444 tubers/ha)
- Planting date: First week of June
- Spacing(Cm): 75 x 30 between rows and plants respectively
- Fertilizer rate (kg/ha):
  - P_2O_5: 90
  - N: 110
- Days to flowering: 60-70
- Days to maturity: 110-120
- Plant height(cm): 69.1
- Growth habit; Erect
- Tuber shape: Oblong
- Eye depth; Shallow
- Flower color: Purplish white
- Tuber color: Creamy white
- Fresh color: Cream
- Number of stems/ plant: 4.3
- Number of tubers /hill: 11.85
- Dry matter (DM) content (%) 22.08
- Iron content (mg/Kg) DW 17.29
- Zinc content (mg/Kg) DW 13.32
- Crop pest reaction*:
- Yield(qt/ha)
  - Research field: 384.2
  - Farmer field: -

1.1.1.2 Year of release: 2020

1.1.1.3 Breeder/Maintainer: Holeta ARC/ EIAR

**Moderately tolerant to LB with two sprays*

1.1.2 Variety name: **Burka (CIP- 391058.175)**

1.1.2.1 Agronomic and Morphological Characteristics

- Adaptation Area: Central highlands and similar areas
  - Altitude (m.a.s.l): 1500-2800
  - annual Rainfall(mm): 500-1000
  - Soil type: Sandy loam
- Seeding rate(tubers/ha): 20qt/ha (44444 tubers/ha)
- Planting date: First week of June
- Spacing (cm): 75 x30 between rows and plants
- Fertilizer rate (kg/ha):
  - P_2O_5: 90
  - N: 110
- Days to flowering: 60-70
- Days to maturity: 110-120
- Plant height(cm): 64.15
- Growth habit; Erect
- Tuber shape: Short-Oval
- Eye depth; Shallow-medium
- Flower color: White
- Tuber color: White cream-Light yellow
- Fresh color: Yellow
- Number of stems/ plant: 4.0
- Number of tubers /hill: 12.00
- Dry matter (DM) content (%) 24.30
- Specific gravity (SG) (g/cm-3) 1.084
- Frying suitability test (IBVL) (5-10) 7.00
- Crop pest reaction: Tolerant to Late blight
- Yield(qt/ha)
  - Research field: 307.7
  - Farmer field: -

1.1.2.2 Year of release: 2020

1.1.2.3 Breeder/Maintainer: Holeta ARC/ EIAR

1.1.3 Variety name: **Wabi (CIP-84866-5)**

1.1.3.1 Agronomic and Morphological Characteristics

- Adaptation Area: Sinana, Goba, Dinsho and similar agro ecology
  - Altitude (m.a.s.l): 2350-3650
  - Annual Rainfall(mm): 600-1000
  - Soil type: Clay loam
- Seeding rate(tubers/ha): 15qt/ha (44444 tubers/ha)
- Planting date: Early April for „ʻGenaʻʻ and August for „ʻBonaʻʻcropping season in high lands of Bale
- Spacing (cm): 75 x30 between rows and plants
- Fertilizer rate (kg/ha):
  - NPS: 195
  - Urea: 165
- Days to flowering: 64
- Days to maturity: 112
- Plant height(cm): 53.96
- Growth habit; Erect
- Tuber shape: Oval
- Eye depth; Very Shallow
- Flower color: White
- Tuber color: White
- Number of stems/ plant: 4.56
- Number of tubers /hill: 14.69
- Crop pest reaction*:
- Yield(qt/ha)
  - Research field: 440-475.2
  - Farmer field: 310- 358.5

1.1.3.2 Year of release: 2020

1.1.3.3 Breeder/Maintainer: Sinna ARC/ORARI

* *Tolerant to late blight diseases*

7. Tomato (*Lycopersicum esculentum*.Mill)

Tomato is one of the most important and widely grown vegetable in Ethiopia. Both the fresh, processing and cherry type is produced in the country. Small-scale farmers produce the bulk of fresh market tomatoes. Processing types are mainly produced in large-scale horticultural farms. It is an important cash-generating crop to small-scale farmers and provides employment in the production and processing industries. It is also important source of vitamin A and C as well as minerals. Farmers are interested in tomato production more than any other vegetables for its multiple harvests potential of year round production, which results in high profit per unit area. The fresh produces is sliced and used as salad. It is also cooked for making local sauce. The processed products such as tomato paste, tomato juice, tomato ketchup and whole peel-tomato are produced for local market and export. Recently tomato is recognized for treating various human diseases. Such diverse uses make the tomato an important vegetable in irrigated agriculture in the country and the production is also rapidly increasing in many parts of the country.

Tomato is a seasonal climbing plant of the family S*olanaceae*. It is grown as an annual and produced for its fruits. It is one of the most popular & important vegetables for fresh consumption as well as for processing. The plant requires a warm & dry climate. The optimum mean day temperature for growth of tomato lies between 21^{o}C and 26^{o}C and temperature above 32^{o}C during fruit development inhibit the formation of red color.

Tomato should be cultivated at an altitude below 2000 m. preferably; soils for tomato cultivation are loamy sand to silt loam. The requirement on the organic matter content of the soil is not so high, but soils with medium organic matter (OM) content have better yields than soils with a low OM content. Good soil drainage is important. Optimum pH range is from 5.5 to 7.0. The first fruits are produced 80-100 days from transplanting.

During **2019/20** Meher cropping season, the total area under production reaches **6,012.28** ha and the production is estimated to be over **349,472.59** quintals.

7.1 New variety

7.1.1. Variety name: **PO364**

7.1.1.1. Agronomic and morphological characteristics

- Adaptation area: Low to mid altitude areas
  - Altitude(masl) 700-2100
  - Temperature(C^{o}): 18-30
  - Soil type: Sandy loam to silty loam
- Seed rate(seeds/ha): 20,000
- Spacing (cm): 100 between rows and 50 between plants
- Fertilizer(kg/ha)
  - Urea : 200
  - NPS. 100
- Leaf coverage: Very good canopy
- Leaf color: Green
- Leaf size: Medium to large
- Days to maturity: 96 after transplanting
- Growth habit Determinate
- Stem strength: Strong
- Fruit number per cluster: 4-6
- Fruit shape Obviate
- Fruit size (gm): 176.4
- Cracks: No
- Color before maturity: Light Green
- Color of ripen fruit skin: Red
- Color of fruit flesh: Red
- Fruit firminess: Firm
- shelf life (days): 12-15
- Fruit quality
  - TSS(^{o}Brix) 3.9-4.3
  - Acceptability: High
- Crop pest reaction*
- Total yield in qt/ha
  - Research field 856
  - Farmers field 486.06

7.1.1.2. Year of registration: 2020

7.1.1.3. Breeder/Maintainer: PoP Veriend Seeds BV
Genral Harvesting Trading

**Restant to meloidogyne incognita (mi)*

9. Onion (*Allium cepa* L.)

Onion is one of the bulb crops belonging to the family Alliaceae. It is an important bulb crop in Ethiopia. It is considerably important in the daily Ethiopian diet. All the plant parts are edible, but the bulbs and the lower stems sections are the most popular as seasonings or as vegetables in stews. It is a recently introduced crop and rapidly becoming popular among producers and consumers. It is widely produced by small farmers and commercial growers throughout the year for local use and export market. Onion is valued for its distinct pungency and form essential ingredients for flavoring varieties of dishes, sauces, soup, sandwiches, snacks as onion rings etc. It is popular over the local shallot because of its high yield potential per unit area, availability of desirable cultivars for various uses, ease of propagation by seed, high domestic (bulb and seed) and export (bulb, cut flowers) markets in fresh and processed forms.

Onion contributes substantially to the national economy, apart from overcoming local demands. Products like bulbs and cut flowers are exported to different countries of the world. With the growing irrigated agriculture in the country, there is a great potential for extensive onion seed and dry bulb production in the different production belts of the country.

Onion prefers well-drained sandy loam with a high content of organic matter. The optimum altitude range for Onion production is between 700 and 2200 m.a.s.l. and the optimum growing temperature lies between 15^{o}C and 23^{o}C.

During **2019/20** Meher cropping season, the total area under production reaches over **36,373.48** hectares and the production is estimated to be over **2,738,589.86** quintals.

9.1 New variety

9.1.1. Variety name: **Baftaim improved – 1**

9.1.1.1. Agronomic and morphological characteristics

- Adaptation area:
  - Altitude(masl) 700-1800
  - Temperature (C^{o}): 15-30
- Planting season: Year round
- Seed rate (kg/ha): 5-6
- Spacing(cm): 40 between furrowes, 20 between rows and 5 between plants
- Fertilizer(kg/ha)
  - NPS: 200
  - Urea: 150
  - Micro- nutrients: Trace amount
- Type: Open pollinated
- Days to bulb maturity: 110 after transplanting
- Plant height (cm): 42.62
- Bulb diameter (cm): 4.63
- Bulb size (gm): 77.5
- Bulb length (cm): 5.96
- Bulb color: Red
- Bulb flesh color: White
- Pungency:: Pungent
- Bulb qulity/accepteblity: Very high
- Crop pest reaction*
- Bulu yield (qt/ha) -
  - Research field 300 - 450
  - Farmers‟ field 200 - 410

9.1.1.2. Year of registration: 2020

9.1.1.3. Breeder/Maintainer: KINM Trading PLC / Alridha for Seed Production and Agriservices Est Hadhramout Govt.

***** *High resistance to leaf diseases tolerant to root diseases*

11a. Chili pepper *(Capsicum frutescence)*

11a.1. New varieties

- No new variety released in 2020

11a.2 Varieties under production

11a.2.1 Variety:	Melka dera (PBC 586)
11a.2.1.1 Year of release:	2016
11a.2.1.2 Breeder/Maintainer:	MARC/EIAR
11a.2.2 Variety:	Melka Oli (PBC 142A)
11a.2.2.1 Year of release:	2016
11a.2.2.2 Breeder/Maintainer:	MARC/EIAR
11a.2.3 Variety:	Melka Shote (PBC 223)
11a.2.3.1 Year of release:	2006
11a.2.3.2 Breeder/Maintainer:	MARC/EIAR
11a.2.4 Variety:	Melka Awaze (PBC 600)
11a.2.4.1 Year of release:	2006
11a.2.4.2 Breeder/Maintainer:	MARC/EIAR
11a.2.5 Variety	Oda Haro
11a.2.5.1 Year of release:	2005
11a.2.5.2 Breeder/Maintainer:	BARC/ OARI
11a.2.6 Variety:	Melka Zala (PBC 972)
11a.2.6.1 Year of release:	2004
11a.2.6.2 Breeder/Maintainer:	MARC/EIAR

11b. Sweet/ Hot Pepper (*Capsicum annum)*

11b.1. New varieties

11b.1.1. Variety name**: (Chala) PBC 602**

(Hot pepper)

11b.1.1.1. Agronomic and morphological characteristics

- Adaptation area: -
  - Altitude(masl) 1550-2000
  - Rainfall: Rain fed/Irrigated
- Spacing (cm): 70 between rows
  30 between plants
- Planting time: April to August under rainfed condition and January to June under irrigated conditions
- Seed rate(Kg/ha): 0.7 - 0.75
- Fertilizer(kg/ha)
  - NPS : 242 at transplanting:
  - Urea: 100 or 79 if NPS is used at 15-20 days after transplanting
- Days to maturity(green pods): 90-95
- Days to maturity (dry pods): 140-150
- Plant height(cm): 62.1
- Growth habit: Erect
- Days to 50% flowering: 46
- Average green pod wieght (gm):10.4
- Dry pod wall thickness (mm): 1-2
- Pod surface: Smooth
- Average pod length (cm): 10-12
- Average pod diameter (mm): 12-18
- Pod shape: Elongate
- Green pod color: Green
- Dry pod color: Red

- Pungency: High
- Outstanding values: Acceptable pod characteristics for green pod and high yield
- Crop pest reaction*: -
- Yield (qt/ha)
  - Green: 206
  - Dry: 29

11b.1.1.2. Year of regitration: 2020

11b.1.1.3. Breeder/Maintainer Melkassa ARC/EIAR/

* *Tolerant to wilt diseases and virus*

11b.2.1. Variety name**: (Gebaba) Rivival**

(Hot pepper)

11b.1.2.1. Agronomic and morphological characteristics

- Adaptation area: -
  - Altitude(masl) 1550 - 2000
  - Rainfall: Rain fed/Irrigated
- Spacing (cm): 70 between rows
  30 between plants
- Planting time: April to August under rainfed condition and January to June under irrigated conditions
- Seed rate(Kg/ha): 0.7-0.75
- Fertilizer(kg/ha)
  - DAP orNPS : DAP: 200 or NPS: 242 at transplanting:
  - Urea: Urea: 100 or 79 if NPS is used at 15-20 days after transplanting
- Days to maturity (green pods): 95-100
- Days to maturity (dry pods): 155-165-
- Plant height(cm): 50.2
- Growth habit: Erect
- Days to 50% flowering: 40
- Average green pod wieght (gm):17.2
- Dry pod wall thickness (mm): 1.5-2.5
- Pod surface: Smooth
- Average pod length (cm): 8-9
- Average pod diameter (mm): 19-25
- Pod shape: Elongate
- Green pod color: Dark Green
- Dry pod color: Dark Red
- Pungency: Medium

27.1 New varieties

27.1.1 Variety name: **Wayka (ML-OK-16)**

27.1.1.1. Agronomic and morphological characteristics

- Adaptation area -
  - Altitude(m.a.s.l) 700-1800
- Planting date Year round both under rainfed & irrigation
- Seed rate (kg/ha) 8-10
- Spacing(cm): 80 between rows and 30 between plants
- Fertilizer(kg/ha)
  - NPS: 242 at transplanting
  - Urea : 100 or 79 if NPS is used at 15-20 days after transplanting and after 2nd harvest
- Days to Maturity: 78
- Seedling vigor: Vigorous
- Growth habit: Erect
- Plant height(cm): 213
- Flower color: Yellowish
- Fruit length (cm): 16
- Number of fruit per plant: 40-55
- Average fruit weight (g): 25-35
- Fruit Pubescence: Downy
- Fruit color: Whitish green
- Fruit surface: Smooth
- Primary branches per plant: 3-6
- Outstanding values: Acceptable pod characteristics for its downy fruits and high yield
- Crop pest reaction -
- Yield (qt/ha)
  - Research field 155
  - Farmers‟ field -

27.1.1.2. Year of release 2020

27.1.1.3. Breeder/Maintainer Melkasa ARC/EIAR

27.1.2 Variety name: **Qenqes (Spineless)**

27.1.2.1. Agronomic and morphological characteristics

- Adaptation area -
  - Altitude(m.a.s.l) 700-1800
- Planting date Year round both under rainfed & irrigation
- Seed rate (kg/ha) 8-10
- Spacing(cm): 80 between rows and 30 between plants
- Fertilizer(kg/ha)
  - NPS: 242 at transplanting
  - Urea : 100 or 79 if NPS is used at 15-20 days after transplanting and after 2nd harvest -
- Days to Maturity: 71
- Seedling vigor: Vigorous
- Growth habit: Erect
- Plant height(cm): 137
- Flower color: Yellowish
- Fruit length (cm): 19
- Number of pods per plant: 45-60
- Average Fruit Weight (g): 35-50
- Fruit Pubescence: Downy
- Fruit color: Green
- Fruit surface: Ridges
- Primary branches per plant: 2-4
- Outstanding values: Acceptable pod for its downy fruits with high yield
- Crop pest reaction -
- Yield (qt/ha)
  - Research field 119
  - Farmers‟ field -

27.1.2.2. Year of release 2020

27.1.2.3. Breeder/Maintainer Melkasa ARC/EIAR

33. Summer squash (*Cucurbita pepo*)

Summer squash (*cucurbita pepo*) is a recent introduction and cultivation to Ethiopia. Summer squash, members of the Cucurbitaceae family and relatives of both the melon and the cucumber, come in many different varieties. While each type varies in shape, color, size and flavor, they all share some common characteristics. The entire vegetable, including its flesh, seeds and skin, is edible. In addition, some varieties of the squashes produce edible flowers. Unlike winter squash, summers squash is more fragile and cannot be stored for long period of time.

Summer squash is a tender, warm-season vegetable that can be grown easily in-home garden anytime during the warm, frost-free growing season. It grows on bush-type plants that do not spread like the plants of fall and winter squash and pumpkin. A few healthy and well-maintained plants produce abundant yields.

Because summer squash develops very rapidly after pollination, they are often picked when they are not too large and over mature. They should be harvested when small and tender for best quality. Most elongated varieties are picked when they are 2 inches or less in diameter and 6 to 8 inches long.

Squash is used generally as a cooked food item, but is sometimes eaten raw as a fresh salad ingredient. The fruit is usually harvested when it is 20 cm (8 in) or less in length while seeds are still soft and palatable. It can be prepared in many ways, including boiled, baked, steamed, stir fried or grilled.

Summer squash varieties neither released nor registered for production in Ethiopia until 2020. However, seeds of the commercial „black beauty“ summer squash variety have been introduced and produced by farmers with the recommendation of ministry of Agriculture since 1970s. However, the productions and consumptions of summer squash have been increased in recent years around large cities due to population increase and the demand of nutritional diversification.

32.1 New variety:

32.1.1 Variety name: **Zucchini-1 (JP-10)**

32.1.1.1. Agronomic and morphological characteristics

- Adaptation area -
  - Altitude(m.a.s.l) 1500-2400
- Planting date: Throughout the year both under rainfed and irrigation condition
- Seed rate (kg/ha) --
- Spacing(cm): 100 between rows and 50 between plants
- Fertilizer(kg/ha)
  - NPS: 242 at transplanting
  - Urea : 100 or 79 if NPS is used at 15-20 days after transplanting and after 3rd harvest
- Days to Maturity: 55
- Seedling vigor: High
- Growth habit: Bushy
- Flower color: Yellow
- Fruit length (cm): 24.8
- Fruit width (cm): 6.2
- Number of fruit per plant: 8.8
- Average Fruit Weight (g): 451.3
- Fruit color: Light green
- Flush color: Whitish
- Fruit shape: Cylindrical
- Fruit surface: Smooth
- Leaf color : Green with white spot
- Outstanding values: Acceptable fruit characteristics, early maturity, frequent and extended harvest; and high yielder,
- Crop pest reaction*

11.2 Varieties under production

11.2.1. Variety**:**	Degaga, Maitsebri-Bako, ILRI#11575
11.2.1.2. Year of released:	2017
11.2.1.3. Breeder/maintainer:	Shire-Maitsebri (TARI) and Bako ARC/OARI
11.2.2. Variety**:**	Degebas, ILRI#16527
11.2.2.2. Year of released:	2017
11.2.2.3. Breeder/maintainer:	Bako ARC/OARI
11.2.3. Variety:	Kibret (ክብረት) (11555)
11.2.3.1. Year of release:	2014
11.2.3.2. Breeder /Maintainer:	Humera ARC (TARI)
11.2.4. Variety:	Tsegab (ፅጋብ) (11566)
11.2.4.1. Year of release:	2014
11.2.4.2. Breeder /Maintainer:	Humera ARC (TARI)
11.2.5 Variety:	DURSA (ICEAP87091)
11.2.5.1 Year of release	2009
11.2.5.2 Breeder/ Maintainer	EIAR/MARC

12. Oats (*Avena sativa*)

12.1 New varieties

12.1.1. Variety name: **Bareda (Acc.5450)**

12.1.1.1. Agronomic & morphological characteristics

- Adaptation area: Mechara, Gelemso, Chiro, Tulo and similar agro-ecologies
  - Altitude (m.a.s.l): 1550-2400
  - Rain fall (mm): 303 - 902
- Seed rate (kg/ha): 100
- Spacing (cm): 30 between row and sowing with drilling
- Planting date: Early July
- Fertilizer rate (kg/ha):
  - NPS(P2O5): 19
  - N: 46
- Fertilizer application time: At the time of sowing
- Fertilizer application method: Row drilling
- Days to flowering (days): 56-90
- Days to Maturity (days): 87-155
- Plant height(cm): 78-138
- Seed color: Pale brown
- Leaf to stem ratio: 0.66
- 1000 seed weight (g): -
- Harvest Index: 0.79
- Crop pest reaction: (1-5)* -
- Fodder quality (g/kg DM)::
  - CP (%): 10.33
  - IVDMD (%): 57.75
  - Ash (%): 10.58
  - NDF (%): 74.15
  - ADF (%): 65.38
  - ADL(%): 7.82
- Yield (qt/ha)
  - Research field: 27-39
  - Farmers‟ field: 16-32

12.1.1.2. Year of release: 2020

12.1.1.3. Breeder/ maintainer: Mechara ARC/ORARI/

22.Napier grass (*Pennisetum purpureum)*

22.1. New varieties

- No new varieties released in 2020

22.2. Varieties under production

22.2.1 Variety:	Bako 04" (ILRI No 16804)
22.2.1.1Year of release:	2019
22.2.1.2 Breeder/Maintainer:	Bako ARC/ ORARI
22.2.2 Variety:	Bako 01" (ILRI No 16801)
22.2.2.1Year of release:	2019
22.2.2.2 Breeder/Maintainer:	Bako ARC/ ORARI

23. Local forage legume

23.1. New varieties

23.1.1. Varety	Teken
23.1.1.1 Year of release	2020
23.1.1 2. Breeder/Maintaniner:	Humera ARC/TRARI
23.1.2. Varety	Eznianchiwa
23.1.2.1 Year of release	2020
23.1.2 2. Breeder/Maintaniner:	Humera ARC/TRARI

24.Mulberry (*Morus indica)*

24.1. New varieties

24.1.1. Variety name**: K-2**

24.1.1.1. Agronomic & morphological characteristics

- Adaptation area: Well adapte from low land to mid land areas with relatively good rainfall
  - Altitude (m.a.s.l): 1250-1800
  - Rain fall (mm): 750-1600
  - Soil condition: Soils which are fertile, well drained, loamy to clay, porous with good moisture holding capacity and soil PH 6.2-6.8
- Seed rate (kg/ha): 100
- Spacing (cm): 60 between row and 60 between plant
- Planting date: Mid June when soil moisture (rainfall) is abundant and year roundwith irigation
- Fertilizer rate (t/ha):
  - Farm yard manure : 15-20
    - Growth habit: Rapidly growing deciduous woody perennial with a deep root system and multiple stems
- Leaves: Simple, alternate, stipulate, petiolate, entire or lobed
- Utilization information : Cutting and carrying leaves and feeding to silkworms in
- Quality parameters
  - Moisture (%): 74.39
  - Crude protein (%): 12.66
  - Total carbohydrate (%): 62.18
  - Crude fat (%): 5.05
  - Ash (%): 20.10

- N (mg/kg): 2.03
- P (mg/kg): 1333.31
- K (mg/kg): 13466.79
- Ca (mg/kg): 16112.7
- Mg (mg/kg): 1276.4
- S (mg/kg): 152.89
- Na (mg/kg) : 78.65

- Leaf yield (qt/ha)
  - Fresh leaf weight : 244
  - Dry leaf weight: 71.6

24.1.1.2. Year of release: 2020

24.1.1.3. Breeder/ maintainer: Melkassa ARC/EIAR/

* *Showed a better tolerance to insect pests and diseases*

24.1.2. Variety name**: S-13**

24.1.2.1. Agronomic & morphological characteristics

- Adaptation area: Well adapte from low land to mid land areas with relatively good rainfall
  - Altitude (m.a.s.l): 1250-1800
  - Rain fall (mm): 750-1600
  - Soil Condition: Soils which are fertile, well drained, loamy to clay, porous with good moisture holding capacity soil PH 6.2-6.8
- Seed rate (kg/ha): 100
- Spacing (cm): 60 between row and 60 between plant
- Planting date: Mid June when soil moisture (rainfall) is abundant and year roundwith irigation
- Fertilizer rate (t/ha):
  - Farm yard manure : 15-20
- Growth habit: Rapidly growing deciduous woody perennial with a deep root system and multiple stems
- Leaves**:** Simple, alternate, stipulate, petiolate, entire or lobed
- Utilization information : Cutting and carrying leaves and feeding to silkworms in
- Quality parameters
  - Moisture (%): 75.48
  - Crude protein (%): 11.89
  - Total carbohydrate (%): 64.2
  - Crude fat (%): 5.22
  - Ash (%): 18.69
  - N (mg/kg): 1.9
  - P (mg/kg): 2982.39

- K (mg/kg): 16030.17
- Ca (mg/kg): 15513.7
- Mg (mg/kg): 1735.9
- S (mg/kg): 288.54
- Na (mg/kg) : 144.75

- Leaf yield (qt/ha)
  - Fresh leaf weigh : 265
  - Dry leaf weight: 80.3

24.1.2.2. Year of release: 2020

24.1.2.3. Breeder/ maintainer: Melkassa ARC/EIAR/

* *Showed a better tolerance to insect pests and diseases*

Group VIII. Industrial Crops

1. Cotton (*Gossypium hirsutum*)

Cotton is a member of the genus Gossypium and belongs to the family Malvaceae which also includes the flowering shrub Hibiscus and Okra. The earliest cultivation of cotton is believed to have begun some 5,000 to 10,000 years ago in the regions of Africa and Southeast Asia. The crop is now grown worldwide with greater concentration in the warmer and hotter dry areas of the tropics/subtropics and temperate regions in approximately 75 countries. Ethiopia is one of the centers of variability and domestication of several cultivated plants, and it is probable that cotton was also domesticated in this region.

Cotton has been produced in Ethiopia since very ancient times. Cotton is one of the more valuable and extensively grown field crop plants in the mild altitudes and lowland areas of Ethiopia. It has great importance in the social, cultural and spiritual way of life of the people. Both medium staple and short staple cottons are produced in the country. It is used to manufacture a wide variety of of hand woven dresses and industrial processed textile fabrics, in addition to edible oil and protein rich-seedcake production for human and animal consumption respectively.

Cotton is grown predominantly as a mono-crop, once in a year. The main season, normally known as summer season, relies either on June to September rainfall or on irrigation water that lasts, depending on the locality, for about 126 days. The major cotton producing regions are Amhara, Tigray, Afar, Gambella and South Nations Nationalities people regions accounting for 96.8% of the total annual cotton production.

Currently, cotton fiber is used for the manufacture of a wide variety of textile products, yarns, cordages and other nonwoven products. Cotton seed meal is generally used as animal feed and its cotton stalk is used as feed, fuel wood and fencing material. The cotton crop is a good source of cash for the growers besides to its role as an export item in the national economic development of the country. In addition, cotton offers considerable employment opportunity on farms, industry, and commercial trade, input and service sectors.

1.1 New varieties

1.1.1 Variety name: **Werer-13**
(Delcero X Deltapine90 #F5-5-4-2-2)
(Irrigated)

1.1.1.1. Agronomic and morphological characteristics

- Adaptation area: Middle Awash, Upper Awash, Lower Awash and Southern part of Ethiopia (Weyto and Omorate) Agro-ecology
  - Altitude (m.a.s.l):- 350 - 1200
- Seed rate (kg/ha):- 15-20 delinated seeds and 30-45 fuzzy cotton seeds
- Spacing(cm): 90 inter-row and 20 intra-row spacing
- Fertilizer rate (Kg/ha): -
  - N: No
  - P: No
- Leaf shape: Normal
- Leaf lobe number: Three to four
- Flower petal color: Cream
- Boll bearing habit: Solitary
- Boll prominence of tip: Blunt
- Plant height(cm): 108.8
- Plant growth habit: Indeterminate
- Average Boll Weight (g): 4.9
- Ginning outturn(%): 38.2
- Fiber quality parameters
  - Micronaire: 4.4
  - Upper Half Mean Length (mm): 28.7
  - Fiber Strength (g/tex): 27.5
- Yield (qt/ha)
  - Lint yield: 18.7
  - Seed cooton yield: 48.9

1.1.1.2. Year of registration: 2020

1.1.1.3. Breeder/maintainer: Werer ARC/EIAR

1.1.2 Variety name: **Sille-13**
(Chamo Farm no 1A1-1 DP-90 F1#307)
(Irrigated)

1.1.2.1. Agronomic and morphological characteristics

- Adaptation area: Middle Awash, Upper Awash, Lower Awash and Southern part of Ethiopia (Weyto and Omorate) Agro-ecology
  - Altitude (m.a.s.l):- 350 - 1200
- Seed rate (kg/ha):- 15-20 delinated seeds and 30-45 fuzzy cootton seeds
- Spacing(cm): 90 inter-row and 20 intra-row spacing
- Fertilizer rate (Kg/ha): -
  - N: No
  - P: No
- Leaf shape: Normal
- Leaf lobe number: Three to four
- Flower petal color: Cream
- Boll bearing habit: Solitary
- Boll prominence of tip: Blunt
- Plant growth habit: Indeterminate
- Pant Height(cm): 103.0
- Average Boll Weight (g): 5
- Ginning outturn (%): 40.2
- Fiber quality parameters
  - Micronaire: 4.7
  - Upper Half Mean Length (mm): 27.8
  - Fiber Strength (g/tex): 28.8
- Yield (qt/ha)
  - Lint yield: 19.2
  - Seed cooton yield: 47.6

1.1.2.2. Year of registration: 2020

1.1.2.3. Breeder/maintainer: Werer ARC/EIAR

plants are mechanically harvested by cutting the stalks of the plants. Only fully mature leaves should be harvested when hand picking is practices and harvests should be carried out at weekly intervals. After harvest, leaves are usually tied in pairs to cure.

Tobacco is one the popular commercial plant grown by Ethiopian farmers for local consumption and as industrial crop for international market. Despite, tobacco growing is an ancient cultivated crop there is no registered variety in the country based on the aforementioned fact, National (Ethiopian)

2.1 New varieties

2.1.1 Variety name: **K-110**

2.1.1.1. Agronomic and morphological characteristics

- Adaptation area: Hawassa, Bilate, Jawe similar agro-ecology
  - Altitude (m.a.s.l):- -
- Seed rate (no/ha):- 24,700
- Spacing(cm): 45 between plants
  90 between rows
- Fertilizer rate (kg/ha): -
  - Urea : 148
  - NPSB: 148
- Date of maturity: First harvest: 2 months after transplanting & last harvest was completed after 3 to 4 months after transplanting
- Plant height (cm): 99-142
- Green leaf weight/plant (kg): 0.4-1.41
- Fresh to dry leaf ratio: 7:1-7.8-1
- Leaf number/plant: 17-22
- An average leaf width (cm): 19.69-34.19
- An average leaf length (cm); 53.4 -64.26
- Stem width (cm): 3.12
- An average leaf area (cm2): 10597.91
- Crop pest reaction:*
- Leaf quality parameters
  - Nicotine content (%): 2.10-2.37
  - Sugar content: 8.96-11.9
- Yield (t/ha)
  - Green leaf: 8.0-11.28
  - Dry leaf: 1.12-1.45

2.1.1.2. Year of registration: 2020

2.1.1.3. Breeder/maintainer: National Tobaco Enterprise

* *Highly resistant to different disease such as; Powdery mildew, Blank shank, Root rot, Brown leaf spot and moderately resistant to Tobacco Mosaic varus, leaf wilt, Leaf curl and Tobacco bushy top*

National Variety Release Committee (NVRC) Standing Committee