## National Variety Release Committee (NVRC) Members

<table>
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<tr>
<th>No.</th>
<th>Name</th>
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<th>Position</th>
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<td>Dr. Firew Mekibib</td>
<td>Haramaya University</td>
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<td>3</td>
<td>Ato Mizan Amare</td>
<td>Tigray Agricultural Research Institute</td>
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<td>Dr. Agidew Bekele</td>
<td>South Agricultural Research Institute</td>
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<td>Ato Tafa Jobie</td>
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<td>Ato Yeshitila Merine</td>
<td>Amhara Regional Agricultural Research Institute</td>
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<td>7</td>
<td>Dr. Getachew Tabor</td>
<td>D/Zeit Agricultural Research Institute</td>
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<td>8</td>
<td>Dr. Million Eshete</td>
<td>Debrezeit Agricultural Research Institute</td>
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<td>Dr. Getachew Ayana</td>
<td>Melkassa Agricultural Research Institute</td>
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<td>Ato Abdulesemed Abdo</td>
<td>Ministry of Agriculture and Natural Resource</td>
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<tr>
<td>11</td>
<td>Ato Daniel Mekonnen</td>
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<td>Secretary</td>
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3. Durum wheat (*Triticum turgidum var. durum*) | 18
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5. Groundnut (Arachis hypogaea)
6. Sunflower (Helianthus annuus)
7. Safflower (Carthamus tinctorius L.)
8. Vernonia (Vernonia galamensis)
9. Castor (Ricinus communis L)
10. Camelina Sativa (Camelina Sativa)

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2. Sweet Potato (Ipomoea batatas)
3. Taro (Colocasia esculenta)
4. Cassava (Manihot esculenta)
5. Enset (Ensete ventricosum (Welw.) Cheesman)
6. Yam (Dioscorea spp)
7. Tomato (Lycopersicum esculentum, Mill)
8. Garlic (Allium Sativum)
9. Onion (Allium cepa L.)
10. Shallot (Allium cepa var. asculonicum Barker; syn. A. ascalonicum auct. non L)
11. Sweet/Hot Pepper (Capsicum annum) and Chili (Capsicum frutescens)
12. Cabbage (Brassica oleracea)
13. Carrot (Daucus carota L.)
14. Lettuce (Lactuca sativa)
15. Snap bean (Phaseolus vulgaris L)
16. Watermelon (Citrullus lanatus)
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I. Acronyms

ACA - Awassa College of Agriculture
ADARC - Adet Agricultural Research Center
ARARC - Areka Agricultural Research Center
ARARI - Amhara Regional Agricultural Research Institute
AwARC - Awassa Agricultural Research Center
AU - Addiss Ababa University
BARC - Bako Agricultural Research Center
DBARC - DebreBirhan Agricultural Research Center
DZARC - Debre Zeit Agricultural Research Center
EIAR - Ethiopian Institute of Agricultural Research
EORC - Essential Oils Research Center
ESE - Ethiopian Seed Enterprise
GoPARC - Gode Pastoral & Agro-Pastoral Research Center
HARC - Holetta Agricultural Research Center
HU - Haramaya University
HwU - Hawassa University
ILRI - International Livestock Research Institute
JARC - Jimma Agricultural Research Center
KARC - Kulumsa Agricultural Research Center
MAR - Melkassa Agricultural Research Center
MCARC - Mechara Agricultural Research Center
MOANR - Ministry of Agriculture and Natural Resources
NVRC - National Variety Release Committee
OARI - Oromia Agricultural Research Institute
PARC - Pawe Agricultural Research Center
SARC - Sinana Agricultural Research Center
ShARC - Sheno Agricultural Research Center
SoRPARI - Somali Region Pastoral & Agro-Pastoral Research Institute
SRARC - Sirinka Agricultural Research Center
SRARI - South Region Agricultural Research Institute
WARC - Werer Agricultural Research Center
TARI - Tigray Agricultural Research Institute
II. Preface

The development of improved varieties is intended to help increase production and productivity of crops in the country. To assure this, newly developed varieties are tested by breeders and evaluated for their superiority over existing varieties by professionals (technical committee) and the National Variety Release Committee (NVRC).

Only those varieties that perform well during the evaluation and approved by NVRC are released or registered on an annual crop variety register.

The Plant Variety Release, Protection and Seed Quality Control Directorate of the Ministry of Agriculture and Natural Resources is responsible in organizing all duties related to the evaluation and providing information on the status of the varieties to breeders, institutions and beneficiary. Released varieties with all their agronomic and morphological descriptions are registered on the variety register and distributed to users.

Accordingly, this 19th issue of the variety register is published with all crop varieties released in 2015/2016 cropping season together with their agronomic and morphological descriptors. The list of varieties registered before 2015/2016 is also included but only with the name of varieties, their year of release and the institution responsible for their maintenance.

All Statistical data provided in this document with regard to area and production of major food crops is from Central Statistics Authority’s Agricultural Sample Survey Bulletin of year 2015/2016.

Plant Variety Release, Protection and Seed Quality Control Directorate
Ministry of Agriculture and Natural Resources
## III. Number of Released Varieties

### Table 1. Crops and its released varieties in 2016 and before 2016 in Ethiopia

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Group I. Cereal Crops

1. Tef (*Eragrostis tef* (Zucc.) Trotter)

Tef is an important cereal crop in Ethiopia. In this cropping season (2015/16), cereal crops were grown on 9,974,316.28 hectares of land. Of these, 2,866,052.99 hectares were allocated for Tef and the total production in the Meher season was about 44,713,786.91 quintals.

Outside Ethiopia there is a growing interest in using tef. For example, small scale commercial production of tef has begun in a few areas of the wheat belts of the USA, Canada and Australia. Tef has been introduced to South Africa and cultivated as a forage crop, and in recent years cultivated as a cereal crop in northern Kenya and The Netherlands.

Tef is endemic to Ethiopia and its major diversity is found only in that country. As with several other crops, the exact date and location for the domestication of Tef is unknown. However, there is no doubt that it is a very ancient crop in Ethiopia, where domestication took place before the birth of Christ.

In Ethiopia, tef is traditionally grown as a cereal crop. The grain is ground to flour, which is mainly used for making popular pancake-like local bread called *enjera* and sometimes for making porridge. The grain is also used to make local alcoholic drinks, called *tela* and *katikala*. Tef straw, besides being the most appreciated feed for cattle, is also used to reinforce mud and plaster the walls of tukuls and local grain storage facilities called *gotera*. Tef grain, owing to its high mineral content, has started to be used in mixtures with soybean, chickpea and other grains in the baby food industry. It is the most adapted crop in the diverse agro-ecologies of the country.
1.1 New varieties

1.1.1. Variety name: **Dagem [DZ-Cr-438 (RIL No. 91A)]**

1.1.1.1. Agronomic & morphological characteristics

- Adaptation area: Optimum to high rain fall areas
  - Altitude (m.a.s.l): 1700-2500
  - Rain fall (mm): 700-1200
- Seed rate (kg/ha): 10-15
- Planting date: July 20-30
- Fertilizer rate (kg/ha):
  - P₂O₅: 60
  - N: 40
- Days to heading: 59
- Panicle length (cm): 35.5
- 1000 seed weight (g): 0.29
- Plant height (cm): 95.6
- Seed color: Very white
- Lemma color: Yellow + Red(variegated)
- Leaf arrangement: Horizontal & bending
- Crop pest reaction: *
- Grain yield (qt/ha):
  - Research field: 25-28
  - Farmer’s field: 18-23

1.1.1.2. Year of release: 2016

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

*Not important and thus not considered in the breeding program.*
1.2 Varieties under production

1.2.1. Variety name: Abola (Quncho x Key)
1.2.1.1 Year of release: 2015
1.2.1.2 Breeder/Maintainer: Adet ARC /AARC/

1.2.2. Variety: Kora [DZ-Cr-438 (RIL No. 133B)]
1.2.2.1 Year of release: 2014
1.2.2.2 Breeder/Maintainer: DZARC/EIAR

1.2.3. Variety: Worekiyu (214746A)
1.2.3.1 Year of release: 2014
1.2.3.2 Breeder/Maintainer: Sirinka ARC/ARARI/

1.2.4. Variety: Boset [DZ-Cr-409 (RIL-50d)]
1.2.4.1 Year of release: 2012
1.2.4.2 Breeder/Maintainer: DZARC/EIAR

1.2.5. Variety: Lakech (RIL 273)
1.2.5.1 Year of release: 2009
1.2.5.2 Breeder/Maintainer: Sirinka ARC/ARARI/

1.2.6 Variety: Simada/DZ- Cr-385 (RIL 295)
1.2.6.1 Year of release: 2009
1.2.6.2 Breeder/Maintainer: DZARC/EIAR

1.2.7 Variety: Kena (23-Tafi-Adi-72)
1.2.7.1 Year of Release: 2008
1.2.7.2 Breeder/Maintainer: Bako ARC

1.2.8 Variety: Etsub (Dz-01-3186)
1.2.8.1 Year of release: 2008
1.2.8.2 Breeder/Maintainer: Adet ARC

1.2.9 Variety: Gemechis/DZ-Cr-387 (RIL-127)
1.2.9.1 Year of release: 2007
1.2.9.2 Breeder/Maintainer: MARC/EIAR
1.2.10 Varieties:
1.2.10.1 Year of release: 
1.2.10.2 Breeder/Maintainer: 

1.2.11 Variety:
1.2.11.1 Year of release: 
1.2.11.2 Breeder/Maintainer: 

1.2.12 Variety:
1.2.12.1 Year of release: 
1.2.12.2 Breeder/Maintainer: 

1.2.13 Variety:
1.2.13.1 Year of release: 
1.2.13.2 Breeder/Maintainer: 

1.2.14 Variety:
1.2.14.1 Year of release: 
1.2.14.2 Breeder/Maintainer: 

1.2.15 Variety:
1.2.15.1 Year of release: 
1.2.15.2 Breeder/Maintainer: 

1.2.16 Variety:
1.2.16.1 Year of release: 
1.2.16.2 Breeder/Maintainer: 

1.2.17 Variety:
1.2.17.1 Year of release: 
1.2.17.2 Breeder/Maintainer: 

1.2.18 Variety:
1.2.18.1 Year of release: 
1.2.18.2 Breeder/Maintainer 

1.2.19 Variety:
1.2.19.1 Year of release: 
1.2.19.2 Breeder/Maintainer: 

MECHARE (Acc. 205953)  
2007  
SRARC/ARARI

Quncho- /Dz-Cr-387 (RIL-355)/  
2006  
DzARC/EIAR

Amarach- (Ho-Cr-136)  
2006  
DzARC/EIAR

Guduru- (DZ-01-1880)  
2006  
BARC/OARI

Dima- (DZ-01-2423)  
2005  
ADARC/ARARI

Yilmana -(DZ-01-1868)  
2005  
ADARC/ARARI

Dega-Tef (DZ-01-2675)  
2005  
DZARC/EIAR

Gimbichu (DZ-01-899)  
2005  
DZARC/EIAR

Zobel (DZ-01-1821)  
2005  
SRARC/ARARI

Genete (DZ-01-146)  
2005  
SRARC/ARARI
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2. Bread wheat  (Triticum aestivum)

Ethiopia is the largest wheat producer in Sub-Saharan Africa. Wheat is one of the major cereal crops in the Ethiopian highlands, which range between 6 and 16°N, 35 and 42°E, and from 1500 to 2800 m. At present, wheat is produced solely under rain fed conditions. At national level, during 2015/16 cropping season 1,664,564.62 ha of land is covered by bread & durum wheat and 42,192,572.23 quintals were harvested from these land.

Altitude plays an important role in the distribution of wheat production through its influence on rainfall, temperature, and diseases. In Arsi, Bale and Shewa regions, the soil, moisture and disease conditions within the range of 1900-2300m altitude zone are favorable for the production of early and intermediate maturing varieties of bread wheat. This is estimated to comprise 25% of the total wheat production area, while the remaining 75% falls in the 2300-2700 m altitude zone. There, early, intermediate and late varieties are grown. Soil types used for wheat production vary from well-drained fertile soils to waterlogged heavy vertisols.

So far, different bread wheat varieties have been released and /or registered to satisfy the growing production demands of the farmers in the country.
2.1 New varieties

2.1.1. Variety name: WANE (ETBW 6130)

Pedigree: SOKOLL/EXCALIBUR
Selection history: CMSA02M00190S-31P0Y-0ZTY-010M-010SY-010M-6ZTY-04B-0Y

2.1.1.1. Agronomic & morphological characteristics

- Adaptation area: Mid to high land altitude
  - Altitude (m.a.s.l): 2100 – 2700
  - Rain fall (mm): 700-1000
- Seed rate (kg/ha): 125-150
- Planting date:
  - End of June to late July
  - based on the agro-ecology of the area

- Fertilizer rate (kg/ha):
  - P<sub>2</sub>O<sub>5</sub>: 46
  - N: 41
- Days to heading: 65
- Days to maturity: 125
- Plant height (cm): 91
- Growth habit: Erect type
- 1000 seed weight (g): 35.8
- Test weight(Kg/kl): 76.5
- Grain color: White
- Crop pest reaction:
- 1000 seed weight (g): 35.8
- Test weight(Kg/kl): 76.5
- Grain color: White

2.1.1.2. Year of release: 2016
2.1.1.3. Breeder/ maintainer: Kulumsa ARC/EIAR/

* Moderately resistant to stem and stripe rust*
2.1.2. Variety name: **LEMU (ETBW 6861)**

Pedigree: **WAXWING*2/HEILO**

Selection history: **CMSS06B00915T-099TOPY-099ZTM-099Y-099M-4WGY-0B**

2.1.2.1. Agronomic & morphological characteristics

- **Adaptation area:** High land agro-ecologies
  - **Altitude (m.a.s.l):** >2200
  - **Rain fall (mm):** 800-1100
- **Seed rate (kg/ha):** 125-150
- **Planting date:** End of June to late July based on the agro-ecology of the area

- **Fertilizer rate (kg/ha):**
  - **P₂O₅:** 46
  - **N:** 41
- **Days to heading:** 69
- **Days to maturity:** 140
- **Plant height (cm):** 98
- **Growth habit:** Erect type
- **1000 seed weight (g):** 36.5
- **Test weight(Kg/hl):** 75.5
- **Grain color:** White
- **Crop pest reaction:** *Moderately resistant to stem and stripe rust*
- **Grain yield (qt/ha):**
  - **Research field:** 55 - 65
  - **Farmer’s field:** 40 - 55

2.1.2.2. Year of release: 2016

2.1.2.3. Breeder/ maintainer: Kulumsa ARC/EIAR/
2.2 Varieties under production

2.2.1. Variety: 
  2.2.1.1. Year of registration: 
  2.2.1.2. Breeder/maintainer: 
  Kingbird 
  2015 
  KARC/ EIAR

2.2.2. Variety: 
  2.2.2.1. Year of release: 
  2.2.2.1. Breeder/maintainer: 
  Obora (UTIQUE96/FLAG-1) 
  2015 
  Sinana ARC/OARI/

2.2.3. Variety: 
  2.2.3.1. Year of release: 
  2.2.3.2. Breeder/maintainer: 
  Dambal (AGUILAL/3/ PYN/BAU//MILAN) 
  2015 
  Sinana ARC /OARI/

2.2.4. Variety: 
  2.2.4.1. Year of release: 
  2.2.4.2. Breeder seed maintainer: 
  Amibera 
  2015 
  Werer ARC/EIAR

2.2.5. Variety: 
  2.2.5.1. Year of release: 
  2.2.5.2. Breeder seed maintainer: 
  Fentale 
  2015 
  Werer ARC/EIAR

2.2.6. Variety: 
  2.2.6.1. Year of release: 
  2.2.6.2. Breeder/maintainer: 
  Bulluq (ETBW 5484) 
  2015 
  Bako ARC/OARI/

2.1.7. Variety: 
  2.2.7.1. Year of release: 
  2.2.7.2. Breeder/maintainer: 
  Liben (ETBW 5653) 
  2015 
  Bako ARC / OARI/
Crop Variety Register

2.2.8. Variety: BIQA (ETBW 6095)
2.2.8.1. Year of release: 2014
2.2.8.2. Breeder/Maintainer: KARC/EIAR

2.2.9. Variety: Mandoyu (Worrakatta/Pastor)
2.2.9.1. Year of release: 2014
2.2.9.2. Breeder/Maintainer: Sinana ARC/OARI/

2.2.10. Variety: Sanate (14F/HAR 1685)
2.2.10.1. Year of release: 2014
2.2.10.2. Breeder/Maintainer: Sinana ARC/OARl/

2.2.11. Variety: HONQOLO (ETBW 5879)
2.2.11.1. Year of release: 2014
2.2.11.2. Breeder/Maintainer: KARC/EIAR

2.2.12. Variety: NEJMAH-14 (Lucy)
2.2.12.1 Year of release: 2013
2.2.12.2 Breeder/Maintainer: WARC/EIAR

2.2.13. Variety: ADEL-6 (SAMAR-13/Pastor-1)
2.2.13.1 Year of release: 2013
2.2.13.2 Breeder/Maintainer: WARC/EIAR

2.2.14. Variety: Sekota-1 (ETBW4886)
2.2.14.1 Year of release: 2013
2.2.14.2 Breeder/Maintainer: SDARC/ARARI

2.2.15. Variety: Sorra (Vo robeycmss 96 YO2555-040Y-020M)
2.2.15.1 Year of release: 2013
2.2.15.2 Breeder/Maintainer: Sirinka ARC/ARARI

2.2.16. Variety: FRTI-1 (Mekel4)
2.2.16.1 Year of release: 2013
2.2.16.2 Breeder/Maintainer: Mekelle and Alamata ARC/TARI
2.2.17 Variety
2.2.17.1 Year of release: Jefferson
2.2.17.2 Breeder/Maintainer: 2012
2.2.17 OARI/Fedis)/MORRELL

2.2.18 Variety: Hulluka (ETBW5496)
2.2.18.1 Year of release: 2012
2.2.18.2 Breeder/Maintainer: KARC/EIAR

2.2.19 Variety: Ogolcho (ETBW5520)
2.2.19.1 Year of release: 2012
2.2.19.2 Breeder/Maintainer: KARC/EIAR

2.2.20 Variety: Hidase (ETBW5795)
2.2.20.1 Year of release: 2012
2.2.20.2 Breeder/Maintainer: KARC/EIAR

2.2.21 Variety: Mekelle- 03 (M17SAWSN-79)
2.2.21.1 Year of release: 2012
2.2.21.2 Breeder/Maintainer: Mekele and Alamata

2.2.22 Variety: ARC/TARI
2.2.22.1 Year of release: Shorima (ETBW 5483)
2.2.22.2 Breeder/Maintainer: 2011

2.2.23 Variety: KARC
2.2.23.1 Year of release: Hoggana (ETBW 5780)
2.2.23.2 Breeder/Maintainer: 2011

2.2.24 Variety: KARC
2.2.24.1 Year of release: Tsehay/HAR3837/ 2011
2.2.24.2 Breeder/Maintainer: Debre Birhan ARC/ARARI/

2.2.25 Variety: MeKelle-01/HUW-468/ 2012
2.2.25.1 Year of release: KARC/EIAR
2.2.25.2 Breeder/Maintainer: MeKelle-02/HI-1418/ 2011

2.2.26 Variety: Mekelle ARC/TARI
2.2.26.1 Year of release: 2011
2.2.26.2 Breeder/Maintainer:
2.2.27 Variety
2.2.27.1 Year of release: Gambo = Quaiu # 2
2.2.27.2 Breeder/Maintainer 2011 KARC/EIAR

2.2.28 Variety
2.2.28.1 Year of release: Danda’a (Danphe#1)
2.2.28.2 Breeder/Maintainer 2010 KARC/EIAR

2.2.29 Variety
2.2.29.1 Year of release: Kakaba (Picaflor # 1)
2.2.29.2 Breeder/Maintainer 2010 KARC/EIAR

2.2.30 Variety:
2.2.30.1 Year of release: Galil
2.2.30.2 Breeder/Maintainer 2010 Hazera Genetics Ltd
               (Axum Greenline Trading Plc)

2.2.31 Variety:
2.2.31.1 Year of release: Inseno-1(BWPRAW 03/36)
2.2.31.2 Breeder/Maintainer 2009 AWARC/SARI

2.2.32 Variety:
2.2.32.1 Year of release: Bolo (HAR-3816)
2.2.32.2 Breeder/Maintainer 2009 DBARC

2.2.33 Variety:
2.2.33.1 Year of release: Qulquulluu (ETBW-4621)
2.2.33.2 Breeder/Maintainer 2009 Haramaya University

2.2.34 Variety:
2.2.34.1 Year of release: GASAY (HAR-3730)
2.2.34.2 Breeder/Maintainer 2007 ADARC/ARARI

2.2.35 Variety:
2.2.35.1 Year of release: DINKNESH (HAR-3919)
2.2.35.2 Breeder/Maintainer 2007 SRARC/ARARI
2.2.36 Varieties:
2.2.36.1 Year of release: LIDORO (HK-14-R251) 2007
2.2.36.2 Breeder/Maintainer: HARC/EIAR

2.2.37 Variety: MENZE (HAR-3008) 2007
2.2.37.1 Year of release: DBARC/ARARI
2.2.37.2 Breeder/Maintainer: SULLA (710/RBC) 2007

2.2.38 Variety: AwARC /SARI
2.2.38.1 Year of release: MILLENNIUM (ETBW-4921) 2007
2.2.38.2 Breeder/Maintainer: KARC/EIAR

2.2.39 Variety: Jiru (HAR-2896) 2006
2.2.39.1 Year of release: DBARC/ARARI
2.2.39.2 Breeder/Maintainer: Warkaye (HAR-3820) 2006

2.2.40 Variety: SRARC/ARARI
2.2.40.1 Year of release: Meraro (11-6-24) 2005
2.2.40.2 Breeder/Maintainer: TAY (ET-12 D4/HAR 604 (1) 2005

2.2.41 Variety: ADARC/ARARI
2.2.41.1 Year of release: Senkegna (HAR 3646) 2005
2.2.41.2 Breeder/Maintainer: ADARC/ARARI

2.2.42 Variety:
2.2.42.1 Year of release:
2.2.42.2 Breeder/Maintainer:

2.2.43 Variety:
2.2.43.1 Year of release:
2.2.43.2 Breeder/Maintainer:

2.2.44 Variety:
2.2.44.1 Year of release:
2.2.44.2 Breeder/Maintainer:
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<tr>
<th>Variety</th>
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<th>Breeder/Maintainer</th>
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<tr>
<td>Digalu</td>
<td>2005</td>
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<td>Tossa</td>
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<tr>
<td>Bobicho</td>
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<tr>
<td>Densa</td>
<td>2002</td>
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<td>Sirbo</td>
<td>2001</td>
<td>KARC/EIAR</td>
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<td>Doddota</td>
<td>2001</td>
<td>KARC/EIAR</td>
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<td>KBG-01</td>
<td>2001</td>
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<td>Dure</td>
<td>2001</td>
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<tr>
<td>Guna</td>
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<td>Sofumar</td>
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<td>Year of release:</td>
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<tr>
<td>Madda Walabu (HAR-1480)</td>
<td>1999/00</td>
<td>SARC/OARI</td>
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<td>Hawi (HAR-2501)</td>
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<td>Wetera (HAR-1920)</td>
<td>1999/00</td>
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<td>Simba (HAR-2536)</td>
<td>1999/00</td>
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<td>Shina (HAR-1868)</td>
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<td>Katar (HAR-1899)</td>
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<td>Tuse (HAR-1407)</td>
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<td>Abola (HAR-1522)</td>
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<td>Megala (HAR-1595)</td>
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<td>Galema (HAR-604)</td>
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<td>Wabe (HAR-710)</td>
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<td>Kubsa (HAR 1685)</td>
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<td>Mitike (HAR 1709)</td>
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<td>Dashen</td>
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<td>Pavon 76</td>
<td>1982</td>
<td>KARC/EIAR</td>
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<td>ET-13 A2</td>
<td>1981</td>
<td>KARC/EIAR</td>
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<td>K6295-4A</td>
<td>1980</td>
<td>KARC/EIAR</td>
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<td>K 6290 bulk</td>
<td>1977</td>
<td>KARC/EIAR</td>
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<tr>
<td>Dereselgne</td>
<td>1974</td>
<td>KARC/EIAR</td>
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3. Durum wheat (*Triticum turgidum var. durum*)

Durum or macaroni wheat is indigenous to Ethiopia and it has been under cultivation since ancient times. Ethiopia is considered to be the center of genetic diversity of this crop. It is a tetraploid wheat species and traditionally grown on heavy black clay soils (Vertisols) of the central and northern highlands of Ethiopia between 1800-2800 meters above sea level. Accurate statistics on area and production of durum wheat in the country are difficult to obtain since they are lumped together with bread wheat.

In Ethiopian, durum wheat is consumed as leavened bread, common bread, macaroni, spaghetti, biscuits, pastries, and in various indigenous food preparations. The straw is mainly used for cattle feed and for fuel at times of scarcity. It has very narrow adaptation and lower yield potential as compared to bread wheat.

Although recommendations may vary from one region to another, the planting of newly improved durum wheat varieties are 2-3 weeks earlier than the normally used land races. In general, the improved varieties of durum wheat are highly beneficial in most of their qualities to agro industries.
### 3.1 New varieties

- No new variety released in 2016

### 3.2 Varieties under production

<table>
<thead>
<tr>
<th>Variety Name</th>
<th>Year of release</th>
<th>Breeder/Maintainer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mukiye (STJ3//BCR/LKS4/3/TER-3)</td>
<td>2012</td>
<td>DZARC/EIAR</td>
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<tr>
<td>Mangudo (ICAJIHAN 22)</td>
<td>2012</td>
<td>SARC/OARI</td>
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<tr>
<td>TOLTU (4/B/R9096#21001 (980SN Patho))</td>
<td>2010</td>
<td>SARC/OARI</td>
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<tr>
<td>Hitosa (CHEN/ALTAR-84)</td>
<td>2009</td>
<td>DZARC/EIAR</td>
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<tr>
<td>Denbi (AJAIA/ BUASHEN)</td>
<td>2009</td>
<td>DZARC/EIAR</td>
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<tr>
<td>Variety Name</td>
<td>Year of Release</td>
<td>Breeder/Maintainer</td>
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<tr>
<td>Werer (Mamouri I)</td>
<td>2009</td>
<td>DZARC/EIAR</td>
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<td>Tate (CD94523)</td>
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<td>FLAKIT (EN-25)</td>
<td>2007</td>
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<td>OBSA (ALTAR 84 ALTO-1/AJAYA)</td>
<td>2006</td>
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<td>EJERSA LABUD/NIGERIS</td>
<td>3/Gan (CD 98206)</td>
<td>2005</td>
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<td>Bakalcha (980SN Gedirfa / Gwerou #15 patho)</td>
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<td>Kokate -- (DZ-2016-1BZR-10 205-OAK-2AK (23))</td>
<td>2005</td>
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<td>Malefia- (CD 191-076 AR-3AP-OAP 2AP-OAP-AL TAR 84/Stn/)</td>
<td>2005</td>
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3.2.16 Variety: Oda (DZ 2227)
3.2.16.1 Year of release: 2004
3.2.16.2 Breeder/Maintainer: SARC/OARI

3.2.17 Variety: Ilani (DZ 2234)
3.2.17.1 Year of release: 2004
3.2.17.2 Breeder/Maintainer: SARC/OARI

3.2.18 Variety: Megenagna (DZ - 2023)
3.2.18.1 Year of release: 2004
3.2.18.2 Breeder/Maintainer: ADARC/ARARI

3.2.19 Variety: Mosobo (DZ - 2178)
3.2.19.1 Year of release: 2004
3.2.19.2 Breeder/Maintainer: ADARC/ARARI

3.2.20 Variety: Mettaya (DZ - 2212)
3.2.20.1 Year of release: 2004
3.2.20.2 Breeder/Maintainer: ADARC/ARARI

3.2.21 Variety: Selam (DZ – 1666-2)
3.2.21.1 Year of release: 2004
3.2.21.2 Breeder/Maintainer: ADARC/ARARI

3.2.22 Variety: Laste (Tob –2)
3.2.22.1 Year of release: 2002
3.2.22.2 Breeder/Maintainer: SRARC/ARARI

3.2.23 Variety: Lelisso (DZ-1605)
3.2.23.1 Year of release: 2002
3.2.23.2 Breeder/Maintainer: SARC/OARI

3.2.24 Variety: Yerer (CD 94026-4Y)
3.2.24.1 Year of release: 2002
3.2.24.2 Breeder/Maintainer: DZARC/EIAR
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<th>Variety</th>
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<th>Breeder/Maintainer</th>
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<tr>
<td>Ude (CD 95294-2Y)</td>
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<td>Ginchi (DZ-1050)</td>
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<td>DZARC/EIAR</td>
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<td>Robe (DZ-1640)</td>
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<td>DZARC/EIAR</td>
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<td>Asasa (DZ 2085)</td>
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<td>Arsi-Robe (TOB 66)</td>
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<td>Quami (CD-75533-A)</td>
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<td>DZARC/EIAR</td>
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<tr>
<td>Bichena (DZ 393-4)</td>
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<td>DZARC/EIAR</td>
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<td>Kilinto (DZ 918)</td>
<td>1994</td>
<td>DZARC/EIAR</td>
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<tr>
<td>Foka</td>
<td>1993</td>
<td>DZARC/EIAR</td>
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<tr>
<td>Boohai</td>
<td>1982</td>
<td>DZARC/EIAR</td>
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</tbody>
</table>
4. Triticale (X-Triticosecale)

Triticale (X-Triticosecale) is a man-made crop developed by crossing wheat (Triticum turgidum or Triticum aestivum) with Rye (Secale cereale). In Ethiopia triticale is a recent introduction. Triticale can be cultivated in a wide range of agro-ecologies, ranging from sea level to over 3000 m.a.s.l. Drought and frost tolerance are the primary advantages that triticale has over other cereal crops. It also exhibits better performance under acidic and degraded soils compared with many other cereals. Triticale has high biomass production and regrowth capacity for grazing. The yield advantage over wheat and barley is also significant.

Triticale is adapted to a wide range of soil conditions ranging from sandy to clay soil types. It requires an average of 500-600 mm rainfall, well distributed during the growing season. However, it can also perform well with as little as 350 mm of seasonal rainfall.

Most cultural practices for growing wheat can be applied directly to triticale. Consequently, the fertilization, seedbed preparation, seeding depth and seeding methods used for wheat are acceptable for triticale. Triticale can be used for making injera, pasta, pastry, bread, tella and beer. Triticale bread and injera products have been well accepted by farmers in South Gondar.
4. 1. New varieties

- No New variety released in 2016

4.2 Varieties under production

<table>
<thead>
<tr>
<th>Variety Name</th>
<th>Year of release</th>
<th>Breeder/Maintainer</th>
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<td>Zenkatie (TCL 59)</td>
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<td>Adet ARC</td>
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<td>Abdissa (TCL-76)</td>
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<tr>
<td>Moti (TCL-61)</td>
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<tr>
<td>Dersolign (ADTR-085)</td>
<td>2012</td>
<td>ADARC</td>
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<td>TT2 (DILFEKAR)</td>
<td>2007</td>
<td>KARC/EIAR</td>
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<tr>
<td>TT14 (LOGAW SHIBO)</td>
<td>2007</td>
<td>KARC/EIAR</td>
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<tr>
<td>Minet (USGEN 19)</td>
<td>2002</td>
<td>ADARC/ARARI</td>
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<tr>
<td>Snan (95t62-APL9-M)</td>
<td>2002</td>
<td>ADARC/ARARI</td>
</tr>
</tbody>
</table>
5. Emmer wheat (*Triticum dicoccum*)

Emmer wheat (*Triticum dicoccum*) is not strictly African; it is originated in the Near East. Indeed, it is one of the first cereals ever domesticated and was part of the early agriculture of the Fertile Crescent.

Farmers have it in fields perhaps as far back as 10,000 years ago. For several thousand years it remained a major cereal throughout the Middle East and North Africa. Then people switched to durum wheat, the type now used worldwide to make spaghetti, macaroni and other pastas. Farmers preferred it because its grain was free threshing (the seed fell out of its husk quite easily), and during the past 2,000 years or so the older form, emmer wheat, became an abandoned wheat. At national level, during 2015/16 cropping season 22,105.72 ha of land is covered by Emmer (aja) wheat and about 402,689.43 quintals are produced in this cropping season.

Emmer, locally known as *Aja*, is used in various ways. Some is ground into flour and baked into special bread (*Kita*). Some is crushed and cooked with milk or water to make porridge (*Genfo*). And some is mixed with boiling water and butter to produce gruel. With emmer's high protein content and smooth and easily digestible starch, infants and nursing mothers especially favor the gruel.
5.1. New varieties

- No New variety released in 2016

5.2 Varieties under production

5.2.1 Variety: Lammesso (ACC-224885-2)
5.2.1.1 Year of release: 2005
5.2.1.2 Breeder/Maintainer: SARC/OARI

5.2.2 Variety: Sinana-01 (Acc. 216074-1)
5.2.2.1 Year of release: 2001
5.2.2.2 Breeder/Maintainer: SARC/OARI
6. Buck wheat (*Fagopyrum esculentum* Moench)

Buck wheat (*Fagopyrum esculentum* Moench) is a recent introduction where its cultivation and use is new to Ethiopia. It is relatively low yielder compared to other grain crops, however, its unique characters such as its ability to perform better relatively on poor soils and its quick maturity, suiting areas with very short rains and as a catch crop where other crops failed or planting is delayed, makes it important.

Though the grain is used in ways similar to cereals, buckwheat is a non-cereal, broadleaved herbaceous plant that flowers prolifically over a period of several weeks belonging to polygonaceae family.

The grain is a source of human food where the flour and/or groats could be used for making different recipes either solely or mixed with other cereal grains; it is also a good feed source to poultry and livestock. The extended nectar supply, for a month or more, for bees makes buckwheat popular among beekeepers. Besides, it is also an important smother and green manure crop.

6.1. New varieties

- No New variety released in 2016

6.2. Varieties under production

6.2.1 Variety: Shashe (Japan)  
6.2.1.1 Year of release: 2010  
6.2.1.2 Breeder/Maintainer: DZARC/EIAR
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 2015/16 cropping season 45,454.18 ha of land is covered by this crop with a total yield estimate of about 1,268,064.47 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. a. Upland type rice

7a.1. New varieties

7a.1.1. Variety name: Fogera 1 (ART15-7-16-30-2-B-B)

7a.1.1.1. Agronomic and morphological characteristics:

- Adaptation area:
  - Altitude(masl): 600-1850
  - Rain fall(mm): 800-1400
- Seed rate (kg/ha): 80 for row planting and 100-120 for broad casting
- Planting date: Early June to late June depending on the onset of rainfall
- Spacing (cm): 25 cm between rows for row drill planting
- Fertilizer rate (kg/ha):
  - P2O5: 46 (all at planting)
  - N: 64 (1/3 at planting, 1/3 at tillering and 1/3 at panicle initiation)
- Days to 50% heading: 75-90
- Days to 85% maturity: 105-120
- Panicle length (cm): 18-19
- Plant height (cm): 82-90
- Thresh ability: Easily thresh able
- Lodging incidence: None
- Shattering: Resistant
- Seed size: Medium
- Growth habit: Erect
- No. of grains per panicle: 84-121
- 1000 seed weight (g): 26-31
- Seed color: White
Crop Variety Register

- Crop pest reaction: Better resistant to major rice disease
- Grain yield (kg/ha):
  - Research field: 42.2-49.8
  - Farmers field: 32.2-39.3
- 7a.1.1.2. Year of release: 2016
- 7a.1.1.3. Breeder/maintainer: Fogera National Rice Research and Training Centre (FNRRTC), EIAR
7a.1.2. Variety name: **Maitsebri-2 (ARCCU16Bar-4-14-2-2-B-1)**

7a.1.2.1. Agronomic and morphological characteristics:

- **Adaptation area:**
  - Altitude (masl): 950 - 1350
  - Rain fall (mm): 800 - 1500
- **Seed rate (kg/ha):**
  - 80 for row planting and 100-120 for broad casting
- **Planting date:**
  - Early June to late June depending on the onset of rainfall
- **Spacing (cm):**
  - 25 cm between rows for row drill planting
- **Fertilizer rate (kg/ha):**
  - P2O5 100 (all at planting)
  - N 100 (1/3 at planting, 1/3 at tillering and 1/3 at panicle initiation)
- **Days to 50% heading:** 83 - 84
- **Days to 85% maturity:** 113 - 124
- **Panicle length (cm):** 19.09 - 22.05
- **Plant height (cm):** 109 - 118
- **Thresh ability:** Easily thresh able
- **Lodging incidence:** None
- **Shattering:** Resistant
- **Seed size:** Medium
- **Growth habit:** Erect
- **No. of grains per panicle:** 77 - 112
- **1000 seed weight (g):** 26.21-28.44
- **Seed color:** White
- **Crop pest reaction:** Better resistant to major rice disease
- Grain yield (qt/ha):
  - Research field: 38.2 – 68.3
  - Farmers field: 36.2 – 45.2
7a.1.2.2. Year of release: 2016
7a.1.2.3. Breeder/maintainer: Shire – Maitsebri ARC
/TARI/
7a. 2 Varieties under production

7a.2.1 Variety name: ADET (WAB450-1-B-P-462-HB)
7a.2.1.1 Year of release: 2014
7a.2.1.2 Breeder/maintainer: Adet ARC (ARARI)

7a.2.2 Variety: Maytsebri-1 (NERICA 13)
7a.2.2.1 Year of release: 2014
7a.2.2.2 Breeder/maintainer: Maitsebri ARC (TARI)

7a.2.3 Variety: NERICA-12 (WAB880-1-38-20-17-P1-HB)
7a.2.3.1 Year of release: 2013
7a.2.3.2 Breeder/Maintainer: Adet ARC

7a.2.4 Variety: Hidasse (WAB 515-B-16A1-2)
7a.2.4.1 Year of release: 2012
7a.2.4.2 Breeder/Maintainer: Adet ARC

7a.2.5 Variety: Chewaqa (YIN LU20)
7a.2.5.1 Year of release: 2013
7a.2.5.2 Breeder/Maintainer: Bako ARC/OARI

7a.2.6 Variety: ANDASSA (AD-012)
7a.2.6.1 Year of release: 2007
7a.2.6.2 Breeder/Maintainer: ADARC/ARARI

7a.2.7 Variety: TANA (AD-048)
7a.2.7.1 Year of release: 2007
7a.2.7.2 Breeder/Maintainer: ADARC/ARARI

7a.2.8 Variety: GETACHEW (AD-01)
7a.2.8.1 Year of release: 2007
7a.2.8.2 Breeder/Maintainer: ADARC/ARARI

7a.2.9 Variety: NERICA-2
7a.2.9.1 Year of release: 2007
7a.2.9.2 Breeder/ Maintainer: GoPARC/ SoRPARI
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<thead>
<tr>
<th>Variety</th>
<th>Year of release</th>
<th>Breeder/Maintainer</th>
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<tbody>
<tr>
<td>NERICA-1</td>
<td>2007</td>
<td>GoPARC/ SoRPARI</td>
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<td>SUPARICA-1 (WAB-450)</td>
<td>2006</td>
<td>PARC/ EIAR</td>
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<td>NERICA-3 (WAB-450-IB-P-28-HB)</td>
<td>2006</td>
<td>PARC/ EIAR</td>
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<td>Kokit (IRAT-209)</td>
<td>1999/00</td>
<td>ADARC/ARARI</td>
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<td>Tigabe (IREM-194)</td>
<td>1999/00</td>
<td>ADARC/ARARI</td>
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<tr>
<td>Gumara (IAC-164)</td>
<td>1999/00</td>
<td>ADARC/ARARI</td>
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<tr>
<td>Pawe-1 (M-55)</td>
<td>1998/99</td>
<td>PARC/EIAR</td>
</tr>
</tbody>
</table>
7b. Low land rice

7b.1. New varieties

7b.1.1. Variety name: Fogera2 (KOMBOKA)

7b.1.1.1. Agronomic and morphological characteristics:

- Adaptation area:
  - Altitude (masl): 500 - 1590
  - Rain fall (mm): 1000 - 1457
- Seed rate (kg/ha):
  - 80 for row planting and 120-140 for broad casting
- Planting date:
  - Early June to mid June depending on the onset of rainfall
- Spacing (cm):
  - 25 cm between rows for row drill planting
- Fertilizer rate (kg/ha):
  - P2O5: 23 (all at planting)
  - N: 69 (1/3 at planting, 1/3 at tillering and 1/3 at panicle initiation)
- Days to 50% heading: 100-103
- Days to 85% maturity: 131 - 139
- Panicle length (cm): 15-17
- Plant height (cm): 61-80
- Thresh ability: Easily thresh able
- Lodging incidence: None
- Shattering: Resistant
- Seed size: Long
- Growth habit: Erect
- No. of grains per panicle: 86-96
- 1000 seed weight (g): 21-24
- Seed color: White
- Crop pest reaction: Better resistant to major rice disease
Crop Variety Register

- Grain yield (qt/ha):
  - Research field: 41.5-67.2
  - Farmers field: 36.7-48.7

7a.1.2.2. Year of release: 2016

7a.1.2.3. Breeder/maintainer:
Fogera National Rice Research and Training Center/IEAR/
7b.2. Variety under production

7b.2.1 Variety: Hiber (IRGA370-38-1-1F-B1-1)
Year of release: 2013
Breeder/maintainer: Adet ARC(AARC)

7b.2.2 Variety: Edget (WAB189-B-B-B-8-HB)
Year of release: 2011
Breeder/Maintainer: ADARC/ARARI

7b.2.3 Variety: VRH 606
Year of release: 2013
Breeder/Maintainer: ViBHA Seeds Ethiopia PLC

7b.2.4 Variety: VRH 640
Year of release: 2013
Breeder/Maintainer: ViBHA Seeds Ethiopia PLC

7b.2.5 Variety: VRH 654
Year of release: 2013
Breeder/Maintainer: ViBHA Seeds Ethiopia PLC
7c. Irrigated rice

7c.1. New varieties

- No New variety released in 2016

7c.2 Varieties under production

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

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

7c.2.3 Variety:
7c.2.3.1 Year of release: 2010
7b.2.3.2 Breeder/Maintainer: GoPARC/SoRPARI

7c.2.4 Variety:
7c.2.4.1 Year of release: 2010
7c.2.4.2 Breeder/Maintainer: GoPARC/SoRPARI

7c.2.5 Variety:
7b.2.5.1 Year of release: 2007
7b.2.5.2 Breeder/Maintainer: GoPARC/SoRPARI

7c.2.6 Variety:
7c.2.6.1 Year of release: 2007
7c.2.6.2 Breeder/Maintainer: GoPARC/SoRPARI

7c.2.7 Variety:
7c.2.7.1 Year of release: 2007
7c.2.7.2 Breeder/Maintainer: GoPARC/SoRPARI

NERICA-6
NERICA-15
Kallafo-1/FOFIFA-3737/
NERICA-14 (upland type)
SHEBELLE (IR 688059-76-3-3-2)
GODE-1 (BG-90-2)
HODEN (MTU-1001)
8. Maize (Zea mays L.)

Maize originated in Central America and was introduced to West Africa in the early 1500s by the Portuguese traders. It was introduced to Ethiopia during the 1960s to 1970s. 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 50° 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 2015/2016 cropping season 2,111,518.23 hectares of land was covered with maize with an estimated production not less than 71,508,354.11 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: AMH852Q: [[POOL9Ac7-SR(BC2)]FS170-2-1-3-1-
#/CML176(BC2)-5-2-1-3-1- #/SRSYN95 [ECU/
/SC/ETO]F1-###(GLS=3.5)-20-2-1-#/CML176
(BC2)-4-2-2-3-2-###/[ECU/SNSYN[SC/ETO]]c1F1-
#(GLS=1)-34-3-1-2/CML144(BC2)-34-29-1-1-1-1-1-1-B
8.1.1.1. Agronomic and morphological characteristics

- Area of adaptation:
  - Altitude (m.a.s.l): 1800 -2400
  - Rainfall (mm): 1000-1200

- Seed rate (kg/ha): 25

- Planting date (kg): Early May to late May

- Fertilizer rate (Kg/ha)
  - DAP: 150
  - UREA: 200

- Days to anthesis: 97

- Days to silking: 101

- Days to maturity: 182

- 1000 seed weight: 40.4

- Ear height (cm): 145

- Plant height (cm): 250

- Seed color: White

- Pollen color: Yellow

- Grain size: Large

- Grain type: Semi-flint

- Crop pest reaction:
  - Tolerant to rust, turcicum leaf blight, streak virus & resistant to lodging

- Yield (qt/ha)
  - Research Field: 90-100
  - Farmers' field: 75-85

8.1.1.2. Year of release: 2016
8.1.1.3. Breeder/maintainer:
  - EIAR/AmboPlant Protection Research Center/Highland Maize Improvement Section
8.1.2. Variety: **AMH853**: [KIT/SNSYN[N3/TUX]]c1F1-##(GLS=1)-21-2-3-1-1-3-##-SRSYN95 [ECU//SC/ETO]F1-#(GLS=3.5)-20-1-1-1-##-##-##[/POOL9Ac7-SR(BC2)]FS2-3SR-2-1-1-1-##-##-##

8.1.2.1. Agronomic and morphological characteristics

- **Area of adaptation:**
  - Altitude (m.a.s.l): 1800 - 2600
  - Rainfall (mm): 1000 - 1200
- **Seed rate (kg/ha):** 25
- **Planting date**
  - Early May to late May
- **Fertilizer rate (kg):**
  - DAP: 100
  - UREA: 230
- **Days to anthesis:** 84
- **Days to silking:** 87
- **Days to maturity:** 179
- **1000 seed weight:** 72.6
- **Ear height (cm):** 168
- **Plant height (cm):** 299
- **Seed color:** White
- **Pollen color:** Yellow
- **Grain size:** Large
- **Grain type:** Semi-flint
- **Crop pest reaction:** Tolerant to rust, turcicum leaf blight, streak virus & resistant to lodging
- **Yield (qt/ha):**
  - Research Field: 90-120
  - Farmers’ field: 80-90

8.1.2.2. Year of release: 2016

8.1.2.3. Breeder/maintainer:

EIAR/AmboPlant Protection
Research Center/Highland
Maize Improvement Section
8.2. Varieties under production

8.2.1. Variety:
8.2.1.1. Year of release:
8.2.1.2. Breeder/maintainer:

8.2.2 Variety:
8.2.2.1. Year of Release:
8.2.2.2. Breeder/Maintainer:

8.2.3. Variety:
8.2.3.1. Year of Release:
8.2.3.2. Breeder/Maintainer:

8.2.4. Variety:
8.2.4.1. Year of Release:
8.2.4.2. Breeder/Maintainer:

8.2.5. Variety:
8.2.5.1. Year of Release:
8.2.5.2. Breeder/Maintainer:

8.2.6. Variety:
8.2.6.1. Year of release:
8.2.6.2. Breeder/Maintainer:

8.2.7. Variety:
8.2.7.1. Year of release:
8.2.7.2. Breeder/Maintainer:

8.2.8. Variety:
8.2.8.1. Year of release:
8.2.8.1. Breeder/Maintainer:

Damote (P3506W 2015) DuPont Pioneer Hi- Bred Seeds Ethiopia

SPRH1 Hybrid 2015 Bako N M RC/EIAR

BHQP548 Hybrid 2015 Bako N M RC/EIAR

Gibe3 Open Pollinated 2015 Bako N M RC/EIAR

SC 719 2014 Seed Co Zimbabwe (plc)

BH546 (CML395 X CML202X BKL1) 2013 EIAR-Bako

BH547 (BKL2/CML312/BKL3/) 2013 EIAR-Bako
8.2.9. Variety: Melkasa-IQ
8.2.9.1. Year of release: 2013
8.2.9.2. Breeder/Maintainer: Melkasa ARC/EIAR

8.2.10. Variety: Mh140 (Melkasa Hybrid 140)
8.2.10.1. Year of release: (CML444CZL0003)//CZL0814
8.2.10.2. Breeder/Maintainer: 2013
            Melkasa ARC/EIAR

8.2.11. Variety: CPS.6
8.2.11.1. Year of release: 2013
8.2.11.2. Breeder/Maintainer: Ethio Flora

8.2.12 Variety: CPS.10.
8.2.12.1. Year of release: 2013
8.2.12.2. Breeder/Maintainer: Ethio Flora

8.2.13 Variety: PAC 781
8.2.13.1. Year of release: 2013
8.2.13.2 Breeder/Maintainer: GCT Trading

8.2.14 Variety: Galaxy
8.2.14.2. Breeder/Maintainer: GCT Trading

8.2.15 Variety: MH 130(CML440//CML445//
8.2.15.1 Year of release: ZIMLINE/KAT BC124#)
8.2.15.2 Breeder/Maintainer: 2012
            MARC /EIAR

8.2.16 Variety: HQ 138
8.2.16.1 Year of release: 2012
8.2.16.2. Breeder/Maintainer: MARC /EIAR

8.2.17 Variety: Giba – Awash Fendisha
8.2.17.1 Year of release: 2012
8.2.17.2. Breeder/Maintainer: Bako (EIAR)
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<th>Variety</th>
<th>Year of Release</th>
<th>Breeder/Maintainer</th>
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<tr>
<td>Webi (AMH760Q)</td>
<td>2012</td>
<td>APCR (EIAR)</td>
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<td>Limu (P3812W)</td>
<td>2012</td>
<td>Pioneer hi-bred seeds in</td>
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<td>Ethiopia</td>
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<td>SC-403</td>
<td>2012</td>
<td>Seedco</td>
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<td>Hawassa-1 (ESE-237)</td>
<td>2012</td>
<td>Ethiopia Seed Enterprise (ESE)</td>
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<td>BH661</td>
<td>2011</td>
<td>Bako NMRC/EIAR</td>
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<td>GIBE 2</td>
<td>2011</td>
<td>Bako NMRC /EIAR</td>
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<td>Shala (P2859W)</td>
<td>2011</td>
<td>Pioneer Hi-bred seeds</td>
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<td>Jibat (AMH851)</td>
<td>2009</td>
<td>EIAR/Ambo Plant Protection Research Center</td>
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<td>ZAMA</td>
<td>2009</td>
<td>Red Speckled Ethiopia</td>
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<td>Morka (UCBS_{1}C_{2})</td>
<td>2008</td>
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<td>Kello-1 (BHQPY-545)</td>
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<td>Melkasa- 6Q (Pool 15 C\textsubscript{7} QPM)</td>
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<td>Shone (Phb30G19)</td>
<td>2006</td>
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<td>Aba raya (Sc 627)</td>
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<td>Syngenta Agro-services AG-Ethiopia</td>
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<td>Melkasa-4 (ECA-EE-36)</td>
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<td>Bako-1 SC-22XFH-625-263 XCML - 197 (BH-544) 2006</td>
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<td>Bako National Maize Research Project/EIAR</td>
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<td>Arganne (AMH-800) 2005</td>
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<td>EIAR/Ambo Highland maize research center</td>
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<td>Hora (Ambo 2 syn1) 2005</td>
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<td>8.2.38</td>
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<td>BH -543 (SC-22 x124-b (109) X cml -197) 2005</td>
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<td>8.2.38.2</td>
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<td>Bereda SC 715 hybrid (SP13w x SP57w x sp59w) 2005</td>
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<td>8.2.39</td>
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<td>Syngenta</td>
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<td>Beles SC 713 hybrid (SP13w Xsp51w) 2005</td>
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<td>8.2.40</td>
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<td>Toga (ESE-203 hybrid) 2005</td>
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<td>8.2.40.2</td>
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<td>Melkassa -2 (ZM-521) 2004</td>
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<td>8.2.41</td>
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<td>8.2.43.2</td>
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8.2.44 Variety: Melkassa-3 (SADVE)
8.2.44.1 Year of release: 2004
8.2.44.2 Breeder/Maintainer: MARC/EIAR

8.2.45 Variety: BH-670 (A-7033xF-7215x144-7-b)
8.2.45.1 Year of release: 2002
8.2.45.2 Breeder/Maintainer: BARC/EIAR

8.2.46 Variety: BH-QP-542 (CML-144XCML-159X CML-176)
8.2.46.1 Year of release: 2002
8.2.46.2 Breeder/Maintainer: BARC/EIAR

8.2.47 Variety: Gusaw (Gambella Composite)
8.2.47.1 Year of release: 2002
8.2.47.2 Breeder/Maintainer: BARC/EIAR

8.2.48 Variety: BH-541 (NSCM-41-188/32/ X CML-197)
8.2.48.1 Year of release: 2002
8.2.48.2 Breeder/Maintainer: BARC/EIAR

8.2.49 Variety: Gibe Comp-1 (MMRC-51)
8.2.49.1 Year of release: 2001
8.2.49.2 Breeder/Maintainer: BARC/EIAR

8.2.50 Variety: Melkassa-1
8.2.50.1 Year of release: 2001
8.2.50.2 Breeder/Maintainer: MARC/EIAR

8.2.51 Variety: Raare-1(EV-1)
8.2.51.1 Year of release: 1997/98
8.2.51.2 Breeder/Maintainer: AU

8.2.52 Variety: Tesfa (ACV6)
8.2.52.1 Year of release: 1996
8.2.52.2 Breeder/Maintainer: ACA
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<th>Variety Name</th>
<th>Year of Release</th>
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<td>Fetene (ACV3)</td>
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<td>ACA</td>
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<td>Kuleni</td>
<td>1995</td>
<td>BARC/EIAR</td>
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<td>Pioneer Hi-Bred Seeds</td>
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<td>BH 140</td>
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<td>BARC/EIAR</td>
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<td>8.2.59</td>
<td>Guto</td>
<td>1988</td>
<td>BARC/EIAR</td>
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<td>Katumani</td>
<td>1974</td>
<td>BARC/EIAR/</td>
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<td>8.2.61</td>
<td>Alemaya Composite</td>
<td>1973</td>
<td>Haramaya University</td>
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<td>8.2.62</td>
<td>A-511</td>
<td>1973</td>
<td>AwARC</td>
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</table>
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 2015/16 cropping season, sorghum is produced on about 1,854,710.93 of land from which 43,232,997.52 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: ESH-4 (PU209A/PU304)

9.1.1.1. Agronomic and morphological characteristics

- Adaptation area:
  - West & East Hararghae
  - North Shoa North & South
  - Wello, North West Tigray
  - and similar agro-ecologies
  - Altitude (masl): <1600
  - Rainfall (mm): <600

- Seed rate (kg/ha): 10-12 for row sowing, 20-24 for broadcasting
- Spacing (cm): 75 cm between rows
- Planting date: Mid June to early July
- Fertilizer rate (kg/ha):
  - DAP: 100
  - Urea: 50

- Days to flowering: 67
- Days to maturity: 110
- Plant height (cm): 120
- 1000 seed weight (g): 32
- Seed color: Red
- Inflorescence compactness and shape: Semi compact
- Crop pest reaction: Tolerant to major pest of Sorghum (Stem borer, Anthracnose, Leaf spot etc)

- Grain yield (qt/ha):
  - Research station: 42
  - Farmers’ field: ----

9.1.1.2. Year of release: 2016

9.1.1.3. Breeder/maintainer: Melkassa ARC/EIAR
9.1.2. Variety: እርሬ (ACC#70583/Hararghecoll.#4)/97AN Progeny DSBM#27)

9.1.2.1. Agronomic and morphological characteristics

- Adaptation Area: Haramaya, Arsi Negelle, Tonga(Assosa highland), Kulumsa and similar agro ecologies
  - Altitude (masl): >1900
  - Rainfall (mm): <1000
- Seed rate (kg/ha): 10-12 for row sowing
  - 20-24 for broadcasting
- Spacing (cm): 75cm between rows
- Planting date: Late march to early April
- Fertilizer rate (kg/ha):
  - DAP: 100
  - Urea: 100
- Days to flowering: 123-149
- Days to maturity: 160-235
- Plant height (cm): 255-356
- 1000 seed weight (g): 23-36
- Seed color: White
- Inflorescence compactness and shape: Semi compact
- Crop pest reaction: Tolerant to major pest of Sorghum (Stem borer, Anthracnose, Leaf spot etc)
- Grain yield (qt/ha):
  - Research station: 37-72
  - Farmers’ field: 30-40

9.1.2.2. Year of release: 2016

9.1.2.3. Breeder/ maintainer: MARC/EIAR
9.1.3. Variety: **Erythrostopus ciliaris** (Jiru) (yellow)/ETS-2752)

9.1.3.1. Agronomic and morphological characteristics

- **Adaptation Area:** Haramaya, Arsi Negelle, Tonga (Assosa highland), Kulumsa and similar agro ecologies

  - **Altitude (masl):** >1900
  - **Rainfall(mm):** <1000

- **Seed rate (kg/ha):**
  - 10-12 for row sowing
  - 20-24 for broadcasting

- **Spacing(cm):** 75cm between rows

- **Planting date:** Late march to early April

- **Fertilizer rate(kg/ha):**
  - **DAP:** 100
  - **Urea:** 100

- **Days to flowering:** 117-144

- **Days to Maturity:** 158-227

- **Plant height(cm):** 239-383

- **1000 seed weight (g):** 20-46

- **Seed color:** Brown

- **Inflorescence compactness and shape:** Semi compact

- **Crop pest reaction:** Tolerant to major pest of Sorghum (Stem borer, Anthracnose, Leaf spot etc)

- **Grain yield (qt/ha):**
  - **Research station:** 33-86
  - **Farmers’ field:** 32-44

9.1.3.2. Year of release: 2016

9.1.3.3. Breeder/ maintainer:

Melkassa ARC/EIAR
9.2. Varieties under production

9.2.1. Variety:
9.2.1.1. Year of release:
9.2.1.2. Breeder/ maintainer:

9.2.2. Variety:
9.2.2.1. Year of release:
9.2.2.2. Breeder/ maintainer:

9.2.3. Variety:
9.2.3.1 Year of release:
9.2.3.2 Breeder/ maintainer:

9.2.4. Variety:
9.2.4.1. Year of release
9.2.4.2. Breeder/maintainer

9.2.5. Variety:
9.2.5.1. Year of release:
9.2.5.2. Breeder/Maintainer:

9.2.6. Variety
9.2.6.1. Year of release:
9.2.6.1. Breeder/Maintainer:

9.2.7. Variety
9.2.7.1. Year of release:
9.2.7.2. Breeder/Maintainer:

9.2.8. Variety:
9.2.8.1. Year of release:
9.2.8.2. Breeder/Maintainer:

9.2.9. Variety:
9.2.9.1. Year of release:
9.2.9.2. Breeder/Maintainer:

8.90 (ETS 639/SRN-39)
2015
MARC/EIAR

Adukara
2015
Assosa ARC/EIAR

Assosa-1 (Bambasi no-9)
2015
Assosa AR/EIAR

Fendisha-1
2015
Haramaya University

ESH-3 836h - 3 (ICSA-15 X M-5568)
2014
MARC/EIAR

PAC 537
2013
GCT/MARC
(Advanta Seed International)

Chemeda (Acc- BRC-18)
2013
BARC/OARI

Gemedi (ACC-BCC-5)
2013
BARC/OARI

Dekeba (ICSR 24004)
2012
MARC/EIAR
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<th>Variety</th>
<th>Year of release</th>
<th>Breeder/Maintainer</th>
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<tr>
<td>Mesay ( Meko X Gobye-2)</td>
<td>2011</td>
<td>SARC/ARARI</td>
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<tr>
<td>Dagem ( 97 MW 6130(IS 10892 X RS/R-20-8614-2 X IS 9379)</td>
<td>2011</td>
<td>MARC/EIAR</td>
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<td>Chare/PGRC/E#222880/</td>
<td>2011</td>
<td>DBARC/ARARI/</td>
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<td>Melkam (WSV 387)</td>
<td>2009</td>
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<td>ESH-1 (\bar{C}=nL-1) (P-9501 A x ICSR14)</td>
<td>2009</td>
<td>MARC/EIAR</td>
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<tr>
<td>ESH-2 (\bar{C}=nL-2) (ICSA 21A x ICSR50)</td>
<td>2009</td>
<td>MARC/EIAR</td>
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<td>GEDO (Gambella 1107XP-9403) (Striga resistant)</td>
<td>2007</td>
<td>SRARC/ARARI</td>
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<td>87 BK -4122 (GEREMEW) (Food type)</td>
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<td>RED SWAZI (Malting type)</td>
<td>2007</td>
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<td>MACIA (Malting type)</td>
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<td>Sorghum EMAHOY (Pw01-092)</td>
<td>2007</td>
<td>PARC/EIAR</td>
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<td>RAYA (PGRC/EX222878XKAT369-1)</td>
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<td>Variety</td>
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<td>Breeder/Maintainer</td>
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<td>Gubiye (P-9401)</td>
<td>2000</td>
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<td>Variety</td>
<td>Year of Release</td>
<td>Breeder/Maintainer</td>
</tr>
<tr>
<td>---------</td>
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<td>ABSHIR (P-9403)</td>
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<td>MEKO-1 (M - 36121)</td>
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<td>1989</td>
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10. Finger millet (*Eleusine coracana.)*

Finger millet, Amharic ከጓሳ "Dagusa" also known as African millet, is an annual plant widely grown as a cereal in the arid areas of Africa and Asia. Finger millet is originally native to the Ethiopian Highlands and was introduced into India approximately 4000 years ago. It is very adaptable to higher elevations and is grown in the Himalaya up to 2,300 meters in elevation. The cultivation of this crop is relatively easy and it has been found to be reliable under circumstances where other cereal crops would have failed due to drought or would have given negligible yield.

Though millets can produce good yield on marginal soils, they also respond very well to fertilizer application and good management. It grows on a wide range of soils but prefer reasonably fertile sandy soils. According to the Central Statistics Agency report of 2015/16 cropping season, finger millet was produced on about 465,508.27 ha of land from which 9,402,463.39 quintals were obtained during the Meher season. The nutritional value of the grain is high and it is used as an important staple food and generally consumed as porridge.

In Ethiopia, finger millet is produced in North Gonder, East Gojam, some parts of Tigray and West Wollega. The seed should be planted into a well-prepared seedbed, not deeper than 2-3 cm. Finger millet requires a well-distributed rainfall during growth, due to its extensive but shallow root system. Whilst moisture requirement is rather high, the crop should be grown on well drained soils with average annual rainfall above 800-900mm.
10.1 New variety

10.1.1. Variety: እንלבן.repeat (GBK- 011119A)

10.1.1.1. Agronomic and morphological characteristics

- Adaptation Area: Shalla, ArsiNegelle, Assosa Bako, Adet, Pawe and similar agro-ecologies of finger millet growing areas
  - Altitude (masl): 1600-1900
  - Rainfall(mm): >900

- Seed rate(kg/ha):
  - 15 for raw sowing and 20-30 for broadcasting

- Spacing (cm):
  - 40 between rows

- Planting date:
  - Late May to early June

- Fertilizer rate(kg/ha):
  - DAP: 100
  - Urea: 50-100

- Days to heading:
  - 92

- Days to maturity:
  - 139

- Plant height(cm):
  - 82

- Finger type:
  - Loose

- Seed color:
  - Brown

- Growth habit:
  - Erect

- Crop pest reaction:
  - Tolerant to major diseases of finger millet (blast)

- Yield (qt/ha):
  - Research field: 21-35
  - Farmers’ field: 23

10.1.1.2. Year of release: 2016

10.1.1.3. Breeder/Maintainer: Melkassa ARC/EIAR
10.1.2. Variety: ከጥንሱ (ACC #229355)

10.1.2.1. Agronomic and Morphological Characteristics

- Adaptation Area: Shalla, Arsi Negelle, Assosa Bako, Adet, Pawe, Axum & similar agro-ecologies of finger millet growing areas

  - Altitude (masl): 1600-1900
  - Rainfall (mm): >900

- Seed rate (kg/ha): 15 for raw sowing and 20-30 for broadcasting

- Spacing (cm): 40 between rows

- Planting date: Late May to early June

- Fertilizer rate (kg/ha):
  - DAP: 100
  - Urea: 50-100

- Days to heading: 93

- Days to maturity: 147

- Plant height (cm): 88

- Finger type: Loose

- Seed color: Brown

- Growth habit: Erect

- Crop pest reaction: Tolerant to major diseases of finger millet (blast)

- Yield (qt/ha):
  - Research field: 22-36
  - Farmers’ field: 21

10.1.2.2. Year of release: 2016

10.1.2.3. Breeder/Maintainer: Melkassa ARC/EIAR
10.1.3. Variety: **Diga-1 (ACC. 216036)**

10.1.3.1. Agronomic & morphological characteristics

- **Adaptation Area:** Western Oromia (Bako, Nekemt and Diga) area with similar agro-ecologies
  - **Altitude (masl):** 1600-2300
  - **Rainfall (mm):** 1200-1300
- **Seed rate (kg/ha):** 15
- **Spacing (cm):** 40 between rows and 10 cm between plants
- **Planting date:** Late May to mid June
- **Fertilizer rate (kg/ha):**
  - **DAP:** 105 (at planting)
  - **Urea:** 65 (Applied in split)
- **Days to maturity:** 140-167
- **Plant height (cm):** 58-73
- **1000 seed weight (g):** 3.0
- **Seed color:** Black
- **Growth habit:** Erect
- **Crop pest reaction:**
- **Yield (qt/ha):**
  - **Research field:** 22-28
  - **Farmers’ field:** 24-32

10.1.3.2. Year of release: 2016

10.1.3.3. Breeder/maintainer: BakoARC (OARI)

*Tolerant to major finger millet diseases, blast (Magnaporthe oryzea)*
10.1.4. Variety: Urji (Acc. 242617)

10.1.4.1. Agronomic & morphological characteristics

- Adaptation Area: Western Oromia (Bako, Nekemt and Diga) area with Similar agro-ecologies
  - Altitude (masl): 1600-2300
  - Rainfall(mm): 1200-1300
- Seed rate(kg/ha): 15
- Spacing (cm): 40cm between rows and 10cm between plants
- Planting date: Late May to mid June
- Fertilizer rate(kg/ha):
  - DAP: 105 at planting
  - Urea: 65 (Applied in split)
- Days to maturity: 153-180
- Plant height(cm): 74-95
- 1000 seed weight (g): 3.25
- Seed color: White
- Growth habit: Erect
- Crop pest reaction:*
- Yield (qt/ha):
  - Research field: 18-27
  - Farmers' field: 21-26

10.1.4.2. Year of release: 2016

10.1.4.3. Breeder/maintainer: BakoARC(OARI)

*Tolerant to major finger millet diseases, blast (Magnaporthe oryzae)
10.1.5. Variety: Mereb-1 (KNE#622)
10.1.5.1. Agronomic & morphological characteristics

- Adaptation Area: Central zone of Tigray (Mereb leke, Ahforom & Adwa) and areas with similar agro-ecologies
  - Altitude (masl): 1300-2100
  - Rainfall(mm): 750 – 1100
- Seed rate(kg): 10
- Spacing (cm): 40 between rows 10 b/n plant
- Planting date: Mid May–late may/early June
- Fertilizer rate(kg/ha): 100 (at planting)
  - DAP: 100 (applied in split)
  - Urea: 70-95
- Days to heading: 70-95
- Days to maturity: 83-121
- Plant height(cm): 71.10-83.4
- 1000 seed weight (g): 3-4.5
- Seed color: Light brown
- Growth habit: Erect
- Crop pest reaction: Resistant to major finger millet diseases, \textit{(blast)} \textit{(Magnaporthe oryzae)}
- Yield (qt/ha):
  - Research field: 24.51-31.5
  - Farmers’ field: 23.75 – 27.5

10.1.5.2. Year of release: 2016
10.1.5.3. Breeder/maintainer: Axum ARC/TARI
10.2 Varieties under production

10.2.1. Variety: Kako-1 (LR005)
   10.2.1.1. Year of release: 2015
   10.2.1.2. Breeder/Maintainer: Jinka ARC/SARI

10.2.2. Variety: Addis-01 (Acc.203544)
   10.2.2.1. Year of release: 2015
   10.2.2.2. Breeder/maintainer: Addis Ababa University (AAU) and Bako ARC (OARI/BARC)

10.2.3. Variety: ACC # 229469: Tessema (†m†y)
   10.2.3.1. Year of release: 2014
   10.2.3.2. Breeder/Maintainer: EIAR/MARC

10.2.4. Variety: Gudetu (Acc.215990)
   10.2.4.1. Year of release: 2014
   10.2.4.2. Breeder/Maintainer: BARC/OARI

10.2.5. Variety: Mecha (†n†p)
   10.2.5.1. Year of release: (PGRC/E Acc # 229371)
   10.2.5.2. Breeder/Maintainer: 2014
   ADARC/ARARI

10.2.6. Variety: Necho (PGRC/E 203572)
   10.2.6.1 Rear of release: 2011
   10.2.6.2. Breeder/maintainer: ADARC/ARARI

10.2.7. Variety: Debatsi (Évi=)
   10.2.7.1 Rear of release: 2010
   10.2.7.2. Breeder/maintainer: EIAR/PARC

10.2.8. Variety
   10.2.8.1. Year of release: BAREDA (BRE 356-1)
   10.2.8.2. Breeder / maintainer: 2009
   BARC/OARI
10.2.9. Variety: GUTE (229373)  
10.2.9.1. Year of release: 2009  
10.2.9.2. Breeder/maintainer: BARC/OARI

10.2.10. Variety: WAMA (KNE#392)  
10.2.10.1. Year of release: 2007  
10.2.10.2. Breeder/maintainer: BARC/OARI

10.2.11. Variety: BARUDA (Pw01-075)  
10.2.11.1. Year of release: 2007  
10.2.11.2. Breeder/maintainer: PARC/EIAR

10.2.12. Variety: Degu (PGRC/E 215874)  
10.2.12.1. Year of release: 2005  
10.2.12.2. Breeder/maintainer: ADARC/ARARI

10.2.13. Variety: Boneya (KNE#411)  
10.2.13.1. Year of release: 2002  
10.2.13.2. Breeder/maintainer: BARC/OARI

10.2.14. Variety: Padet (KNE # 409)  
10.2.14.2. Breeder/maintainer: MARC/EIAR

10.2.15. Variety: Tadesse (KNR # 1098)  
10.2.15.1. Year of release: 1998/99  
10.2.15.2. Breeder/maintainer: MARC/EIAR
11. Pearl millet (*Pennisetum glaucum* (L.) R. Br.)

Pearl millet is the most widely grown type of millet. Grown in Africa and the Indian subcontinent since prehistoric times, it is generally accepted that pearl millet originated in Africa and was subsequently introduced into India. Its origin has been traced to tropical Africa. The center of diversity for the crop is in the Sahel zone of West Africa. Cultivation subsequently spread to east and southern Africa, and southern Asia.

Pearl millet is well adapted to production systems characterized by drought, low soil fertility, and high temperature. It performs well in soils with high salinity or low pH. Because of its tolerance to difficult growing conditions, it can be grown in areas where other cereal crops, such as maize or wheat, would not survive. Earliness, high tillering capacity and also tolerance to pests are important traits to minimize risks in drought prone-areas. In this connection there are no other alternative crops except early maturing sorghum varieties in most drought-prone areas. Hence, pearl millet, being a rapid-growing warm-weather crop can importantly be used as a substitute or emergency crop.

Pearl millet is a new crop for Ethiopian farmers both in terms of cultivation and utilization, indicating the urgent need for further study. Millet being a highly cross-pollinated crop, maintenance of seed-purity is a challenge that needs higher attention. The seeds of millet ripen first in the upper part of the head and then successively downward.
11.1 New varieties

- No new variety released in 2016

11.2 Varieties under production

11.2.1. Variety: KOLA-1 (ICMV-221)
11.2.1.1 Year of release: 2007
11.2.1.2 Breeder/Maintainer: MARC/EIAR
12. Foxtail millet (*Setaria italic*)

It is the second-most widely planted species of millet, and the most important in East Asia. It has the longest history of cultivation among the millets, having been grown in China since sometime in the sixth millennium BC. Other names for foxtail millet include Italian millet, German millet, Chinese millet, and Hungarian millet.

It is an annual grass with slim, vertical, leafy stems which can reach a height of 120–200 cm. The seed head is a dense, hairy panicle 5–30 cm long. The small seeds, around 2 mm in diameter, are encased in a thin, papery hull which is easily removed in threshing. Seed color varies greatly between varieties.

In China, foxtail millet is the most common millet and one of the main food crops, especially among the poor in the dry northern part of that country. In Europe and North America it is planted at a moderate scale for hay and silage, and to a more limited extent for birdseed.

It is a warm season crop, typically planted in late spring. Its early maturity and efficient use of available water make it suitable for rising in dry areas.

Nutrient composition is similar to common millet, approximately 11% of protein, 4% oil, 6.7% of crude fibre. Foxtail millet grain has higher content of essential amino acids, vitamins (thiamine, riboflavin, niacin).
12.1 New varieties

- No new variety released in 2016

12.2 Varieties under production

12.2.1. Variety: Fetan- (₪₪1)
12.2.1.1 Year of release: 2011
12.2.1.2 Breeder/Maintainer: Zhangjiakou Agricultural Research Academy (China)

12.2.2. Variety: Fetan- (₪₪) (E7(Bagu-214))
12.2.2.1 Year of release: 2011
12.2.2.2 Breeder/Maintainer: Zhangjiakou Agricultural Research Academy (China)
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 2015/16 cropping season, 944,401.34 ha of land is covered by food and malt barley and over 18,567,042.76 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: Illala-01(ERETH07-51)
    Pedigree:(Saesea/C111458)
13.1.1.1. Agronomic and Morphological characteristics

- Adaptation Areas:
  - Low to optimum moisture areas of Eastern, South Eastern weredas of Tigray and similar areas
  - Altitude (m.a.s.l): 1700-2700
  - Rainfall(mm): > 400
  - Seed rate(kg/ha): 100
  - Planting date: Late June to early July
  - Fertilizer Rate (kg/ha):
    - N: 41
    - P$_2$O$_5$: 46
  - Days to heading: 51-61(56)
  - Days to maturity: 95-114(105)
  - Plant height (cm): 55.5-78.1(66.8)
  - Growth habit: Erect type
  - 1000-kernel weight(gm): 42
  - Stand (%): 95
  - Spike orientation: Droopy
  - Lodging tendency: None lodging
  - Water logging tolerance: Medium
  - Seed color: White
  - Row type: Two row
  - Crop pest reaction:*
  - Yield (qt/ha):
    - Research field: 36
    - Farmer’s field: 20-25

13.1.1.3. Breeder/maintainer: Mekelle ARC/TARI

*Moderately resistant to Scald and Net blotch*
13.1.2. Variety Name: Illala-02 (ERETH07-80)
Pedigree: (Saesea/Atsa)

13.1.2.1. Agronomic and morphological characteristics

Adaptation Areas:
Low to optimum moisture areas of Eastern, South Eastern weredas of Tigray and similar areas

- Altitude (m.a.s.l): 1700-2700
- Rainfall (mm): > 500
- Seed rate (kg/ha): 100
- Planting date: Late June to early July
- Fertilizer rate (kg/ha):
  - N: 41
  - P<sub>2</sub>O<sub>5</sub>: 46
- Days to heading: 54-63(59)
- Days to maturity: 97-125(111)
- Plant height (cm): 62.8-80.4(71.6)
- Growth habit: Erect type
- 1000 kernel weight (gm): 45
- Stand (%): 95
- Spike orientation: Droopy
- Lodging tendency: None lodging
- Water logging tolerance: Medium
- Seed color: White
- Row type: Two row
- Crop pest reaction:*
- Yield (qt/ha):
  - Research field: 38
  - Farmer’s field: 22-28

13.1.2.2. Year of release: 2016
13.1.2.3. Breeder/maintainer: Mekelle ARC/TARI

*Moderately resistant to Scald and Net blotch
13.1.3. Variety: **Robera (ACC.218956)**

13.1.3.1. Agronomic and morphological characteristics

- Adaptation areas:
  - Highlands of Bale and similar agro ecology
  - Altitude (m.a.s.l): 2300-2600
  - Rainfall (mm): 750-1000

- Seed rate (kg/ha): 125
- Planting date:
  - Mid June to early September
  - In Bale based on the agro-ecology of the area

- Fertilizer rate (kg/ha):
  - DAP: 100
- Days to heading: 65
- Days to maturity: 117
- Plant height (cm): 97.56
- Growth habit: Erect type
- 1000 kernel weight (gm): 36.23
- Test weight (kg/hl): 60.67
- Stand (%): 82.78
- Ear type: Compacted six row type
- Seed color:
- Crop pest reaction:
- Yield (qt/ha):
  - Research field: 29-42
  - Farmer’s field: 24-31

13.1.3.2. Year of release: 2016

13.1.3.3. Breeder/maintainer: Sinana ARC/OARI/

*Resistant to disease and shoot fly*
13.1.4. Variety: **ADENA (SXH-08-F4-S-143)**

13.1.4.1 Agronomic and morphological characteristics

- **Adaptation Areas:** With medium moisture
  - **Altitude (m.a.s.l):** 2000
  - **Rainfall (mm):** >300
- **Seed rate (kg/ha):** For row planting 100
  - **Broad casting:** 120-125
- **Fertilizer rate (kg/ha):** Late June to early July
  - **P$_2$O$_5$:** 46
  - **N:** 41
- **Days to heading:** 65
- **Days to maturity:** 114
- **Plant height (cm):** 86
- **Ear type:** Six row
- **Growth habit:** Erect
- **1000 seed weight (gm):**
- **HLW:** --
- **Stand (%):** 100
- **Test weight (kg/hl):** 55
- **Seed color:** White
- **Crop pest reaction:** Resistant for scaled & other disease

- **Yield (qt/ha):**
  - **Research field:** 50
  - **Farmers’ field:** 40

13.1.4.2. Year of release:
- **Research field:** 2016
- **Farmers’ field:**

13.1.4.3. Breeder/Maintainer:
- Mekelle University
13.1.5. Variety: **Wolelay (SXH-08-F4-T-10)**

13.1.5.1 Agronomic and morphological characteristics
- **Adaptation Areas:** With medium moisture
  - Altitude (m.a.s.l): 2000
  - Rainfall (mm): >300
- **Seed rate (kg/ha):** Row planting 100
  - Broad casting 120-125
- **Planting date:** Late June to early July
- **Fertilizer rate (kg/ha):**
  - $P_2O_5$: 46
  - $N$: 41
- **Days to heading:** 58
- **Days to maturity:** 95
- **Plant height (cm):** 86
- **Ear type:** Two row
- **Growth habit:** Erect
- **1000 seed weight (gm):** 60
- **HLW:** --
- **Stand (%):** 100
- **Test weight(kg/hl):** 57.1
- **Seed color:** White
- **Crop pest reaction:** Moderately resistant for scaled & other disease
- **Yield (qt/ha):**
  - Research field: 48
  - Farmers’ field: 35

13.1.5.2. Year of Release: 2016
13.1.5.3. Breeder/Maintainer: Mekelle University
13.2 Varieties under production

13.2.1. Variety: Walker
13.2.1.1 Year of Release: 2012
13.2.1.2 Breeder/Maintainer: OARI (Fedis)/MORRELL

13.2.2. Variety: Golden eye
13.2.2.1 Year of Release: 2012
13.2.2.2 Breeder/Maintainer: OARI (Fedis)/MORRELL

13.2.3. Variety: Aquila
13.2.3.1 Year of Release: 2012
13.2.3.2 Breeder/Maintainer: OARI (Fedis)/MORRELL

13.2.4. Variety: Cross # 41/98
13.2.4.1 Year of release: 2012
13.2.4.2 Breeder/Maintainer: HARC/EIAR

13.2.5. Variety: EH 1493/F6.32H.3
13.2.5.1 Year of release: 2012
13.2.5.2 Breeder/Maintainer: HARC/EIAR

13.2.6. Variety: Gobe (CBSS96M00487T-D-1M-1Y-2M-OY)
13.2.6.1 Year of release: 2012
13.2.6.2 Breeder/Maintainer: KARC/EIAR

13.2.7. Variety: Fetina (SXH, T182)
13.2.7.1 Year of release: 2012
13.2.7.2 Breeder/Maintainer: Mekelle University

13.2.8. Variety: Hriti (SXH, S106)
13.2.8.1 Year of release: 2012
13.2.8.2 Breeder/Maintainer: Mekelle University

13.2.9. Variety: Abdane (Aruso/EH956/F2-8H-6-4SNR FBC99G0003-21)
13.2.9.1 Year of Release: 2011
13.2.9.2 Breeder/Maintainer: SARC
<table>
<thead>
<tr>
<th>Variety</th>
<th>Year of Release</th>
<th>Breeder/Maintainer</th>
</tr>
</thead>
<tbody>
<tr>
<td>FELAMIT 2011</td>
<td>Mekelle University</td>
<td></td>
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<tr>
<td>Diribe (7th EMBSN 19/98) 2010</td>
<td>KARC/EIAR</td>
<td></td>
</tr>
<tr>
<td>TILLA (EMBSN 14/98) 2007</td>
<td>ADARC/ARARI</td>
<td></td>
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<tr>
<td>AGEGNEHU (218950-08) 2007</td>
<td>SRARC/ARARI</td>
<td></td>
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<tr>
<td>GUTA (Acc. 3260-18) 2007</td>
<td>SARC/OARI</td>
<td></td>
</tr>
<tr>
<td>GABULA (Acc. 231222/MS) 2007</td>
<td>AwARC/SARI</td>
<td></td>
</tr>
<tr>
<td>Bentu (EMBSN 5th 2/95-3-3-3) 2006</td>
<td>KARC/EIAR</td>
<td></td>
</tr>
<tr>
<td>Desta (EMBSN 5th 46/95-9-9-5) 2006</td>
<td>KARC/EIAR</td>
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</tr>
<tr>
<td>HB-1307 (EH-1700/F7, B1, 63) 2006</td>
<td>HARC/EIAR</td>
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<tr>
<td>SHIRE (3297-06) 2005</td>
<td>KARC/EIAR</td>
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<tr>
<td>Variety</td>
<td>Year of release</td>
<td>Breeder/Maintainer</td>
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<tr>
<td>Biftu (Shasho # 22 GO-1 (Sn 98B))</td>
<td>2005</td>
<td>SARC/ OARI</td>
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<tr>
<td>Dafo (Arosu (42) 4 (Sn 99G))</td>
<td>2005</td>
<td>SARC/ OARI</td>
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<tr>
<td>Yedogit (BI 95 IN 198)</td>
<td>2005</td>
<td>SRARC/ARARI</td>
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<tr>
<td>Dinsho (Wadago-4)</td>
<td>2004</td>
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<tr>
<td>Estayish (218963-4)</td>
<td>2004</td>
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<tr>
<td>Trit (215235-2)</td>
<td>2004</td>
<td>ARARI/SRARC</td>
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<td>Mulu (3371-03)</td>
<td>2004</td>
<td>ADARC/ARARI</td>
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<td>Setegn (3369-17)</td>
<td>2004</td>
<td>ADARC/ARARI</td>
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<tr>
<td>Harbu (Arosu Bale # 10-1)</td>
<td>2004</td>
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<td>Variety:</td>
<td>13.2.29.1 Year of release:</td>
<td>13.2.29.2 Breeder/Maintainer:</td>
</tr>
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<td>--------------------------</td>
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<td>4731-7</td>
<td>2004</td>
<td>DBARC/ARARI</td>
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<th>Variety:</th>
<th>13.2.30.1 Year of release:</th>
<th>13.2.30.2 Breeder/Maintainer:</th>
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<tr>
<td>4748-16</td>
<td>2004</td>
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<th>Variety:</th>
<th>13.2.31.1 Year of release:</th>
<th>13.2.31.2 Breeder/Maintainer:</th>
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<tbody>
<tr>
<td>Shedho (3381-01)</td>
<td>2003</td>
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<th>Variety:</th>
<th>13.2.32.1 Year of release:</th>
<th>13.2.32.2 Breeder/Maintainer:</th>
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<tr>
<td>Dimtu (3369-19)</td>
<td>2001</td>
<td>HARC/EIAR</td>
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<table>
<thead>
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<th>Variety:</th>
<th>13.2.33.1 Year of release:</th>
<th>13.2.33.2 Breeder/Maintainer:</th>
</tr>
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<tbody>
<tr>
<td>Meserach (Kulumsa 1/88/)</td>
<td>1997/98</td>
<td>SHARC/ARARI</td>
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<th>Variety:</th>
<th>13.2.34.1 Year of release:</th>
<th>13.2.34.2 Breeder/Maintainer:</th>
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<tbody>
<tr>
<td>Abay /3357-10/</td>
<td>1997/98</td>
<td>ADARC/ARARI</td>
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<th>Variety:</th>
<th>13.2.35.1 Year of release:</th>
<th>13.2.35.2 Breeder/Maintainer:</th>
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<tr>
<td>Shege</td>
<td>1995</td>
<td>HARC/EIAR</td>
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<tr>
<th>Variety:</th>
<th>13.2.36.1 Year of release:</th>
<th>13.2.36.2 Breeder/Maintainer:</th>
</tr>
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<tbody>
<tr>
<td>HB-42</td>
<td>1984</td>
<td>HARC/EIAR</td>
</tr>
</tbody>
</table>
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

Pedigree PFC9215/3/ZHEDAR#1/SHYRI//OLMO

14.1.1.1 Agronomic and morphological characteristics:

- **Adaptation area**
  - **Altitude (masl)**: >2300
  - **Rainfall (mm)**: 500-700

- **Soil type**: Well drained reddish brown soils

- **Fertilizer rate (Kg/ha)**
  - As per recommendation for the specific growing areas with due consideration to nitrogen fertilization not to increase the grain protein above 11.5%.

- **Seed rate (kg/ha)**: 25
- **Planting date**: Mid June late June
- **Days to heading**: 90
- **Days to maturity**: 146
- **Plant height (cm)**: 95.7
- **Row number**: Two
- **Growth habit**: Erect
- **Stem pigmentation**: Green
- **Glume pigmentation**: Green
- **Anthocyanin colour**: Absent
- **1000 seed weight (g)**: 47.9
- **Test weight (kg hl⁻¹)**: 60.9
- **Percent screening recovery**: >90
  - 
  - (2.8 + 2.5)
- **Grain color**: White
- **Crop pest reaction**: Resistant to scald and net blotch
- Grain and malt quality
  - Protein(%) 10.6
  - Extract value (%) 81
- Yield (qt/ha)
  - Research field 35-60
  - Farmer field ---

14.1.1.2 Year of release: 2016
14.1.1.3 Breeder/Maintainer: Holetta ARC/EIAR
14.1.2. Variety: **HB1964**  
Pedigree RECLA78//SHYRI/GRIT/3/ATAH92/GOB

14.1.2.1 Agronomic and morphological characteristics:

- **Adaptation area**
  - Central highlands of Shoa, Arisi, & Bale similar ecologies in NW and South Ethiopia
  - **Altitude (masl)**: >2300
  - **Rainfall (mm)**: 500-700

- **Soil type**: Well drained reddish brown soils

- **Fertilizer rate (kg/ha)**: As per recommendation for the specific growing areas with due consideration to nitrogen fertilization not to increase the grain protein above 11.5 %

- **Seed rate (Kg/ha)**: 25
- **Planting date**: Mid June late June
- **Days to heading**: 81
- **Days to maturity**: 138
- **Plant height (cm)**: 96.9
- **Row number**: Two
- **Growth habit**: Erect
- **Stem pigmentation**: Purple
- **Glume pigmentation**: Purple
- **Anthocyanin colour**: Medium
- **1000 seed weight (g)**: 55.1
- **Test weight (kg hl⁻¹)**: 66.6
- **Percent screening recovery**: > 90
  
  \[(2.8 + 2.5)\]
- **Grain color**: White
- **Crop pest reaction**: Resistant to scald and Netblotch

- **Grain and malt quality**
  - **Protein (%)**: 11.5
  - **Extract value (%)**: 80
Yield (qt/ha)
  o Research field 33-56
  o Farmers’ field --
14.1.2.2 Year of release: 2016
14.1.2.3 Breeder /Maintainer: Holetta ARC/EIAR
14.1.3. Variety: **Singitan (IBON-MRA)**

14.1.3.1 Agronomic and morphological characteristics:

- Adaptation area: Highlands of Bale similar ecology
  - Altitude (masl): 2200-2600
  - Rainfall (mm): 750-1000

- Seed rate (kg/ha): 100

- Planting date: Mid June to early September in Bale based on the agro-ecology of the area

- Fertilizer rate (kg/ha):
  - DAP: 150

- Days to heading: 65

- Days to maturity: 119

- Plant height (cm): 83.63

- Ear type: Two

- Growth habit: Erect

- 1000 seed weight (g): 47.68

- Test weight (kg hl⁻¹): 67.45

- Crop pest reaction: Resistant to disease and shoot fly

- Grain and malt quality:
  - Protein (%): 11.5
  - Sieve screening ( %) ≥: 98.3
  - Malt Extract (%): 78

- Yield (qt/ha):
  - Research field: 31-41
  - Farmers’ field: 21-35

14.1.3.2 Year of release: 2016

14.1.3.3 Breeder /Maintainer: Sinana ARC//OARI
## 14.2 Varieties under production

<table>
<thead>
<tr>
<th>Variety</th>
<th>Year of Release</th>
<th>Breeder/Maintainer</th>
</tr>
</thead>
<tbody>
<tr>
<td>HKBL 1512-5 (Fanaka)</td>
<td>2015</td>
<td>Diageo/Meta Abo/HARC/EIAR</td>
</tr>
<tr>
<td>Traveler</td>
<td>2013</td>
<td>Heinken/ HARC/EIAR</td>
</tr>
<tr>
<td>Grace</td>
<td>2013</td>
<td>Heinken/ HARC/EIAR</td>
</tr>
<tr>
<td>IBON 174/03</td>
<td>2012</td>
<td>HARC/EIAR</td>
</tr>
<tr>
<td>Sabini</td>
<td>2011</td>
<td>KARC/EIAR</td>
</tr>
<tr>
<td>Bahati</td>
<td>2011</td>
<td>KARC/EIAR</td>
</tr>
<tr>
<td>EH1847/F4.2p.5.2 (BEA/IBON64/91)</td>
<td>2011</td>
<td>HARC/ EIAR</td>
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<tr>
<td>$¢$¢ ህ мероприятии (EH1609-F5-B3-10)</td>
<td>2010</td>
<td>Adet ARC (ARARI)</td>
</tr>
<tr>
<td>Bekoji-1</td>
<td>2010</td>
<td>KARC/EIAR</td>
</tr>
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</table>

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<table>
<thead>
<tr>
<th>Variety</th>
<th>Year of release</th>
<th>Breeder/Maintainer</th>
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<tbody>
<tr>
<td>Kiflu-B (Miscal-21)</td>
<td>2006</td>
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<tr>
<td>Haruna Nijo / specific for northern region</td>
<td>2006</td>
<td>KARC/EIAR</td>
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<tr>
<td>CDC Select</td>
<td>2006</td>
<td>HARC/EIAR</td>
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<tr>
<td>HB - 1533</td>
<td>2004</td>
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</tr>
<tr>
<td>HB-52</td>
<td>2001</td>
<td>HARC/EIAR</td>
</tr>
<tr>
<td>HB-120</td>
<td>1994</td>
<td>HARC/EIAR</td>
</tr>
<tr>
<td>Holker</td>
<td>1979</td>
<td>HARC/EIAR</td>
</tr>
<tr>
<td>Beka</td>
<td>1976</td>
<td>HARC/EIAR</td>
</tr>
</tbody>
</table>
15. Quinoa (*Chenopodium quinoa* Willd)

15.1 New variety

15.1.1 Variety: Yenewa YMP (Titicaca)

15.1.1.1. Agronomic and morphological characteristic

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adaptation area:</td>
<td>Lowland to highland</td>
</tr>
<tr>
<td>o Altitude (m.a.s.l):</td>
<td>1400-2950</td>
</tr>
<tr>
<td>o Rainfall (mm):</td>
<td>--</td>
</tr>
<tr>
<td>Seed rate (kg/ha):</td>
<td>10</td>
</tr>
<tr>
<td>Sowing depth(cm):</td>
<td>1.5-2</td>
</tr>
<tr>
<td>Planting date:</td>
<td>---</td>
</tr>
<tr>
<td>Fertilizer rate (kg/ha):</td>
<td></td>
</tr>
<tr>
<td>o DAP:</td>
<td>100</td>
</tr>
<tr>
<td>o UREA:</td>
<td>50</td>
</tr>
<tr>
<td>Days to flowering:</td>
<td>55</td>
</tr>
<tr>
<td>Days to maturity:</td>
<td>85</td>
</tr>
<tr>
<td>Plant height (cm):</td>
<td>86</td>
</tr>
<tr>
<td>Panicle length(cm):</td>
<td>28.5</td>
</tr>
<tr>
<td>Panicle width(cm):</td>
<td>9.7</td>
</tr>
<tr>
<td>1000 seed weight(gm):</td>
<td>1.6</td>
</tr>
<tr>
<td>See color:</td>
<td>Light brown</td>
</tr>
<tr>
<td>Panicle color at maturity:</td>
<td>Yellow</td>
</tr>
<tr>
<td>Seed head color at maturity:</td>
<td>Orange</td>
</tr>
<tr>
<td>Crop pest reaction:</td>
<td>---</td>
</tr>
<tr>
<td>Yield (qt/ha)</td>
<td></td>
</tr>
<tr>
<td>Research field:</td>
<td>20-26</td>
</tr>
<tr>
<td>Farmers’ field:</td>
<td>--</td>
</tr>
</tbody>
</table>

15.1.1.2 Year of registration: 2016

15.1.1.3 Breeder/Maintainer: Dan church and Melkassa

ARC/EIAR
Group II. Food legume /Pulse/ Crops

1. Faba bean (*Vicia faba*)

Ethiopia is probably one of the primary centers of diversification for faba bean. Although the small-seeded type of the Ethiopian faba bean is not well studied, there are some reports of tremendous diversity in protein content, chocolate spot and leaf rust resistance.

Faba bean is produced in many regions of Ethiopia. The major producing regions are Tigray, Gondar, Gojjam, Wollega, Wollo, Gamo, Gofa and Shoa. In addition, it is grown in pockets in the rest of the country's high land and semi-high land regions with altitudes ranging from 1800-3000 meters above sea level. In 2015/16 cropping season, the total area under cultivation is estimated to be 443,966.09 ha of land from which 8,486,545.69 quintals are produced.

It is widely used for food and has high protein content. Due to its nitrogen fixing capacity it is used in crop rotation with the nationally important cereal crops like wheat, tef and barley.
## 1. 1. New varieties

### 1.1.1 Variety: Numan (*ftype*) EH 06007-2

### 1.1.1.2 Agronomic and morphological characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>For potential (wide adopted) areas such as Kulumsa, Bekoji, Kofele, Adadi, holetta, Sinana, Adet, Shanbu and similar agroecologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adaptation Area:</td>
<td>production</td>
</tr>
<tr>
<td>Altitude (m.a.s.l):</td>
<td>1800 - 3000</td>
</tr>
<tr>
<td>Rain fall (mm):</td>
<td>700 - 1100</td>
</tr>
<tr>
<td>Seed rate (kg/ha):</td>
<td>275</td>
</tr>
<tr>
<td>Planting date :</td>
<td>Mid June to early July</td>
</tr>
<tr>
<td>Fertilizer rate (kg/ha):</td>
<td></td>
</tr>
<tr>
<td>P&lt;sub&gt;2&lt;/sub&gt;O&lt;sub&gt;5&lt;/sub&gt;:</td>
<td>46</td>
</tr>
<tr>
<td>N:</td>
<td>18</td>
</tr>
<tr>
<td>Days to flowering:</td>
<td>50-60</td>
</tr>
<tr>
<td>Days to maturity:</td>
<td>137-148</td>
</tr>
<tr>
<td>Plant height (cm):</td>
<td>128-137</td>
</tr>
<tr>
<td>Growth habit :</td>
<td>Indeterminate</td>
</tr>
<tr>
<td>1000 seed weight (gm):</td>
<td>1069</td>
</tr>
<tr>
<td>Seed coat color:</td>
<td>Light green</td>
</tr>
<tr>
<td>Cotyledon color:</td>
<td>Ceramic</td>
</tr>
<tr>
<td>Flower Color:</td>
<td>White with black spot</td>
</tr>
<tr>
<td>Crop Pest Reaction: *</td>
<td></td>
</tr>
<tr>
<td>Crude protein content (%):</td>
<td>26.5</td>
</tr>
<tr>
<td>Yield (qt/ha):</td>
<td></td>
</tr>
<tr>
<td>Research Field:</td>
<td>36.51</td>
</tr>
<tr>
<td>Farmers’ Field:</td>
<td>22-38</td>
</tr>
</tbody>
</table>

### 1.1.1.2 Year of Release: 2016

### 1.1.1.3 Breeder/Maintainer: KARC/EIAR

*Moderately resistant to Chocolate spot and Rust*
1.2 Varieties under production

1.2.1 Variety: ASHEBEKA (λ anál†) (EH01075-4)
1.2.1.1 Year of Release: 2015
1.2.1.2 Breeder/Maintainer: KARC/EIAR

1.2.2 Variety: HASHENGE (ILB 4358)
1.2.2.1 Year of Release: 2015
1.2.2.2 Breeder/Maintainer: Alamata ARC/TARI

1.2.3 Variety: DIDE'A (EH01048-1)
1.2.3.1 Year of Release: 2014
1.2.3.2 Breeder/Maintainer: KARC/EIAR

1.2.4 Variety: GORA (EK 01024-1-2)
1.2.4.1 Year of Release: 2013
1.2.4.1 Breeder/Maintainer: KARC/EIAR

1.2.5 Variety: EH00099-1 (Bobicho-05)
1.2.5.1 Year of Release: 2013
1.2.5.2 Breeder/Maintainer: Hawassa ARC

1.2.6 Variety: Mosisaa (: EH-99047-1)
1.2.6.1 Year of Release: 2013
1.2.6.2 Breeder/maintainer: Sinana ARC (OARI)

1.2.7 Variety: Bule-04 (EH00102-5)
1.2.7.1 Year of Release: 2012
1.2.7.2 Breeder/maintainer: HWARC/SARI

1.2.8 Variety: TUMSA (EH99051-3)
1.2.8.1 Year of Release: 2010
1.2.8.2 Breeder/maintainer: HARC/EIAR

1.2.9 Variety: Hachalu (EH00102-4-1)
1.2.9.1 Year of Release: 2010
1.2.9.2 Breeder/maintainer: HARC/EIAR
1.2.10 Variety: Angacha-l (TFB-097)
Year of release: 2009
Breeder/maintainer: Hawassa research center

1.2.11 Variety: DOSHA (COLL 155/00-3)
Year of release: 2009
Breeder/maintainer: HARC/EIAR

1.2.12 Variety: Gachena (ETH91001-13-2)
Year of release: 2008
Breeder/maintainer: HU (Haramaya University)

1.2.13 Variety: Walki (EH96049-2)
Year of release: 2008
Breeder/maintainer: HARC/EIAR

1.2.14 Variety: OBSE (EH95073-1)
Year of release: 2007
Breeder/maintainer: HARC/EIAR

1.2.15 Variety: Moti (EH 95078-6)
Year of release: 2006
Breeder/maintainer: HARC/EIAR

1.2.16 Variety: Gabelcho (EH 96009-1)
Year of release: 2006
Breeder/maintainer: HARC/EIAR

1.2.17 Variety: Adet-Hanna (PGRC/E 25041-2-2)
Year of release: 2005
Breeder/maintainer: ADARC/ARARI

1.2.18 Variety: Selale (Selale Kasim 91-13)
Year of release: 2002
Breeder/maintainer: HARC/EIAR

1.2.19 Variety: Wayu (Wayu 89-5)
Year of release: 2002
Breeder/maintainer: HARC/EIAR
<table>
<thead>
<tr>
<th>Variety Code</th>
<th>Variety:</th>
<th>Year of release:</th>
<th>Breeder/Maintainer:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2.20</td>
<td>Degaga (R-878-3)</td>
<td>2002</td>
<td>HARC/EIAR</td>
</tr>
<tr>
<td>1.2.21</td>
<td>Dagm (Grarjarso 89-8)</td>
<td>2002</td>
<td>SHARC/ARARI</td>
</tr>
<tr>
<td>1.2.22</td>
<td>Lalo (Selale kasim 89-4)</td>
<td>2002</td>
<td>SHAR/ARARI</td>
</tr>
<tr>
<td>1.2.23</td>
<td>Holetta (BP 1802-1-2)</td>
<td>2001</td>
<td>HAR/EIAR</td>
</tr>
<tr>
<td>1.2.24</td>
<td>Shallo (EH011-22-1)</td>
<td>1999/00</td>
<td>SARC/OARI</td>
</tr>
<tr>
<td>1.2.25</td>
<td>Tesfa (75 TA 2626-1-2-1)</td>
<td>1995/96</td>
<td>HARC/EIAR</td>
</tr>
<tr>
<td>1.2.26</td>
<td>Messay</td>
<td>1995/96</td>
<td>HARC/EIAR</td>
</tr>
<tr>
<td>1.2.27</td>
<td>Bulga 70</td>
<td>1994/95</td>
<td>HARC/EIAR</td>
</tr>
<tr>
<td>1.2.28</td>
<td>Kassa</td>
<td>1980</td>
<td>HARC/EIAR</td>
</tr>
<tr>
<td>1.2.29</td>
<td>KUSE /2-27-33/</td>
<td>1979</td>
<td>HARC/EIAR</td>
</tr>
</tbody>
</table>
1.2.30  Variety:  NC-58
1.2.30.1 Year of release:  1978
1.2.30.2 Breeder/Maintainer:  HARC/EIAR

1.2.31  Variety:  CS-20-DK
1.2.31.1 Year of release:  1977
1.2.31.2 Breeder/Maintainer:  HARC/ EIAR
2. Field pea (*Pisum sativum*)

Field pea, one of the oldest crops in the country, has a unique subspecies developed in Ethiopia called *P. sativum subsp. abyssinicum*. The existing field pea germplasm in the country has a phenotypic diversity and tolerance/resistance to diseases. Field pea is highly produced in the North, South, West and Central parts of Ethiopia. In addition, it is grown in pockets in the rest of the country's high land and semi highland regions with altitudes ranging from 1800-3000 meters above sea level.

It is widely used for food because of its highest protein contents. In Ethiopia, the annual consumption of pea seeds per person is estimated about 6 - 7 kg. Main dishes include 'shiro wot' (split pea seeds ground and made into stew) and 'kik wot' (split pea seeds boiled and made into stew). Snacks include 'eshet' (fresh green field pea seeds either eaten raw or roasted), 'nifro' (boiled dry or fresh green pea seeds) and 'endushdush' (seeds soaked first and then roasted). In local markets white and cream colored seeds are preferred for 'kik' making, and grey colored seeds for 'shiro' making.

In Ethiopia in the 2015/16 cropping season 221,415.67 ha of land was covered with field pea and the annual production was estimated at about 3,233,901.34 quintals.
2.1 New varieties

- No new variety released in 2016

2.2 Varieties under production

2.2.1 Variety: BURSA (0·C"^4") (EH05027-2)
2.2.1.2 Year of release: 2015
2.2.1.3 Breeder/Maintainer: KARC/EIAR

2.2.2 Variety: BILALLO (EH 02-002-3)
2.2.2.1 Year of release: 2012
2.2.2.2 Breeder/maintainer: KARC/EIAR

2.2.3 Variety: Haranna (Cool 38/00-4)
2.2.3.1 Year of release: 2012
2.2.3.2 Breeder/maintainer: SARC/OARI

2.2.4 Variety: Teshale (EH99005-7)
2.2.4.1 Year of release: 2012
2.2.4.2 Breeder/maintainer: AARC/EIAR

2.2.5 Variety: GEDO-1 (EH99002-1)
2.2.5.1 Year of release: 2010
2.2.5.2 Breeder/maintainer: BARC/OARI

2.2.6 Variety: LATU A* (EH 02-036-2)
2.2.6.1 Year of release: 2010
2.2.6.2 Breeder/maintainer: KARC/EIAR

2.2.7 Variety: BURKITU (EH99004-2)
2.2.7.1 Year of release: 2009
2.2.7.2 Breeder/maintainer: HARC/EIAR

2.2.8 Variety: Senk (GFP 233)
2.2.8.1 Year of release: 2009
2.2.8.2 Breeder/maintainer: SRARC/ARARI
<table>
<thead>
<tr>
<th>Variety</th>
<th>Year of release</th>
<th>Breeder/maintainer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agrit (IFP 308-4)</td>
<td>2009</td>
<td>SRARC/ARARI</td>
</tr>
<tr>
<td>Meti (NI-21)</td>
<td>2008</td>
<td>HU (Haramaya University)</td>
</tr>
<tr>
<td>Ambericho (IG-51664)</td>
<td>2008</td>
<td>SRARI/ArARC</td>
</tr>
<tr>
<td>URJI (Acc. 32615-1)</td>
<td>2007</td>
<td>SARC/OARI</td>
</tr>
<tr>
<td>Megeri (Helina)</td>
<td>2006</td>
<td>HARC/EIAR</td>
</tr>
<tr>
<td>Gume (EH96026-1-4)</td>
<td>2006</td>
<td>HARC/EIAR</td>
</tr>
<tr>
<td>Bamo (Flagman)</td>
<td>2005</td>
<td>BARC/OARI</td>
</tr>
<tr>
<td>Bariso (EH 90011-1-2)</td>
<td>2005</td>
<td>BARC/OARI</td>
</tr>
<tr>
<td>Arjo-I(EH 90025-1)</td>
<td>2005</td>
<td>BARC/OARI</td>
</tr>
<tr>
<td>Weyitu (EH 90-006-2)</td>
<td>1999/00</td>
<td>SARC/OARI</td>
</tr>
</tbody>
</table>
2.2.19 Variety: Tullu-dimtu
2.2.19.1 Year of release: 1999/00
2.2.19.2 Breeder/Maintainer: SARC/OARI

2.2.20 Variety: Wolmera
2.2.20.1 Year of release: 1999/00
2.2.20.2 Breeder/Maintainer: HARC/EIAR

2.2.21 Variety: Hursa (KFP-103/B/)
2.2.21.1 Year of release: 1997
2.2.21.2 Breeder/Maintainer: SARC/OARI

2.2.22 Variety: Adet 1
2.2.22.1 Year of release: 1997
2.2.22.2 Breeder/Maintainer: ADARC/ARARI

2.2.23 Variety: Sefinesh
2.2.23.1 Year of release: 1997
2.2.23.2 Breeder/Maintainer: ADARC/ARARI

2.2.24 Variety: Holetta
2.2.24.1 Year of release: 1995/96
2.2.24.2 Breeder/Maintainer: HARC/EIAR

2.2.25 Variety: Adi
2.2.25.1 Year of release: 1995/96
2.2.25.2 Breeder/Maintainer: HARC/EIAR

2.2.26 Variety: Hassabe
2.2.26.1 Year of release: 1995
2.2.26.2 Breeder/Maintainer: HARC/EIAR

2.2.27 Variety: Milky
2.2.27.1 Year of release: 1995/96
2.2.27.2 Breeder/Maintainer: HARC/EIAR

2.2.28 Variety: Markos
2.2.28.1 Year of release: 1994/95
2.2.28.2 Breeder/Maintainer: HARC/EIAR
<table>
<thead>
<tr>
<th>Variety</th>
<th>Year of release</th>
<th>Breeder/Maintainer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dadimos</td>
<td>1994/95</td>
<td>SARC/OARI</td>
</tr>
<tr>
<td>Tulu (PGRC/E32 21-181)</td>
<td>1994/95</td>
<td>SARC/OARI</td>
</tr>
<tr>
<td>Tegegnech</td>
<td>1993/94</td>
<td>HARC/ EIAR</td>
</tr>
<tr>
<td>Ne-95 Haik</td>
<td>1981</td>
<td>HARC/ EIAR</td>
</tr>
<tr>
<td>G22763-2c</td>
<td>1981</td>
<td>HARC/ EIAR</td>
</tr>
<tr>
<td>Mohanderfer</td>
<td>1979</td>
<td>HARC/ EIAR</td>
</tr>
<tr>
<td>FP DZ</td>
<td>1979</td>
<td>HARC/ EIAR</td>
</tr>
</tbody>
</table>
3. Dekoko (*Pisum sativum* var. *abyssinicum*)

Dekoko is a pulse crop cultivated and developed in Ethiopia. The crop is known to grow in few pocket areas especially in South Tigray and North Wello regions. Dekoko grows from mid-altitude areas to highland areas. Although it is a cool season crop like field pea, the crop has an ability to grow in the low land areas such as Chercher where the elevation is 1720 m. a. s. l. In higher areas, however, Dekoko needs late sowing (from mid July to early August) and a soil free of water logging condition. As Dekoko is a crop that matures within three months of planting, it is usually weeded once or twice before it produces tendrils and flowers but latter stages it is difficult to differentiate the root with weeds and usually uprooted with weed plants. The crop grows best on different types of soils with well-drained.

Dekoko usually needs less amount of water and can be fruit full by only two or three rain showers. Hence, the acceptance of the crop by farming communities is extremely high due to earliness and delicious for food. The communities in South Tigray call the crop as the derowot/chicken stew/ of the poor to appreciate its taste and food preference. The crop is the most popular one and the local price for Dekoko is usually more than twice the price for faba-bean and field pea. However the crop has been neglected so far due to its localized cultivation nature.
3.1 New variety

- No new variety released in 2016

3.2 Varieties under production

3.2.1. Variety: RAYA-1 (TK-006/08 Al)
3.2.1.1. Year of release: 2015
3.2.1.2. Breeder/Maintainer: Alamata ARC/TARI

3.2.2. Variety: RAYA-2 (TA-015/08 Sr)
3.2.2.1. Year of release: 2015
3.2.2.2. 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 2015/16 cropping season, 258,486.29 hectares of land was covered with chickpea and the production was estimated at about 4,726,113.88 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: (Dimtu) DZ-2012 CK-031/ICCV-10107

4a.1.1.1 Agronomic and morphological characteristics

- Adaptation areas:
  - Altitude (m.a.s.l): 1800-2800
  - Rain fall (mm): 700-1200
- Seed rate (kg/ha): 120 – 140
- Plating date: Mid Augst
- Days to flowering: 47
- Days to maturity: 121.67
- Plant height (cm): 45.52
- Growth habit: Semi-erect
- 100 seed weight (g): 31.81
- Seed color: Golden brown
- Flower color: Purple blue
- Crop pest reaction: Better wilt reaction
- Yield (qt/ha)
  - Research field: 25-47
  - Farmers’ field: 23-36

4a.1.1.2 Year of release

2016

4a.1.1.3 Breeder/ Maintainer:

DZARC/EIAR
4a.2 Varieties under production

4a.2.1 Variety:
4a.2.1.1 Year of release:
4a.2.1.2 Breeder/Maintainer:

4a.2.2 Variety:
4a.2.2.1 Year of release:
4a.2.2.2 Breeder/Maintainer:

4a.2.3 Variety:
4a.2.3.1 Year of release:
4a.2.3.2 Breeder/Maintainer:

4a.2.4 Variety:
4a.2.4.1 Year of release:
4a.2.4.2 Breeder/Maintainer:

4a.2.5 Variety:
4a.2.5.1 Year of release:
4a.2.5.2 Breeder/Maintainer:

4a.2.6 Variety:
4a.2.6.1 Year of release:
4a.2.6.2 Breeder/Maintainer:

4a.2.7 Variety:
4a.2.7.1 Year of release:
4a.2.7.2 Breeder/Maintainer:

4a.2.8 Variety:
4a.2.8.1 Year of Release:
4a.2.8.2 Breeder/ Maintainer:

Teketay (ICCV-00104)
2013
D/zeit ARC

Dalota
(ICCX-940002-F5-242P-1-1-1)
2013
D/zeit ARC/EIAR

Minjar (ICCV-03107)
2010
EIAR/ DZARC

Naatolii (ICCX-910112-6)
2007
DZARC/EIAR

Mastewal (ICCV-92006)
2006
DBARC/ARARI

Fetenech (ICCV-92069)
2006
SRARC/ARARI

Kutaye (ICCV-92033)
2005
SRARC/ARARI

Akaki (DZ-10-9-2)
1995
DZARC/ EIAR
<table>
<thead>
<tr>
<th>Variety</th>
<th>Year of Release</th>
<th>Breeder/ Maintainer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worku (DZ-10-16.2)</td>
<td>1994</td>
<td>DZARC/EIAR</td>
</tr>
<tr>
<td>Mariye</td>
<td>1985</td>
<td>DZARC/EIAR</td>
</tr>
<tr>
<td>DZ-10-4</td>
<td>1974</td>
<td>DZARC/EIAR</td>
</tr>
<tr>
<td>DZ-10-11</td>
<td>1974</td>
<td>DZARC/EIAR</td>
</tr>
</tbody>
</table>
4b Kabuli types

4.b.1 New varieties

4b.1.1 Variety:  (Hora) DZ-2012 CK-001/FLIP 04-9C
4b.1.1.1 Agronomic and morphological characteristics

- Adaptation areas:
  - Altitude (m.a.s.l): 1800-2600
  - Rain fall (mm): 700-1200
- Seed rate (kg/ha): 120 – 140
- Plating date: Mid August
- Days to flowering: 60.5
- Days to maturity: 133
- Plant height (cm): 48.05
- Growth habit: Semi-erect
- 100 seed weight (g): 31.36
- Seed color: Creamy
- Flower color: White
- Crop pest reaction: Better wilt reaction
- Yield (q/ha):
  - Research field: 20 - 42
  - Farmers’ field: 15 - 18

4b.1.1.2 Year of release: 2016

4b.1.1.3 Breeder/ Maintainer: DZARC/EIAR
4b.2.1 Variety: **(Dhera) DZ-2012 CK-009/FLIP 0163**

4b.2.1.1 Agronomic and morphological characteristics

- **Adaptation areas:**
  - Altitude (m.a.s.l): 1800-2800
  - Rain fall (mm): 700-1200
- **Seed rate (kg/ha):** 120 – 140
- **Plating date:** Mid Augst
- **Days to flowering:** 61
- **Days to maturity:** 134
- **Plant height (cm):** 61
- **Growth habit:** Semi-erect
- **100 seed weight (g):** 33.24
- **Seed color:** Creamy
- **Flower color:** White
- **Crop pest reaction:** Better wilt reaction
- **Yield (q/ha):**
  - Research field 17-39
  - Farmers’ field 13-14

4b.2.1.2 Year of release: 2016

4b.2.1.3 Breeder/ Maintainer: DZARC/EIAR
4b. 2 Varieties under production

4b.2.1 Variety:
4b.2.1.1 Year of registration
4b.2.1.2 Breeder/ Maintainer

4b.2.2 Variety:
4b.2.2.1 Year of registration
4b.2.2.2 Breeder/ Maintainer

4b.2.3 Variety
4b.2.3.1 Year of registration:
4b.2.3.2 Breeder/ Maintainer

4b.2.4 Variety
4b.2.4.1 Year of registration
4b.2.4.2 Breeder/ Maintainer

4b.2.5 Variety:
4b.2.5.1 Year of release:
4b.2.5.2 Breeder/Maintainer:

4b.2.6 Variety:
4b.2.6.1 Year of release:
4b.2.6.2 Breeder/Maintainer:

4b.2.7 Variety:
4b.2.7.1 Year of release:
4b.2.7.2 Breeder/Maintainer:

4b.2.8 Variety:
4b.2.8.1 Year of release:
4b.2.8.2 Breeder/Maintainer:

4b.2.9 Variety:
4b.2.9.1 Year of release:
4b.2.9.2 Breeder/Maintainer:

Kobo (ICCV-01308)
2012
Sirinka ARC/ARARI

Akuri (ICCV-03402)
2011
SARC/ARARI

KASECH (FLIP-95-31C)
2011
SARC/ARARI

Monino (ACOS DUIBIE)
2009
ACOS and EIAR/D/DZARC

Yelbey (ICCV-14808)
2006
SRARC/ARARI

Teji (FLIP-97-266c)
2005
DZARC/EIAR

EJERI (FLIP-97-263c)
2005
DZARC/EIAR

Habru (FLIP 88-42C)
2004
DZARC/EIAR

Chefe (ICCV-92318)
2004
DZARC/EIAR
<table>
<thead>
<tr>
<th>Code</th>
<th>Variety</th>
<th>Year of Release</th>
<th>Breeder/ Maintainer</th>
</tr>
</thead>
<tbody>
<tr>
<td>4b.2.10.</td>
<td>Shasho (ICCV-93512)</td>
<td>1999/00</td>
<td>DZARC/EIAR</td>
</tr>
<tr>
<td>4b.2.10.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4b.2.10.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4b.2.11.</td>
<td>Arerti (FLIP 89-84C)</td>
<td>1999/00</td>
<td>DZARC/EIAR</td>
</tr>
<tr>
<td>4b.2.11.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4b.2.11.2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5. Cowpea (*Vigna unguiculata*.)

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

- No new variety released in 2016

5.2 Varieties under production

<table>
<thead>
<tr>
<th>Variety</th>
<th>Year of release</th>
<th>Breeder/ Maintainer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keti (IT99K-1122)</td>
<td>2012</td>
<td>MARC /EIAR</td>
</tr>
<tr>
<td>82D-889</td>
<td>2008</td>
<td>EIAR/MARC</td>
</tr>
<tr>
<td>Bole (85D-3517-2)</td>
<td>2006</td>
<td>MARC/EIAR</td>
</tr>
<tr>
<td>IT (98k-131-2)</td>
<td>2006</td>
<td>AwARC/SRARI</td>
</tr>
<tr>
<td>Asrat (ITS 92KD-279-3)</td>
<td>2001</td>
<td>SRARC/ARARI</td>
</tr>
<tr>
<td>Bekur (838 689 4)</td>
<td>2001</td>
<td>SRARC/ARARI</td>
</tr>
</tbody>
</table>
6. Lentil (*Lens culinaris*)

Lentil is one of the highland crops widely grown in Ethiopia. It is largely produced in the highland & semi-highland regions of the country mainly on clay soil. During 2015/16 cropping season, 100,692.74 hectares of land is covered with Lentil and about 1,339,336.41 quintals were produced. This crop is widely used for food because of its high protein content.

Apart from this, due to its ability to fix nitrogen, it is used in crop rotation with the nationally important crops. Although the above-mentioned realities indicate the national importance of lentil, the national yield is only about 8.35 quintals per hectare.

The Lentil is a much-branched annual, up to 18 inches high, with slender, angular stems. Its leaves are pinnate, with 4-7 pairs of more or less oval leaflets, about ½ inches long. The small white flowers are papilionaceous with a large upper petal, two lateral petals, and two narrow petals between these.
6.1. New varieties

- No new variety released in 2016

6.2 Varieties under production

6.2.1 Variety: Jiru (R-186 X FLIP 86-38L-2)
   6.2.1.1. Year of release: 2015
   6.2.1.2. Breeder/Maintainer: Debre Birhan ARC/ARARI

6.2.2. Variety: Dembi (EI – 142 x r-186-3)
   6.2.2.1. Year of release: 2013
   6.2.2.2. Breeder/Maintainer: D/Ziet ARC/EIAR

6.2.3 Variety: Derso (Alemaya FLIP-88-411-02-AK-14)
   6.2.3.1 Year of release: 2012
   6.2.3.2 Breeder/Maintainer: EIAR/DZARC

6.2.4 Variety: Teshale (FLIP 96-46L)
   6.2.4.1 Year of release: 2004
   6.2.4.2 Breeder/Maintainer: DZARC/ EIAR

6.2.5 Variety: Alem Tena (FLIP 96-49L)
   6.2.5.1 Year of release: 2004
   6.2.5.2 Breeder/Maintainer: DZARC/ EIAR

6.2.6 Variety: Assano (Flip 88-46)
   6.2.6.1 Year of release: 2003
   6.2.6.2 Breeder/Maintainer: SARC/ OARI

6.2.7 Variety: Alemaya 98(Flip 89-63L)
   6.2.7.1 Year of release: 1997/98
   6.2.7.2 Breeder/Maintainer: DZARC/EIAR

6.2.8 Variety: Gudo (Flip 84-78L)
   6.2.8.1 Year of Release: 1995
   6.2.8.2 Breeder/ Maintainer: DZARC/ EIAR
<table>
<thead>
<tr>
<th>Variety</th>
<th>Year of Release</th>
<th>Breeder/Maintainer</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADA (Flip- 86-14L)</td>
<td>1995</td>
<td>DZARC/ EIAR</td>
</tr>
<tr>
<td>Chalew (NEL 358)</td>
<td>1984</td>
<td>DZARC/ EIAR</td>
</tr>
<tr>
<td>Checole (ENAL-2704)</td>
<td>1984</td>
<td>DZARC/ EIAR</td>
</tr>
</tbody>
</table>
7. Haricot bean (*Phaseolus vulgaris*)

Haricot bean also known as common bean is an herbaceous annual plant domesticated independently in ancient Mesoamerica and the Andes, and now grown worldwide for its edible bean, popular both dry and as a green bean. The common bean is a highly variable species with a long history. Bush varieties form erect bushes 20–60 cm tall, while pole or running varieties form vines 2–3 m long. All varieties bear alternate, green or purple leaves, divided into three oval, smooth-edged leaflets, each 6–15 cm long and 3–11 cm wide. The white, pink, or purple flowers are about 1 cm long, and give way to pods 8–20 cm long, 1–1.5 cm wide, green, yellow, black or purple in color, each containing 4–6 beans. The beans are smooth, plump, and kidney-shaped, up to 1.5 cm long, range widely in color, and are often mottled in two or more colors.

Haricot bean is one of the lowland pulse crops produced in the hot humid regions of Ethiopia. It has been known as an export crop for a long period of time contributing to the foreign exchange earnings of the country. It is also grown as a food crop consumed in traditional dishes. Dry beans are mostly prepared as 'nifro' (boiled grain mixed with sorghum or maize), can be used for preparing 'wot' (local stew) and also the boiled split beans are eaten mixed with 'kocho' in south Ethiopia. Fresh beans (mature, whole non-dried grain) are popular for their taste and crack ability. The protein content is (22%) and its amino acid composition is high in lysine, which complements cereals and other staple foods in the diet. The current national average yield of haricot bean is 14 quintals per hectare. In the 2015/16 cropping season, the total area and total production was estimated to be 356,299.89 hectares and 5,402,389.37 quintals respectively.
7.1 New varieties

- No new variety released in 2016

7.2 Varieties under production

<table>
<thead>
<tr>
<th>Variety</th>
<th>Year of release</th>
<th>Breeder/Maintainer</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAB 736 (Ado)</td>
<td>2015</td>
<td>MARC /EIAR</td>
</tr>
<tr>
<td>SAB 632 (Tafach)</td>
<td>2015</td>
<td>MARC /EIAR</td>
</tr>
<tr>
<td>SER 119</td>
<td>2014</td>
<td>EIAR/MARC</td>
</tr>
<tr>
<td>SER 125</td>
<td>2014</td>
<td>EIAR/MARC</td>
</tr>
<tr>
<td>Remeda (AFR-702-1)</td>
<td>2014</td>
<td>HwRC/ SARI</td>
</tr>
<tr>
<td>Tatu (ETAW-01-L-7-6K)</td>
<td>2014</td>
<td>HwRC/ SARI</td>
</tr>
<tr>
<td>Waju (ETAW-01-L-1-7A)</td>
<td>2014</td>
<td>HwRC/ SARI</td>
</tr>
<tr>
<td>Ada (KAT B1)</td>
<td>2013</td>
<td>Melkasa ARC</td>
</tr>
</tbody>
</table>

MoANR Plant Variety Release, Protection and Seed Quality Control Directorate
7.2.9 Variety: Dandesu (KAT B69)
7.2.9.1 Year of release: 2013
7.2.9.2 Breeder/Maintainer: Melkasa ARC

7.2.10 Variety: Awash-2
7.2.10.1 Year of release: 2013
7.2.10.2 Breeder/Maintainer: Melkasa ARC

7.2.11 Variety: Fedis (ECAB0060)
7.2.11.1 Year of release: 2012
7.2.11.2 Breeder/maintainer: Haramaya University

7.2.12 Variety: Hirna (ECAB 0203)
7.2.12.1 Year of release: 2012
7.2.12.2 Breeder/maintainer: Haramaya University

7.2.13 Variety: Babile (ECAB 0247)
7.2.13.1 Year of release: 2012
7.2.13.2 Breeder/maintainer: Haramaya University

7.2.14 Variety: Hundane (K-132)
7.2.14.1 Year of release: 2012
7.2.14.2 Breeder/maintainer: Haramaya University

7.2.15 Variety: Tinike (RXR-10)
7.2.15.1 Year of release: 2012
7.2.15.2 Breeder/maintainer: Haramaya University

7.2.16 Variety: Dandesu (BRC-Acc.No-4)
7.2.16.1 Year of release: 2012
7.2.16.2 Breeder/maintainer: BARC/EIAR

7.2.17 Variety: SARI-1(CAW-02-04-11-4-1)
7.2.17.1 Year of release: 2011
7.2.17.2 Breeder/maintainer: AwA RC
<table>
<thead>
<tr>
<th>Variety</th>
<th>Year of release</th>
<th>Breeder/maintainer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morka (ECAB-0056)</td>
<td>2011</td>
<td>MARC/ EIAR</td>
</tr>
<tr>
<td>GLP-2</td>
<td>2011</td>
<td>MARC/ EIAR</td>
</tr>
<tr>
<td>LEHODE (DA-NAZCR-02-12)</td>
<td>2010</td>
<td>SARC/ARARI</td>
</tr>
<tr>
<td>Loko (AFR-716)</td>
<td>2009</td>
<td>BARC/OARI</td>
</tr>
<tr>
<td>A197 X OM NAZ Cr 02-11</td>
<td>2008</td>
<td>EIAR/MARC</td>
</tr>
<tr>
<td>Deme (SUG-131)</td>
<td>2008</td>
<td>EIAR/MARC</td>
</tr>
<tr>
<td>Kufanzik (MX-8754-9M)</td>
<td>2008</td>
<td>Haramaya University (HU)</td>
</tr>
<tr>
<td>Dursitu (DOR- 811)</td>
<td>2008</td>
<td>Haramaya University (HU)</td>
</tr>
<tr>
<td>SNNPR-120 (Hawassa Dume)</td>
<td>2008</td>
<td>SARIAWRC</td>
</tr>
<tr>
<td>CRANSCOPE (Red speckled)</td>
<td>2007</td>
<td>MARC/EIAR</td>
</tr>
</tbody>
</table>
7.2.28 Variety: MONTCALM/ACOS RED (Red kidney)
7.2.28.1 Year of registration: 2007
7.2.28.2 Breeder/Maintainer: MARC/EIAR

7.2.29 Variety: GABISA (VAX-2)
7.2.29.1 Year of registration: 2007
7.2.29.2 Breeder/Maintainer: BARC/OARI

7.2.30 Variety: Chercher (STTT-165-96) - canning type
7.2.30.1 Year of release: 2006
7.2.30.2 Breeder/Maintainer: HU

7.2.31 Variety: Haramaya (G-843) - Food type
7.2.31.1 Year of release: 2006
7.2.31.2 Breeder/Maintainer: HU

7.2.32 Variety: Chore (STTT-165-92) - canning type
7.2.32.1 Year of release: 2006
7.2.32.2 Breeder/Maintainer: MARC/EIAR

7.2.33 Variety: Bobe-red (XAN-310) - Food type
7.2.33.1 Year of release: 2006
7.2.33.2 Breeder/Maintainer: MARC/EIAR

7.2.34 Variety: Melkadima (RAB-484) - Food type
7.2.34.1 Year of release: 2006
7.2.34.2 Breeder/Maintainer: MARC/EIAR

7.2.35 Variety: Batagonia (RWV-482) - Food type
7.2.35.1 Year of release: 2005
7.2.35.2 Breeder/Maintainer: AwARC/ SRARI
<table>
<thead>
<tr>
<th>Variety</th>
<th>Year of release</th>
<th>Breeder/Maintainer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anger (EMP-376)</td>
<td>2005</td>
<td>BARC/OARI</td>
</tr>
<tr>
<td>Tibe (812-BRC-28)</td>
<td>2004</td>
<td>BARC/OARI</td>
</tr>
<tr>
<td>Wedo (MAM-41)</td>
<td>2003</td>
<td>SRARC/ARARI</td>
</tr>
<tr>
<td>Ibbado (AFR-722)</td>
<td>2003</td>
<td>ARARC/SRARI</td>
</tr>
<tr>
<td>Omo-95 (RWR-719)</td>
<td>2003</td>
<td>ARARC/SRARI</td>
</tr>
<tr>
<td>Nasir (Dicta-105)</td>
<td>2003</td>
<td>MARC/EIAR</td>
</tr>
<tr>
<td>Dimtu (DOR-554)</td>
<td>2003</td>
<td>MARC/EIAR</td>
</tr>
<tr>
<td>Tabor (A-788)</td>
<td>1998/99</td>
<td>ARARC/SRARI</td>
</tr>
<tr>
<td>Variety</td>
<td>Year of release</td>
<td>Breeder/Maintainer</td>
</tr>
<tr>
<td>---------</td>
<td>----------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Zebra 98(GX-1175-3)</td>
<td>1998/99</td>
<td>MARC/EIAR</td>
</tr>
<tr>
<td>Gobe Rasha-l(ICA-15541)</td>
<td>1998/99</td>
<td>MARC/EIAR</td>
</tr>
<tr>
<td>Beshbesh/Melk 97 (Originally ‘Cross 5’)</td>
<td>1997/98</td>
<td>MARC/EIAR</td>
</tr>
<tr>
<td>Melke/Areka 97 (Originally ‘cross 14’)-</td>
<td>1997/98</td>
<td>MARC/EIAR</td>
</tr>
<tr>
<td>Ayenew-</td>
<td>1997</td>
<td>HU</td>
</tr>
<tr>
<td>Gofta-</td>
<td>1997</td>
<td>HU</td>
</tr>
<tr>
<td>Atndaba /A-262/-</td>
<td>1997</td>
<td>MARC/EIAR</td>
</tr>
<tr>
<td>Red Wolaita-</td>
<td>1974</td>
<td>MARC/EIAR</td>
</tr>
</tbody>
</table>
7.2.52 Variety: AR04GY - Canning type
7.2.52.1 Year of release: 2005
7.2.52.2 Breeder seed Maintainer: MARC/EIAR

7.2.53 Variety: Nazareth-2 (TA04JI) - Canning type
7.2.53.1 Year of release: 2005
7.2.53.2 Breeder seed Maintainer: MARC/EIAR

7.2.54 Variety: Melka Awash-98 (PAN-182) - Canning type
7.2.54.1 Year of release: 1998/99
7.2.54.2 Breeder/Maintainer: MARC/EIAR

7.2.55 Variety: Roba - Canning type
7.2.55.1 Year of release: 1990
7.2.55.2 Breeder/Maintainer: MARC/EIAR

7.2.56 Variety: Awash - Canning type
7.2.56.1 Year of release: 1990
7.2.56.2 Breeder/Maintainer: MARC/EIAR

7.2.57 Variety: Mexican 142 - Canning type
7.2.57.1 Year of release: 1973
7.2.57.2 Breeder/Maintainer: MARC/EIAR
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 acre 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 2015/16 cropping season, this crop covers about 38,166.04 hectares of land with an estimated production not less than 812,418.33 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 Variety: Pawe 03 (TGX-1987-62F)
8.1.1.1 Agronomic and morphological characteristics

- Adaptation area: Pawe, Areka, Asosa, Tepi, Jimma and other similar agro-ecologies
  - Altitude (m.a.s.l) 520 - 1800
  - Rainfall (mm) 460 - 1600
- Seed rate (kg/ha): 60 - 70
- Spacing: 60cm between n rows & 5 cm between n plants
- Planting date: Mid June to early July
- Fertilizer (kg/ha):
  - P$_2$O$_5$: 100 at planting
  - (N): --
- Days to 50% flowering: 63.3
- Days to 95% maturity: 118.7
- Plant height (cm): 71.4
- Growth habit: Indeterminate
- Leaf shape: Broaden, darker
- Leaf color: Dark green
- Seed coat color: Yellow
- Seed shape: Spherical
- Hilium color: Black
- Flower color: Purple
- 100 seed weight (gm): 10.9 (smaller)
- Oil content (%): 23.6
- Protein content (%): 42
- Maturity group: Medium to late
Crop Variety Register

- Crop disease reaction: Resistance to Bacterial blight leaf bloch and brown spot and moderately resistant to frog eye leaf spot and rust.

- Yield (qt/ha):
  - Research field: 23.4
  - Farmers' field: 21.1

8.1.1.2 Year of release register: 2016
8.1.1.3 Breeder/Maintainer: Pawe ARC/EIAR
### 8. 2 Varieties under production

<table>
<thead>
<tr>
<th>Variety</th>
<th>Year of release/register</th>
<th>Breeder/Maintainer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gazale</td>
<td>2015</td>
<td>HwARC/SARI and Pawe/EIAR</td>
</tr>
<tr>
<td>Pawe 01 (PARC-2013-2)</td>
<td>2015</td>
<td>Pawe ARC/EIAR/</td>
</tr>
<tr>
<td>Pawe-02 (PARC-2013-3)</td>
<td>2015</td>
<td>Pawe ARC/EIAR/</td>
</tr>
<tr>
<td>Nyala</td>
<td>2014</td>
<td>HwRC/ SARI and Pawe ARC/EIAR</td>
</tr>
<tr>
<td>Hawssa-04 (AGS-7-1)</td>
<td>2012</td>
<td>HWARC</td>
</tr>
<tr>
<td>NOVA</td>
<td>2012</td>
<td>HWARC</td>
</tr>
<tr>
<td>Wello (TGX-1895-33F)</td>
<td>2012</td>
<td>SARC/ARARI</td>
</tr>
<tr>
<td>KORME (AGS-129-2)</td>
<td>2011</td>
<td>BARC</td>
</tr>
<tr>
<td>Variety (PR-145-2)</td>
<td>Year of registration</td>
<td>Breeder/Maintainer</td>
</tr>
<tr>
<td>---------------------</td>
<td>---------------------</td>
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</tr>
<tr>
<td>KATTA (PR-145-2)</td>
<td>2011</td>
<td>BARC</td>
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<td>Wegayen (TGX-1998-29F)</td>
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<td>Gizo (TGX-1885-33F)</td>
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<th>Variety (PR-143-(26))</th>
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<th>Breeder/Maintainer</th>
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<td>Gishama (PR-143-(26))</td>
<td>2010</td>
<td>PARC</td>
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<th>Year of registration</th>
<th>Breeder/Maintainer</th>
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<tbody>
<tr>
<td>BOSHE (IAC-13-1)</td>
<td>2008</td>
<td>BARC/OARI</td>
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<table>
<thead>
<tr>
<th>Variety (PR-149-81-EP-7-2)</th>
<th>Year of registration</th>
<th>Breeder/Maintainer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dhidhessa (PR-149-81-EP-7-2)</td>
<td>2008</td>
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<tr>
<td>AFGAT (TGX-1892-10F)</td>
<td>2007</td>
<td>AwARC/ SRARI</td>
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<tbody>
<tr>
<td>ETHIO-YUGOSLAVIA</td>
<td>2007</td>
<td>BARC/OARI</td>
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<th>Variety (PR-149)</th>
<th>Year of registration</th>
<th>Breeder/Maintainer</th>
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<tbody>
<tr>
<td>Awassa-95 (G 2261)</td>
<td>2005</td>
<td>AwARC/SRARI</td>
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<th>Variety (PR-149)</th>
<th>Year of registration</th>
<th>Breeder/Maintainer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belesa-95 (PR-149)</td>
<td>2003</td>
<td>ARARC/ SRARI</td>
</tr>
</tbody>
</table>
8.2.19 Variety: Jalale (AGS-217)
8.2.19.1 Year of release: 2003
8.2.19.2 Breeder/Maintainer:
BARC/OARI

8.2.20 Variety: Cheri (IPB-81-EP7)
8.2.20.1 Year of release: 2003
8.2.20.2 Breeder/Maintainer:
BARC/OARI

8.2.21 Variety: Clark 63K
8.2.21.1 Year of release: 1981/82
8.2.21.2 Breeder/Maintainer:
AwARC/SRARI

8.2.22 Variety: Coker 240
8.2.22.1 Year of release: 1981/82
8.2.22.2 Breeder/Maintainer:
AwARC/SRARI

8.2.23 Variety: Davis
8.2.23.1 Year of release: 1981/82
8.2.23.2 Breeder/Maintainer:
AwARC/SRARI

8.2.24 Variety: Williams
8.2.24.1 Year of release:
8.2.24.2 Breeder/Maintainer:
AwARC/SRARI

8.2.25 Variety: Crawford
8.2.25.1 Year of release:
8.2.25.2 Breeder/Maintainer:
AwARC/SRARI
9. Grass pea (Lathyrus sativus L.)

Grass pea is among the important highland pulses of Ethiopia grown on more than 159,105.68 thousands of hectares with the production of about 2,876,743.76 quintals in this 2015/16 cropping season. It is one of the important crops of economic significance in Ethiopia which is the fifth most important pulse crop after faba bean, field pea, chickpea and haricot bean. It is the cheapest source of protein in the diets of most people. Grass pea is a highly popular food and feed legume in the farming system due to its tolerance of drought, flooding and diseases and also its importance in ameliorating soil fertility. It is commonly grown as a double crop after the cereals; tef or barley.

Its paradoxical growth elasticity during both under and over moisture stress made it exceptional but important behavior. It is a crop of insurance to depend on during crop failures usually due to the recurrent droughts. Despite its importance, presence of neurodegenerative toxin abbreviated as Beta-ODAP, (which is responsible for irreversible crippling of lower limbs (but not lethal), if the seeds are consumed as a major part of the diet for an extended period) is a discouraging factor for grass pea production. It has comparable yield to other pulse crops. Grass pea is tolerant to most biotic and abiotic stresses, ameliorates poor soil and gives relatively higher biomass.

The development of biotechnology and its application in grass pea has resulted in soma clones with neurotoxin ODAP content of less than 0.1% (100 mg ODAP/100gm seed) in India. Low ODAP lines are also available at the International Center for Agricultural Research in Dry land Areas (ICARDA).
9.1. New varieties

- No new variety released in 2016.

9.2 Varieties under production

9.2.1 Variety: Wasie (ILAT-LS-LS-B2)
9.2.1.1 Year of release: 2005
9.2.1.2 Breeder/Maintainer: DZARC/EIAR
10. Mung bean (*Vigna radiata* L)

Mung bean is an ancient and well-known crop in Asia. It is often included in rice or wheat-based cropping systems in the tropics and subtropics. The Mung bean, also known as green bean, choroko (in Swahili), is native to Bangladesh, India, and Pakistan. It is also cultivated in several countries of Asia, Africa, and South America. The beans are small, ovoid in shape, and green in color. Mung beans are a warm season crop requiring 90–120 days of frost free conditions from planting to maturity. Adequate rainfall is required from flowering to late pod fill in order to ensure good yield. Mung beans are adapted to the same climatic areas as soybean, dry bean and cowpea.

Mung beans are grown widely for use as a human food (as dry beans or fresh sprouts), but can be used as a green manure crop and as forage for livestock. Sprouts are high in protein (21%–28%), calcium, phosphorus and certain vitamins. Because they are easily digested they replace scarce animal protein in human diets in tropical areas of the world.

Mung bean is in the Legume family of plants and is closely related to adzuki and cowpea. It is a warm season annual, highly branched and having trifoliate leaves like the other legumes. Both upright and vine types of growth habit occur in mung bean, with plants varying from one to five feet in length. The pale yellow flowers are borne in clusters of 12–15 near the top of the plant. Mature pods are variable in color (yellowish-brown to black), about five inches long, and contain 10 to 15 seeds. Self pollination occurs so insect and wind is not required. Mature seed colors can be yellow, brown, mottled black or green, depending upon variety.
10.1 New varieties

- No new variety released in 2016

10.2 Varieties under production

10.2.1 Variety: NVL-1
10.2.1.1 Year of release: 2014
10.2.1.2 Breeder/Maintainer: Nirmal Plc/EIAR/MARC

10.2.2 Variety: Arkebe (SML-668)
10.2.2.1 Year of release: 2014
10.2.2.2 Breeder/Maintainer: Humera ARC/TARI

10.2.3 Variety: Rasa (N-26)
10.2.3.1 Year of release: 2011
10.2.3.2 Released by MARC/EIAR

10.2.4 Variety: MH-97-6 (Borda)
10.2.4.1 Year of release: 2008
10.2.4.2 Released by SARI/AWRC

11. Adzuki bean (Vigna angularis)

11.1 New varieties

- No new variety released in 2016

11.2 Varieties under production

11.2.1 Variety: Erimo (Adzuki bean)
11.2.1.1 Year of release: 2015
11.2.1.2 Breeder/Maintainer: MARC/EIAR and ACOS Ethiopia

MoANR Plant Variety Release, Protection and Seed Quality Control Directorate
12. Fenugreek (*Trigonella foenum-graecum*)

Fenugreek is a plant in the family of Fabaceae. It is used both as an herb (the leaves) and as a spice (the seed). It is cultivated worldwide as a semi-arid crop. It is frequently used in curry. The word for fenugreek in Amharic is *abesh*, and the seed is often used in Ethiopia as a natural herbal medicine in the treatment of diabetes. It is also sometimes used as an ingredient in the production of clarified butter.

Major fenugreek producing countries are India, Argentina, Egypt, France, Spain, Turkey, Morocco and China. Fenugreek seed is widely used as a galactagogue (milk producing agent) by nursing mothers to increase inadequate breast milk supply. Since the maple syrup-like flavor is strong and not always liked, the seeds are ground to a powder and administered in capsules. Studies have shown that fenugreek is a potent stimulator of breast milk production and its use was associated with increases in milk production of as much as 900%.

According to Central Statistics Agency 2015/16 report, the total area under production was 29,837.65 hectares and the production was estimated to be over 356,337.64 quintals.
12.1. New varieties

12.1.1 Variety: Wereilu (201606/2)

12.1.1.1. Agronomic and morphological characteristic

- **Adaptation area:**
  - Altitude (m.a.s.l):
    - 2300-2800
  - Rainfall (mm):
    - 868-1000
  - Temp. (°C):
    - 9 - 21.6
  - Soil type:
    - Black vertisol

- **Seed rate (kg/ha):**
  - Row planting: 12-14
  - Broad casting: 18-20

- **Planting date:**
  - 1st - 2nd weeks of July

- **Fertilizer rate (kg/ha):**
  - P₂O₅:
    - 0
  - N₂:
    - 0

- **Days to flower:** 61
- **Days to maturity:** 148
- **Plant height (cm):** 42.0
- **Growth habit:** Bush type
- **1000 seed weight (gm):** 17.1
- **Seed coat color:** Yellowish green
- **Flower color:** Pink
- **Grain size:** Medium
- **Crop pest reaction:** Tolerant to powdery mildew
- **Yield (qt/ha):**
  - Research field: 11-21
  - Farmers’ field: 12

12.1.1.2 Year of release: 2016

12.1.1.3 Breeder/Maintainer: Sirinka ARC/ARARI
12.1.2 Variety: Jamma (202169/3)

12.1.2.1. Agronomic and morphological characteristic

- Adaptation area: Wereilu, Jamma, Inewari and similar agro-ecologies
  - Altitude (m.a.s.l.): 2300-2800
  - Rainfall (mm): 868-1000
  - Temp. (°C): 9 - 21.6
  - Soil type: Black vertisol

- Seed rate (kg/ha)
  - Row planting: 12-14
  - Broad casting: 18-20

- Planting date: 1st - 2nd weeks of July

- Fertilizer rate (kg/ha):
  - P2O5: 0
  - N2: 0

- Days to flower: 61
- Days to maturity: 147
- Plant height (cm): 43
- Growth habit: Bush type
- 1000 seed weight (gm): 17.9
- Seed coat color: Green
- Flower color: Pink
- Grain size: Large
- Crop pest reaction: Tolerant to powdery mildew

- Yield (qt/ha)
  - Research field: 12-23
  - Farmers’ field: 11

12.1.2.2 Year of release: 2016

12.1.2.3 Breeder/Maintainer: Sirinka ARC/ARARI
12.1.3 Variety: **Burqaa (201617Sno3-7)**

12.1.3.1. Agronomic and morphological characteristic

- **Adaptation area:**
  - Altitude (m.a.s.l.): 1650-2400
  - Rainfall (mm): 120-500
- **Seed rate (kg/ha):** 20
- **Planting date:** September - 1st week of November
- **Fertilizer rate (kg/ha):**
  - $P_2O_5$: 90
  - N: 20
- **Days to flower:** 50
- **Days to maturity:** 129
- **Plant height (cm):** 40
- **Growth habit:** Basal branching
- **1000 seed weight (gm):** 15.6
- **Seed coat color:** Deep orange yellow
- **Pod color:** Brown
- **Leaf color:** Deep green
- **Stem color:** Brown
- **Pods per plant:** 22
- **Grain size:** --
- **Crop pest reaction:** Moderately resistant to powdery mildew
- **Yield (qt/ha):**
  - Research field: 22.21
  - Farmers’ field: --

12.1.3.2 Year of release: 2016

12.1.3.3 Breeder/Maintainer: Sinana ARC/OARI
12. 2 Varieties under production

12.2.1 Variety: Ebbisa (AC-TR-7)
12.2.1.1 Year of release: 2012
12.2.1.2 Breeder/Maintainer: SARC/OARI

12.2.2 Variety: Hunda-01 (FG-18)
12.2.2.1 Year of release: 2006
12.2.2.2 Breeder/Maintainer: SARC/OARI

12.2.3 Variety: Chala (FG-47-01)
12.2.3.1 Year of release: 2005
12.2.3.2 Breeder/Maintainer: DZARC/EIAR
Group III. Oil Crops

1. Noug (*Guizotia abyssinica* L.)

Noug is an oil-seed crop, indigenous to Ethiopia and holds significant promise for improving rural livelihoods in Sub-Saharan Africa. The species is used in intercropping systems, grows on poor but also extremely wet soils, and contributes to soil conservation. It contributes up to 50% of the Ethiopian oil-seed crop. Noug diversity is numerous in Ethiopia and Eritrea and local farmers are able to distinguish many landraces. Apart from Africa (East and South African countries), noug is cultivated in parts of South Asia, where it was introduced thousand years ago, and the West Indies.

Noug belongs to the Compositae family and is closely related to sunflower. It differs from domesticated sunflower mainly due to its high level of branching, numerous flower heads and small seeds. The oil content of noug seed varies from 30 to 50%. The fatty acid composition is typical for seed oils of the Compositae family with linoleic acid being the dominant component.

It is one of the major oil crops of Ethiopia with the highest share of area coverage. The oil quality is very high and is comparable to the cooking oils used in the developed countries. In 2015/16 cropping season, 281,036.36 ha of land was covered with noug and about 2,563,271.66 quintals were estimated to be produced.
1.1 New variety

- No new variety released in 2016

1.2 Varieties under production

1.2.1 Variety: Ginchi-1 (PGRC/E 227187)
1.2.1.1 Years of release: 2010
1.2.1.2 Breeder seed maintainer: HARC

1.2.2 Variety: Shambu-1 (PGRC/E 228423)
1.2.2.1 Year of release: 2002
1.2.2.2 Breeder/Maintainer: HARC/EIAR

1.2.3 Variety: Kuyu
1.2.3.1 Year of release: 1994
1.2.3.2 Breeder/Maintainer: HARC/EIAR

1.2.4 Variety: Fogera
1.2.4.1 Year of release: 1988
1.2.4.2 Breeder/Maintainer: HARC/EIAR

1.2.5 Variety: Esete-1
1.2.5.1 Year of release: 1988
1.2.5.2 Breeder/Maintainer: HARC/EIAR
2. Linseed (*Linum usitatissimum* L.)

Linseed is a plant in the family of Linaceae with a diploid chromosome number of 2n=30. It is a short-lived perennial which occurs in western and southern Europe and western Asia. India is an important centre of genetic diversity for *Linum usitatissimum*, but cannot be considered the centre of origin because of the absence of its progenitor *Linum bienne*. *Linum usitatissimum* was among the first crops to be taken into cultivation in the Fertile Crescent more than 8000 years ago. It developed into a fiber crop, called ‘fiber flax’ and an oilseed crop, called ‘linseed’. Mediterranean and European types developed into fiber flax; short-season types adapted to the warmer climates of western Asia, the Indian subcontinent and Ethiopia developed into linseed types.

In tropical Africa linseed production is concentrated in the Ethiopian highlands, where linseed has been grown since time immemorial. At higher altitudes it is the second most important oil crop after noug (*Guizotia abyssinica* (L.f.) Cass.). Linseed is also grown on a small scale in the other highlands of East Africa.

In Ethiopia the seed is commonly roasted, ground and mixed with spices and some water to be served along with local breads. It is also consumed in soups, soft drinks and with porridges or cooked potatoes. Its industrial use is higher than all other oil crops. Its highest contribution in paint, soap, lubricant and pharmaceutical factories helped to gain international attention. In the 2015/16 cropping season, 85,415.67 ha of land was covered with linseed and the production was estimated to be 885,511.44 quintals.
2.1 New varieties

2.1.1. Variety: **Kuma/ h-c7 (R734D X B-96/111)**

2.1.1.1. Agronomic and morphological characters

- **Adaption area:** Highland areas of Arsi and West Arsi and other similar agro-ecologies of Ethiopia
  - Altitude (m.a.s.l.): 2000-2800
  - Rainfall (mm): 600-1100
- **Planting date:** Early to late June
- **Seed rate (kg/ha):** 25 for row planting and 40 for broadcasting
- **Spacing (cm):** ---
- **Fertilizer rate (kg/ha):**
  - P<sub>2</sub>O<sub>5</sub>: 23
  - N: 23
- **Days to flowering:** 80-96
- **Days to maturity:** 150-170
- **1000 seed weight (gm):** 5.9
- **Plant height (cm):** 92-112
- **Flower color:** Brown
- **Seed color:** Resistant to linseed wilt, pasmo and powdery mildew diseases
- **Oil content (%):** 39.3
- **Oil yield(kg/ha):** 875.2
- **Seed yield (qt/ha):**
  - Research field: 20 - 22.27
  - Farmers’ field: 15.82 - 17.02

2.1.1.2. Year of release: 2016

2.1.1.3. Breeder/ Maintainer: Kulumssa ARC/EIAR
2.2 Varieties under production

2.2.1. Variety: Yadanno
2.2.1.1. Year of release: 2014
2.2.1.2. Breeder/ Maintainer: BEKOJI-14

2.2.2. Variety: Biltstar
2.2.2.1. Year of release: 2013
2.2.2.2. Breeder/Maintainer: BILTSTAR

2.2.3. Variety: Sole Agro PLC
2.2.3.1. Year of release: 2014
2.2.3.2. Breeder/Maintainer: Sole Agro PLC

2.2.4. Variety: Furtu
2.2.4.1. Year of release: 2013
2.2.4.2. Breeder/Maintainer: KARC/EIAR

2.2.5. Variety: Jiituu
2.2.5.1. Year of release: 2012
2.2.5.2. Breeder seed maintainer: SARC/OARI

2.2.6. Variety: Kassa-2
2.2.6.1. Year of release: 2012
2.2.6.2. Breeder/Maintainer: HARC/EIAR

2.2.7. Variety: CI-1652xOmega/23 (Jeldu)
2.2.7.1. Year of release: 2010
2.2.7.2. Breeder seed maintainer: HARC

2.2.8. Variety: Bakalcha
2.2.8.1. Year of release: 2010
2.2.8.2. Breeder/Maintainer: KARC/EIAR

(H31 X Belay-96-208) KARC/EIAR
2015
KARC/EIAR

Bekoji-14
2014
HARC/EIAR

Biltstar
2013
Sole Agro PLC

Furtu (CI-1525 X PGRC/E 10011/)
2013
KARC/EIAR

Jiituu (CI-1652x Omega/ B/53)
2012
SARC/OARI

Kassa-2
(PGRC/E 10306X Chilalo/ y/3)
2012
HARC/EIAR

CI-1652x Omega/23 (Jeldu)
2010
HARC

Bakalcha
(Chilalo X Omega/4B) nha/
2010
KARC/EIAR
Crop Variety Register

2.2.9 Variety:
2.2.9.1 Year of release:
2.2.9.2 Breeder/Maintainer:

2.2.10 Variety:
2.2.10.1 Year of release:
2.2.10.2 Breeder/Maintainer:

2.2.11 Variety:
2.2.11.1 Year of release:
2.2.11.2 Breeder/Maintainer:

2.2.12 Variety:
2.2.12.1 Year of release:
2.2.12.2 Breeder/Maintainer:

2.2.13 Variety:
2.2.13.1 Year of release:
2.2.13.2 Breeder/Maintainer:

2.2.14 Variety:
2.2.14.1 Year of release:
2.2.14.2 Breeder/Maintainer:

2.2.15 Variety:
2.2.15.1 Year of release:
2.2.15.2 Breeder/Maintainer:

2.2.16 Variety:
2.2.16.1 Year of release:
2.2.16.2 Breeder/Maintainer:

2.2.17 Variety:
2.2.17.1 Year of release:
2.2.17.2 Breeder/Maintainer:

Dibannee
(CI-1525XCDC1747/21)
2009
SARC/OARI

Chilalo (Kulumsa-1)
2006
KARC/EIAR

Tolle
(CI2698 X PGRC/E 13611/B)
2004
HARC/EIAR

Berene (PGRC/E 01 3627)
2001
HARC/ EIAR

Geregera (R7-20D)
1999/00
ADARC/ARARI

Belay-96 (IAR/Li)
1996/97
HARC/ EIAR

Chilalo
1992
HARC/ EIAR

CI-1525
1984
HARC/ EIAR

CI - 1652
1984
HARC/ EIAR
3. Rapeseed and Ethiopian mustard (*Brassica* spp.)

The culture and cultivation of Ethiopian mustard (*Brassica carinata* Braun) in Ethiopia is as old as cultivation of cereals, which is believed to date back in the 4th to 5th Millennia BC. There are two types of *Brassica* spp. cultivated in Ethiopia. These are Ethiopian mustard (*Brassica carinata* Braun) known as 'Gomenzer' in Amharic, and the exotic rapeseed (*Brassica napus*). It is widely cultivated in the highland and semi-highland parts of the country with altitudes ranging from 1800-2600 m.a.s.l.; and it prefers low temperature with average rainfall of 650 mm. Rapeseed requires high nutrient status of the soil with high level of nitrogen. However, it can grow on wide range of soil types, from light to heavy.

Despite its long history and deep-rooted tradition of production, however, until very recently it has never been known as a full-fledged field crop. Its cultivation was so limited that it was grown either as a garden crop around homestead or sparsely mixed within thick crop stands of maize, sorghum, tef and finger millet. One very important additional advantage in the farming systems, especially in respect of growing in large-scale farms, is the role it can play as a break crop for the cultivation of cereals with comparable ecological amplitude.

Traditional utilization of this crop in Ethiopia, embraces quite an array of purposes. Ground seeds are used to grease a bread-baking clay pan, cure certain ailments or stomach upsets and prepare beverages; the leaves of young plants are good source of vegetable relish. The oil, very often adulterated with the premium oil from noug is the commercial product.

Different research data show that the crop has about 40-46% oil content. Even though the crop is widely produced in the country, its high "erucic" and "linoleic" acids content has limited its use either for food or feed. In 2015/16 cropping season, 29,989.17ha of land are covered with *Brassica* spp. and the annual production was estimated at 550,429.93 quintals.
3a Rape seed (*Barssica napus*)

3a. 1. New varieties
3a.1.1 Variety: *Swifter*

3a.1.1.1 Agronomic and morphological characteristics

- Adaptation area: Highland areas of Arsi, West and Central Shewa similar agro-ecologies
  - Rainfall (mm): 600-1100
  - Altitude (m): 2200-2800
- Seed rate (kg/ha): 2.5-4.5 drilling with 30cm inter row spacing
- Planting date: Early to late June
- Fertilizer rate (kg/ha):
  - P2O5: NS
  - N: NS
- Days to flower (50%): 73
- Days to maturity: 145
- Plant height (cm): 148
- 1000 seed weight (g): 3.0
- Seed color: Dark brown
- Disease reaction: Resistant to black leg
- Average oil content (%): 46
- Average oil yield (kg/ha): 829
- Oil quality:
  - Canola type (low erucic acid (< 5% and glucosinolate (<15μmole/g of seed))
- Average seed yield (qt/ha)
  - Research field: 18
  - Farmers’ field: --
3a.1.1.2. Year of registration: 2016
3a.2 Variety under production

3a.2.1. Variety: Axana
3a.2.1.1. Year of registration: 2015
3a.2.1.2. Breeder/Maintainer: BAYER CROP SCIENCE REP. PLC/ HARC

3a.2.2. Variety: Belinda
3a.2.2.1. Year of registration: 2015
3a.2.2.2. Breeder/Maintainer: BAYER CROP SCIENCE REP. PLC/ HARC

3b Ethiopian mustard (*Brassica carinata*)

3b. 1. New varieties

- No new varieties released in 2016

3b.2 Variety under production

3b.2.1 Variety: Awassa-1 (Acc-153)
3b.2.1.1 Year of release: 2006
3b.2.1.2 Maintainer: ARC/SRARI

3b.2.2 Variety: Kokate-1 (PGRC/E 2006/208507)
3b.2.2.1 Year of release: 2006
3b.2.2.2 Breeder/Maintainer: AwARC/SRARI

3b.2.3 Variety: MS-YD X Zem-1-BCR-5 (Holetta-1)
3b.2.3.1 Year of release: 2005
3b.2.3.2 Breeder/Maintainer: HARC/EIAR

3b.2.4 Variety: Muger (PGRC/E 20021)
3b.2.4.1 Year of release: 2002
3b.2.4.2 Breeder/Maintainer: ADARC/ ARARI
<table>
<thead>
<tr>
<th>Variety</th>
<th>Year of Release</th>
<th>Breeder/Maintainer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tule (PGRC/E 21163)</td>
<td>2002</td>
<td>ADARC/ ARARI</td>
</tr>
<tr>
<td>Shaya (S-67 x zem-1/xs-67c6)</td>
<td>1993</td>
<td>SARC/OARI</td>
</tr>
<tr>
<td>Yellow dodolla</td>
<td>1986</td>
<td>HARC/EIAR</td>
</tr>
<tr>
<td>S-67</td>
<td>1976</td>
<td>HARC/EIAR</td>
</tr>
</tbody>
</table>
4. Sesame (*Sesamum indicum*)

It is an annual short-day warm season plant and mostly grown as a rain fed crop in the rainy season in the semi-arid regions of the tropics and subtropics. Temperatures of around 27°C favor growth and fruiting. It is usually grown in areas with an annual rainfall of 625-1100 mm, fairly drought resistant, but is very intolerant to water lodging and excessive rainfall. It is adapted to a wide range of soils, but prefers deep, well-drained, fertile, sandy loam soils.

In Ethiopia, sesame seed grows mainly in the northern and northwestern region. The sowing is done during June to mid-September and harvesting is from October onwards. The country is one of the major sesame exporting nations, currently ranked at the fourth position in world markets. Types of Sesame Seed in Ethiopia are: - Humera, Gondar and Wollega types, where Humera Sesame seed is the main type exported by the country. Ethiopian commodity exchange has started trading in sesame seeds since May 2009. The exchange provides platform to deal in Humera sesame seed grade 1 and 2, Gondar Sesame Seed grade 1 and 2 and Wollega Sesame Seed grade 1, 2 and 3.

Sesame is used for food. The dried seeds are eaten in soups and, mixed with sugar, are a popular sweet in Africa and Asia. It is used as a salad and cooking oil. The oil is also used in the manufacture of margarine and compound cooking fats. In 2015/16 cropping season, the total land coverage of sesame in Ethiopia is 388,245.50 ha and the production was estimated at about 2,742,174.27 quintals. It is one of the most important export crops in the country. The Setit Humera (Tigray), Metema (Amhara) and West Wellega (Oromia) areas are the major production regions of sesame in the country.
4.1 New variety

4.1.1. Variety: Benishangul-l (WW-001(6))

4.1.1.1. Agronomic and morphological characters

- Adaption area: High rainfall areas of Assossa and Pawe
  - Altitude (m.a.s.l): 740-1280
  - Rainfall (mm): 650-1570
  - Soil: Sandy clay
- Planting date: Middle June to early July
- Seed rate (kg/ha): 1.5-3
- Spacing (cm): 40 cm between rows and 10 cm between plants
- Fertilizer rate (kg/ha):
  - P<sub>2</sub>O<sub>5</sub>: 0
  - N: 0
- Days to flowering: 58
- Days to maturity: 115.7
- 1000 seed weight: 2.5-3
- Plant height (cm): 121.7
- Flower color: White
- Seed color: White
- Crop pest reaction: Moderately resistant for bacterial blight
- Oil content (%): 54.1
- Seed yield (qt/ha):
  - Research field: 4.35-8.36
  - Farmers' field: 4

4.1.1.2. Year of release: 2016

4.1.1.3. Breeder/ Maintainer: Humera ARC/TARI and Asossa ARC/EIAR
4.1.2. Variety: Setit-2 (J-03)

4.1.2.1. Agronomic and morphological characters

- **Adaption area:** Drought prone areas of north western Ethiopia and similar agro-ecologies
  - Altitude (m.a.s.l): 600 - 1028
  - Rainfall (mm): 576 – 888
  - Soil: Clay vertisol
- **Planting date:** Early July – last July
- **Seed rate (kg/ha):** 1.5 – 3
- **Spacing (cm):** 40 cm between rows and 10 cm between plants
- **Fertilizer rate (kg/ha):**
  - $P_2O_5$: 100
  - $N$: 50
- **Days to flowering:** 41.2
- **Days to maturity:** 87
- **Growth habit:** Intermediate
- **1000 seed weight:** 3
- **Plant height (cm):** 123.4
- **Stem and branching character:** Angular and branched
- **Growth pattern:** Erect
- **Seed color:** White
- **Crop pest reaction:** Moderately resistant for bacterial blight
- **Oil content (%):** 53.77
- **Seed yield (qt/ha):**
  - Research field: 9.13
  - Farmers’ field: 8

4.1.2.2. Year of release: 2016

4.1.2.3. Breeder/ Maintainer: Humera ARC/TARI
4.1.3. Variety: **Gonder-1 (Acc.ba002)**

4.1.3.1. Agronomic and morphological characters

<table>
<thead>
<tr>
<th>Character</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Adaption area:</strong></td>
<td></td>
</tr>
<tr>
<td>- Altitude (m.a.s.l):</td>
<td>Low land area of north western Ethiopia and similar agro ecologies</td>
</tr>
<tr>
<td>- Rainfall (mm):</td>
<td>760-1022</td>
</tr>
<tr>
<td>- Soil:</td>
<td>Sandy clay loam</td>
</tr>
<tr>
<td><strong>Planting date:</strong></td>
<td>Middle June to early July</td>
</tr>
<tr>
<td><strong>Seed rate (kg/ha):</strong></td>
<td>---</td>
</tr>
<tr>
<td><strong>Spacing (cm):</strong></td>
<td>---</td>
</tr>
<tr>
<td><strong>Fertilizer rate (kg/ha):</strong></td>
<td></td>
</tr>
<tr>
<td>- P&lt;sub&gt;2&lt;/sub&gt;O&lt;sub&gt;5&lt;/sub&gt;:</td>
<td>0</td>
</tr>
<tr>
<td>- N:</td>
<td>30</td>
</tr>
<tr>
<td><strong>Days to flowering:</strong></td>
<td>60</td>
</tr>
<tr>
<td><strong>Days to maturity:</strong></td>
<td>101</td>
</tr>
<tr>
<td><strong>Growth habit:</strong></td>
<td>Indeterminate</td>
</tr>
<tr>
<td><strong>1000 seed weight:</strong></td>
<td>2.3-2.6</td>
</tr>
<tr>
<td><strong>Plant height (cm):</strong></td>
<td>129</td>
</tr>
<tr>
<td><strong>Stem and branching character:</strong></td>
<td>Angular and branched</td>
</tr>
<tr>
<td><strong>Growth pattern:</strong></td>
<td>Erect</td>
</tr>
<tr>
<td><strong>Seed color:</strong></td>
<td>White</td>
</tr>
<tr>
<td><strong>Crop pest reaction:</strong></td>
<td>Moderately resistant for bacterial blight</td>
</tr>
<tr>
<td><strong>Oil content (%):</strong></td>
<td>50</td>
</tr>
<tr>
<td><strong>Seed yield (qt/ha):</strong></td>
<td></td>
</tr>
<tr>
<td>- Research field:</td>
<td>5-9</td>
</tr>
<tr>
<td>- Farmers’ field:</td>
<td>---</td>
</tr>
</tbody>
</table>

4.1.3.2. Year of release: 2016

4.1.3.3. Breeder/ Maintainer: Gonder ARC/ARARI
4.1.4. Variety: **BaHaNecho-(W-109/WSS/(Acc-EW-012(5)))**

4.1.4.1. Agronomic and morphological characters

- **Adaption area:** Gursum, Babile, Kile, Error Guda, Bisidimo and similar agro-ecologies
- **Altitude (m.a.s.l.):** 560-1650
- **Rainfall (mm):** 550 - 686
- **Planting date:** End of June to mid July
- **Seed rate (kg/ha):** Row planting 2-3
- **Spacing (cm):** Broad casting 3-4
  - 10 between plants and
  - 40 between rows
- **Fertilizer rate (kg/ha):**
  - **P<sub>2</sub>O<sub>5</sub>:** 0
  - **N:** 0
- **Days to flowering:** 60 - 73
- **Days to maturity:** 114 - 129
- **Growth habit:** ----
- **1000 seed weight:** 2.5 - 3.0
- **Plant height (cm):** 110 - 150
- **Seed color:** White
- **Crop pest reaction:** Moderately resistant for bacterial blight
- **Oil content (%):** 52
- **Protein(%):** 23.8
- **Seed yield (qt/ha):**
  - **Research field:** 12
  - **Farmers’ field:** 8 - 12

4.1.4.2. Year of release: 2016

4.1.4.3. Breeder/ Maintainer: Haramaya University
4.1.5. Variety: **BaHaZeyit-(W-119/WSM/(Acc-EW-023(1))**

4.1.5.1. Agronomic and morphological characters

- **Adaption area:** Gursum, Babile, Kile, Error Guda, Bisidimo and similar agro-ecologies
  - Altitude (m.a.s.l): 560-1650
  - Rainfall (mm): 550 - 686
- **Planting date:** End of June to mid July
- **Seed rate (kg/ha):** Row planting 2-3
  - Broad casting 3-4
- **Spacing (cm):** 10 between plants and 40 between rows
- **Fertilizer rate (kg/ha):**
  - $P_2O_5$: 0
  - N: 0
- **Days to flowering:** 60 - 74
- **Days to maturity:** 113 - 134
- **Growth habit:** ---
- **1000 seed weight:** 2.6 - 3.0
- **Plant height (cm):** 113-160
- **Stem and branching character:** ---
- **Growth pattern:** ---
- **Seed color:** Light gray
- **Crop pest reaction:** Moderately resistant for bacterial blight
- **Oil content (%):** 56
- **Protein(%):** 27.1
- **Seed yield (qt/ha):**
  - Research field: 13
  - Farmers’ field: 10-13

4.1.5.2. Year of release: 2016

4.1.5.3. Breeder/ Maintainer: Haramaya University
4.2 Varieties under production

4.2.1. Variety:
4.2.1.1. Year of release:
4.2.1.2. Breeder/ Maintainer:

4.2.2. Variety:
4.2.2.1. Year of release:
4.2.2.2. Breeder/Maintainer:

4.2.3. Variety:
4.2.3.1. Year of release:
4.2.3.2. Breeder/Maintainer:

4.2.4. Variety:
4.2.4.1 Year of release:
4.2.4.2 Breeder/Maintainer:

4.2.5. Variety:
4.2.5.1 Year of release:
4.2.5.2 Breeder/Maintainer:

4.2.6. Variety:
4.2.6.1 Year of release:
4.2.6.2 Breeder/Maintainer:

4.2.7. Variety:
4.2.7.1 Year of release:
4.2.7.2 Breeder/Maintainer:

4.2.8. Variety:
4.2.8.1. Year of release:
4.2.8.2. Breeder/ maintainer:

4.2.9. Variety:
4.2.9.1. Year of release:
4.2.9.2. Breeder/ maintainer:

Dangur (E.W.013.(8))
2015
Pawe ARC/EIAR

Chalasa - EW023 (2)
2013
BARC/OARI

Acc.00047
2013
Sirinka ARC

Setit-l (col sel p#1)
2011
Humera ARC/TARI

Humera-l(ACC.038 sel.1)
2011
Humera ARC/TARI

Barsan/ACC-00016 (1)
2010
Go PARC/SoRPARI

Lidan / ACC-00044 (2)
2010
Go PARC/SoRPARI

Obsa (EW004)
2010
BARC/OARI

Dicho (EW015)
2010
BARC/OARI
<table>
<thead>
<tr>
<th>Variety</th>
<th>Year of release</th>
<th>Breeder/Maintainer</th>
</tr>
</thead>
<tbody>
<tr>
<td>AHADU (Kelafo 74XC-22sel4)</td>
<td>2007</td>
<td>SRARC/ARARI</td>
</tr>
<tr>
<td>BORKENA (Pungun Yongae)</td>
<td>2007</td>
<td>SRARC/ARARI</td>
</tr>
<tr>
<td>Argane</td>
<td>1993</td>
<td>WARC/EIAR</td>
</tr>
<tr>
<td>Adi</td>
<td>1993</td>
<td>WARC/EIAR</td>
</tr>
<tr>
<td>Sarkamo</td>
<td>1993</td>
<td>WARC/EIAR</td>
</tr>
<tr>
<td>Abasena</td>
<td>1990</td>
<td>WARC/EIAR</td>
</tr>
<tr>
<td>Tate /BSC-003/</td>
<td>1989</td>
<td>WARC/EIAR</td>
</tr>
<tr>
<td>Mehado.80</td>
<td>1989</td>
<td>WARC/EIAR</td>
</tr>
<tr>
<td>S</td>
<td>1978</td>
<td>WARC/EIAR</td>
</tr>
<tr>
<td>E</td>
<td>1978</td>
<td>WARC/EIAR</td>
</tr>
</tbody>
</table>
4.2.20 Variety: T.85
4.2.20.1 Year of release: 1976
4.2.20.2 Breeder/Maintainer: WARC/EIAR

4.2.21 Variety: Kelafo 74
4.2.21.1 Year of release: 1976
4.2.21.2 Breeder/Maintainer: WARC/EIAR
5. **Groundnut (Arachis hypogaea)**

Groundnut is a species in the legume or "bean" family (Fabaceae). The cultivated groundnut was probably first domesticated in the valleys of Peru. It is grown as an oil-seed and grain legume crop. It is a major cash crop and widely grown in all the tropical and subtropical regions of the world for direct use as food, oil, and high protein meal.

It is an annual herbaceous legume and a warm-season crop and need abundant sunshine and a warm climate for its normal growth. It is intolerant and killed by frost. It is grown in annual rainfall of 1000 mm or more. The plant could reach 30 to 50 cm in height. The leaves are opposite, pinnate with four leaflets (two opposite pairs; no terminal leaflet), each leaflet 1 to 7 cm long and 1 to 3 cm broad. The flowers are a typical pea flower in shape, 2 to 4 cm across, yellow with reddish veining. After pollination, the fruit develops into a legume 3 to 7 cm long, containing 1 to 4 seeds, which forces its way underground to mature. Hypogaea means "under the earth."

The most suitable soils are well-drained loose, friable, sandy loam, well supplied with lime and with moderate (but not high) amounts of organic matter. Groundnut requires five months of warm weather. The pods ripen 120 to 150 days after the seeds are planted. If the crop is harvested too early, the pods will be unripe. If they are harvested late, the pods will snap off at the stalk, and will remain in the soil. Groundnut is particularly susceptible to contamination during growth and storage. Poor storage can lead to an infection by the mold fungus Aspergillus flavus, releasing the toxic and highly carcinogenic substance aflatoxin. The aflatoxin-producing molds exist throughout the peanut growing areas and may produce aflatoxin in peanuts when conditions are favorable to fungal growth.

In **2015/16** cropping season, the total land coverage of groundnut in Ethiopia is **67,062.40** ha and the production is estimated to be **1,039,395.34** quintals.
5.1. New varieties

5.1.1. Variety: Babile-1 (ICGV-98412)

5.1.1.1. Agronomic and morphological characters

- Adaption area:
  - Altitude (m.a.s.l): Werer, Miesso, Assosa, Pawe & Babile
  - Rainfall (mm): 750-1650
  - Altitude (m.a.s.l): 569 - 1100

- Planting date:
  - At the beginning of the summer for rain fed areas, mid May for Babile
  - At the beginning of the summer for rain fed areas, mid May for Babile
  - Seed rate (kg/ha):
    - 60-110
  - Spacing (cm):
    - 10 cm between plants and 60cm between rows
  - Fertilizer rate (kg/ha):
    - P2O5: 0
    - N: 0
  - Days to flowering: 48
  - Days to maturity: 131
  - Shelling percentage: 67.83
  - Growth habit:
    - Spanish bunch with sequential branching
  - 1000 seed weight(gm): 78.07
  - Seed color:
    - Tan
  - Flower color:
    - Yellow
  - Crop pest reaction:
    - Moderately resistant major foliar disease (leaf spot)
  - Oil content (%): 49.32
  - Seed yield (qt/ha):
    - Research field: 24
    - With irrigation: 30
    - Marginal rainfall: 22
    - Farmers’ field: 19

5.1.1.2. Year of release: 2016

5.1.1.3. Breeder/ Maintainer: Haramaya University
5.1.2. Variety: Babile-2 (ICGV-98404)

5.1.2.1. Agronomic and morphological characters

- Adaption area: Werer, Miesso, Assosa, Pawe & Babile
  - Altitude (m.a.s.l): 750-1650
  - Rainfall (mm): 569 - 1100
- Planting date: At the beginning of the summer for rain fed areas, mid May for Babile
- Seed rate (kg/ha): 60-110
- Spacing (cm): 10 cm between plants and 60cm between rows
- Fertilizer rate (kg /ha):
  - P$_2$O$_5$: 0
  - N: 0
- Days to flowering: 52
- Days to maturity: 132
- Shelling percentage: 66.2
- Growth habit: Spanish bunch with sequential branching
- 1000 seed weight: 79.5
- Seed color: Tan
- Flower color: Yellow
- Crop pest reaction: Moderately resistant major foliar disease (leaf spot)
- Oil content (%): 51.13
- Seed yield (qt/ha):
  - Research field: 20.02
  - With irrigation: 28
  - Marginal rainfall: 20.54
  - Farmers’ field: 18

5.1.2.2. Year of release: 2016

5.1.2.3. Breeder/ Maintainer: Haramaya University
5.1.3. Variety: Babile-3 (ICGV-94100)

5.1.3.1. Agronomic and morphological characters

- Adaption area:
  - Altitude (m.a.s.l): 750-1650
  - Rainfall (mm): 569 - 1100
- Planting date: At the beginning of the summer for rain fed areas, mid May for Babile
- Seed rate (kg/ha): 60-110
- Spacing (cm): 10 cm between plants and 60 cm between rows
- Fertilizer rate (kg/ha):
  - $P_2O_5$: 0
  - N: 0
- Days to flowering: 59
- Days to maturity: 142
- Shelling percentage: 66.07
- Growth habit: Spanish bunch with sequential branching
- 1000 seed weight: 53.65
- Seed color: Tan
- Flower color: Yellow
- Crop pest reaction: Moderately resistant major foliar disease (leaf spot)
- Oil content (%): 51
- Seed yield (qt/ha):
  - Research field: 24.3
    - With irrigation: 31
    - With rainfall: 17.01
  - Farmers’ field: 16.5

5.1.3.2. Year of release: 2016
5.1.3.3. Breeder/ Maintainer: Haramaya University
5.1.4. Variety: DAMKT-2016 (ICGV-96346)

5.1.4.1. Agronomic and morphological characters

- Adaption area: Werer, Miesso, and similar areas
  - Altitude (m.a.s.l): 740-1450
  - Rainfall (mm): 350-700
- Planting date: Mid May
- Seed rate (kg/ha): 84-100
- Spacing (cm): ---
- Fertilizer rate (kg/ha):
  - P₂O₅: 0
  - N: 0
- Days to flowering: 35-40
- Days to maturity: 112
- Shelling percentage: 32.25
- Growth habit: Semi erect
- 1000 seed weight: ---
- Seed color: Light red
- Crop pest reaction: Tolerant to major pest
- Oil content (%): 48.76
- Seed yield (qt/ha):
  - Research field: 25.96-73.29
    - With irrigation: 73.29
    - With rain fall: 25.96
  - Farmers’ field: 22.5 – 67.95

5.1.4.2. Year of release: 2016

5.1.4.3. Breeder/ Maintainer: Werer ARC/EIAR
5.2 Varieties under production

5.2.1. Variety: BaHa gudo (ICGV-88357)
5.2.1.1 Year of release: 2012
5.2.1.2 Breeder/maintainer: Haramaya University

5.2.2. Variety: BaHa jidu (NC-AC-2748 X CHICO)
5.2.2.1 Year of release: 2012
5.2.2.2 Breeder/maintainer: Haramya University

5.2.3. Variety: Eta (ICGV-96395)
5.2.3.1 Year of release: 2010
5.2.3.2 Breeder/maintainer: SARC/ARARI

5.2.4. Variety: Fenta (ICVG- 96395)
5.2.4.1 Year of release: 2010
5.2.4.2 Breeder/maintainer: SARC/ARARI

5.2.5. Variety: Fetene (ICGV-93370)
5.2.5.1 Year of release: 2009
5.2.5.2 Breeder/maintainer: Werer Research Center

5.2.6. Variety: ICGV-94205
5.2.6.1 Year of release: 2008
5.2.6.2 Breeder/maintainer: Werer Research Center

5.2.7. Variety: ICGV-94222
5.2.7.1 Year of release: 2008
5.2.7.2 Breeder/maintainer: Werer Research Center

5.2.8. Variety: ICGV-93164
5.2.8.1 Year of release: 2008
5.2.8.2 Breeder/maintainer: Werer ARC/EIAR

5.2.9 Variety: Werer- 961 (ICGV-87108)
5.2.9.1 Year of release: 2004
5.2.9.2 Breeder/Maintainer: WARC/EIAR
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<thead>
<tr>
<th>Variety</th>
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<th>Breeder/Maintainer</th>
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<tbody>
<tr>
<td>Werer-962 (ICGV-86928)</td>
<td>2004</td>
<td>WARC/EIAR</td>
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<tr>
<td>Werer-963 (ICGV-86644)</td>
<td>2004</td>
<td>WARC/EIAR</td>
</tr>
<tr>
<td>Werer-964 (ICGV-86635)</td>
<td>2004</td>
<td>WARC/EIAR</td>
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<tr>
<td>Bulki-01 (ICGV-88424)</td>
<td>2002</td>
<td>WARC/EIAR</td>
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<tr>
<td>Lote-01 (ICGV-86330)</td>
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<td>Lotte</td>
<td>2002</td>
<td>EIAR</td>
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<tr>
<td>Bulgi</td>
<td>2002</td>
<td>EIAR</td>
</tr>
<tr>
<td>Betisedi (ICG-273)</td>
<td>1993</td>
<td>WARC/EIAR</td>
</tr>
<tr>
<td>Roba (ICG-7794)</td>
<td>1989</td>
<td>WARC/EIAR</td>
</tr>
<tr>
<td>NC 343</td>
<td>1986</td>
<td>WARC/EIAR</td>
</tr>
</tbody>
</table>
Crop Variety Register

5.2.20 Variety:
5.2.20.1 Year of release: 1986
5.2.20.2 Breeder/Maintainer: WARC/EIAR

5.2.21 Variety:
5.2.21.1 Year of release: 1976
5.2.21.2 Breeder/Maintainer: WARC/EIAR
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.
6.1 New varieties

- No new variety released in 2016

6.2 Varieties under production

6.2.1 Variety:
6.2.1.1 Year of release:
6.2.1.2 Breeder/ Maintainer:

6.2.2 Variety:
6.2.2.1 Year of release:
6.2.2.2 Breeder/ Maintainer:

6.2.3 Variety:
6.2.3.1 Year of release:
6.2.3.2 Breeder/ Maintainer:

6.2.4 Variety:
6.2.4.1 Year of release:
6.2.4.2 Breeder/ Maintainer:

6.2.5 Variety:
6.2.5.1 Year of release:
6.2.5.2 Breeder/ Maintainer:

6.2.6 Variety:
6.2.6.1 Year of release:
6.2.6.2 Breeder/ Maintainer:

6.2.7 Variety:
6.2.7.1 Year of release:
6.2.7.2 Breeder/ Maintainer:

6.2.8 Variety:
6.2.8.1 Year of release:
6.2.8.2 Breeder/ Maintainer:

Gimja (P63A98)
2015
DuPont Pioneer

Pawi 2 (P63LL06)
2015
DuPont Pioneer

Ayehu (Ayeh)
(PGRC/E ACC#208768)
2014
AARC/ARAR

X6859
2014
Minerva Plc /HARC/EIAR/

Camara II
2014
Minerva Plc /HARC/EIAR/

N LN 11037
2014
Minerva Plc /HARC/EIAR/

Vincenzo
2014
Minerva Plc /HARC/EIAR/

Hysun 33
2013
GCT PLC
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<td>NK Delfi (Hybrid)</td>
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<td>2012</td>
<td>Red Speckled Ethiopia</td>
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<tr>
<td></td>
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<td>Global Trading Enterprise</td>
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<tr>
<td>6.2.9.2</td>
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<td>6.2.10</td>
<td></td>
<td>Neoma (Hybrid)</td>
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<tr>
<td>6.2.10.1</td>
<td>2012</td>
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<tr>
<td></td>
<td></td>
<td>Global Trading Enterprise</td>
</tr>
<tr>
<td>6.2.10.2</td>
<td></td>
<td></td>
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<tr>
<td>6.2.11</td>
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<td>VSFH- 2074 (Hybrid)</td>
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<td>Vibha Seeds Ethiopia</td>
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<td>Private Limited Company</td>
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<td>6.2.11.2</td>
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<td>6.2.12</td>
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<td>VSFH- 1006 (Hybrid)</td>
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<td>Vibha Seeds Ethiopia</td>
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<td>Private Limited Company</td>
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<td>6.2.12.2</td>
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<td>6.2.13</td>
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<td>KAZANOVA (Hybrid)</td>
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<td></td>
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<tr>
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<td>6.2.13.2</td>
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<td>6.2.14</td>
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<td>PLC</td>
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<td>6.2.14.2</td>
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</table>
6.2.15 Variety:
6.2.15.1 Year of release:
6.2.15.2 Breeder/Maintainer:

NS-H-111 (Hybrid)
2011
Institute of Field and Vegetable Crops, Republic of Serbia/Ashraf Agricultural and industrial PLC

6.2.16 Variety:
6.2.16.1 Year of release:
6.2.16.2 Breeder/Maintainer:

Oissa (NSH-25)
2005
AwARC/ SRARI
7. Safflower (*Carthamus tinctorius* L.)

It is an annual composite plant from the asteraceae family. This herb is highly branched with many long sharp spines on the leaves. Plants are generally 30 to 150 cm tall with globular flower heads (capitula) and commonly, brilliant yellow, orange or red flowers. It is widely grown for its red or orange flower heads and seeds that yield valuable oil.

It is an annual species in the same plant family as sunflower. This crop is adapted to dry land or irrigated cropping systems. It is commercially cultivated for vegetable oil extracted from the seeds.

Traditionally, the crop was grown for its seeds, and used for colouring and flavouring foods, in medicines, and making red (carthamin) and yellow dyes, especially before cheaper aniline dyes became available.

Safflower seed oil is flavorless and colorless, and nutritionally similar to sunflower oil. It is used mainly in cosmetics and as cooking oil, in salad dressing, and for the production of margarine. It may also be taken as a nutritional supplement. There are two types of safflower that produce different kinds of oil: one high in monounsaturated fatty acid (oleic acid) and the other high in polyunsaturated fatty acid (linoleic acid). Currently the predominant edible oil market is for the former, which is lower in saturates than olive oil, for example. The latter is used in painting in the place of linseed oil, particularly with white, as it does not have the yellow tint which linseed oil possesses. In 2015/16 cropping season, the total land coverage of safflower in Ethiopia is 7,361.30 ha and the production is estimated to be 67,310.46 quintals.
7.1 New varieties

- No new variety released in 2016

7.2 Varieties under Production

7.2.1 Variety: Kuhar Acc 229086
7.2.1.1 Year of release: 2015
7.2.1.2 Breeder/Maintainer: Adet ARC

7.2.2 Variety: Turkana
7.2.2.1 Year of release: 2011
7.2.2.2 Breeder/Maintainer: Holetta/EIAR
8. Vernonia (*Vernonia galamensis*)

*Vernonia galamensis* is a new potential industrial crop with very high content of vernolic acid in the seed oil. The products that can be made from vernonia include epoxies for manufacturing adhesives, varnishes and paints, and industrial coatings. The low viscosity of Vernonial oil would allow it to be used as a non-volatile solvent in oil based-paints since it will become incorporated in the dry paint rather than evaporating in to the air, which reduces pollution. Vernonia could also serve as a natural source of plasticizers and stabilizers (binders) for producing polyvinyl chloride (PVC), which currently manufactured from petroleum. It is also used in manufacturing cosmetics, pharmaceuticals, insecticides, crop-oil concentrates, and formulation of carriers for slow release of pesticides.

The development of alternative non-competitive to existing crops is receiving increased recognition as an answer to some of the problems facing today's agriculture in the world. Poor Ethiopian farmers in arid and semi-arid regions of the country will benefit from this crop if varieties and improved cultural practices are developed soon.

8. 1. New varieties

- No new variety released in 2016.

8.2 Varieties under production

8.2.1 Variety: Boke Kuni (AD-01-04 (Acc#7)
8.2.1.1 Year of release: 2005
8.2.1.2 Breeder/Maintainer: ADARC / ARARI
9. Castor (*Ricinus communis* L)

Castor is a flowering plant in the spurge family, *Euphorbiaceae*. It is indigenous to the southeastern Mediterranean Basin, Eastern Africa, and India, but is widespread throughout tropical regions. Castor seed is the source of castor oil, which has a wide variety of uses. The seeds contain between 40% and 60% oil that is rich in triglycerides, mainly ricinolein. The seed contains *ricin*, a toxin, which is also present in lower concentrations throughout the plant.

Castor oil plant can vary greatly in its growth habit and appearance. The variability has been increased by breeders who have selected a range of cultivars for leaf and flower colors, and for oil production. It is a fast-growing, suckering perennial shrub which can reach the size of a small tree (around 12 meters).

Global castor seed production is around 1 million tons per year. Leading producing countries are India (with over 60% of the global yield), China and Brazil, and it is widely grown as a crop in Ethiopia (about 15,000 tones). Under Ethiopian condition, castor is tolerant to moisture stress and can be grown in areas where Bread wheat, maize, and tef would not be grown such as lower and middle Awash, Kobo, Afar and Metema. Perennial castor can be grown as hedges and sheds for animals, peoples or coffee. Castor is higher yielder than noug, linseed, Ethiopian mustard and its oil content is only exceeded by Coconut. The research opportunity particularly on developing high yielding genotypes is great because of the availability of germplasm. There are more than 400 accessions of castor at the Institute of Biodiversity Conservation in Addis Ababa. Castor bean has a sound economic importance since castor oil is now being used to produce biodiesel.
9.1. New varieties

- No new variety released in 2016.

9.2 Varieties under production

<table>
<thead>
<tr>
<th>Variety</th>
<th>Year of Release</th>
<th>Breeder/Maintainer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hiruy(GK-SEL-1)</td>
<td>2011</td>
<td>MARC/EIAR</td>
</tr>
<tr>
<td>Abaro (&gt;va)</td>
<td>2007</td>
<td>EORC/EIAR</td>
</tr>
</tbody>
</table>
10. Camelina sativa (*Camelina sativa*)

Camelina (*Camelina Sativa*) is an oleaginous plant from the Cruciferae family, which has been domesticated and extensively used in Europe and America for several thousand years. The crop has multitude of uses among which its edible oil being the major one. The seed oil of Camelina contains an exceptional amount (up to 45 per cent) of omega-3 fatty acids, as well as a unique antioxidant complex making the oil very stable and resistant to heat and rancidity. Unlike any other omega-3 oil, Camelina oil is perfectly suitable for use not only as a well balanced omega-3 supplement, but also as a health promoting everyday cooking oil.

Combined with a delicious flavor, this extraordinary blend of beneficial polyunsaturated fatty acids and high oxidative stability makes camelina oil an excellent, versatile overall source of both heart healthy omega-3 fats and powerful antioxidants, including tocopherols, carotenoids, and phosphatides. Known as "wild flax" because it is often found growing together with common flax and also sometimes referred to as "false flax" due to its visual similarity to regular flax, Camelina, while supplying almost as many omega-3 fatty acids as common flax, is much more stable than the latter, and also tastes much better.

In recent years, extensive research and numerous clinical studies in different parts of the world confirmed that omega-3 fats are involved in numerous vital physiological processes in our bodies, and that their deficit may cause or aggravate many serious medical problems and conditions, including atherosclerosis, hypertension, and other cardiovascular problems, arthritis, irritable bowel syndrome, dermatitis, asthma, and even cancer. Therefore, adding a good source of omega-3 fatty acids to one's diet is believed to be a good way of improving or preventing these conditions. Apart from this the feed of the byproducts is well nourished source for animals and highly recommended.
### 10.1. New varieties

- No new variety released in 2016

### 10.2 Varieties under production

<table>
<thead>
<tr>
<th>Variety</th>
<th>Year of release</th>
<th>Breeder/Maintainer</th>
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<tbody>
<tr>
<td>Zeytee-1 <em>(Camelina America)</em></td>
<td>2014</td>
<td>EIAR/DZARC/HARC /ORDA/Canana</td>
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<tr>
<td>Zeytee-2 <em>(Camelina Syria)</em></td>
<td>2014</td>
<td>EIAR/DZARC/HARC /ORDA/Canana</td>
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</tbody>
</table>
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 2015/16 cropping season, the total area under production reaches 70,131.32 hectares and the production is estimated to be 9,432,334.43 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:

• No new variety released in 2016

1.2 Varieties under production

1.2.1. Variety:
1.2.1.1. Year of release
1.2.1.2. Breeder/Maintainer

1.2.2. Variety:
1.2.2.1. Year of release:
1.2.2.2. Breeder/Maintainer:

1.2.3. Variety:
1.2.3.1. Year of release:
1.2.3.2. Breeder/Maintainer:

1.2.4. Variety:
1.2.4.1. Year of release:
1.2.4.2. Breeder/Maintainer:

1.2.5 Variety:
1.2.5.1 Year of release:
1.2.5.2 Breeder/Maintainer:

1.2.6 Variety:
1.2.6.1 Year of register:
1.2.6.2 Breeder/Maintainer:

Horro (CIP384321.30)
2015
Bako ARC/OARI.

Laura
2015
Europlant Pflanzenzucht
GmbH Kartoffelzucht Bohm
& Co KG Gibagri farm plc.

Jelly
2015
Bohm-Nordkartoffel
Agrarproduction GmbH &
Co. OHG / Europlan
Pflanzenzucht GmbH,
Gibagri farm PLC.

Rumba
2015
Kartoffelzucht Bohm GmbH
& Co.KG Europlant
Pflanzenzucht GmbH
Gibagri farm PLC.

Dagim (CIP-396004.337)
2013
Adet ARC/ ARARI

Milki (CIP-394640.539)
2012
SARC/OARI
1.2.7 Variety:
1.2.7.1 Year of register:
1.2.7.2 Breeder/Maintainer:

1.2.8 Variety:
1.2.8.1 Year of register:
1.2.8.2 Breeder/Maintainer:

1.2.9 Variety:
1.2.9.1 Year of register:
1.2.9.2 Breeder/Maintainer:

1.2.10 Variety:
1.2.10.1 Year of release:
1.2.10.2 Breeder/Maintainer:

1.2.11 Variety:
1.2.11.1 Year of register:
1.2.11.2 Breeder/Maintainer:

1.2.12 Variety:
1.2.12.1 Year of register:
1.2.12.2 Breeder/Maintainer:

1.2.13 Variety:
1.2.13.1 Year of release:
1.2.13.2 Breeder/Maintainer:

1.2.14 Variety:
1.2.14.1 Year of release:
1.2.14.2 Breeder/Maintainer:

1.2.15 Variety:
1.2.15.1 Year of release:
1.2.15.2 Breeder/Maintainer:

1.2.16 Variety:
1.2.16.1 Year of release:
1.2.16.2 Breeder/Maintainer:

MoANR Plant Variety Release, Protection and Seed Quality Control Directorate
1.2.17 Variety: Gudanie (CIP-386423.13)  
1.2.17.1 Year of release: 2006  
1.2.17.2 Breeder/Maintainer: HARC/EIAR

1.2.18 Variety: Gabbisa (Cip 3870-96-11)  
1.2.18.1 Year of release: 2005  
1.2.18.2 Breeder/Maintainer: HU

1.2.19 Variety: Shonkolla (KP- 90134.5)  
1.2.19.1 Year of release: 2005  
1.2.19.2 Breeder/Maintainer: AwARC/ SARI

1.2.20 Variety: Bulle (Cip 387224-25)  
1.2.20.1 Year of release: 2005  
1.2.20.2 Breeder/Maintainer: AwARC/ SARI

1.2.21 Variety: Chala (Cip 387412-2)  
1.2.21.1 Year of release: 2005  
1.2.21.2 Breeder/Maintainer: Haramaya University

1.2.22 Variety: Mara Charre (Cip 389701-3)  
1.2.22.1 Year of release: 2005  
1.2.22.2 Breeder/Maintainer: AwARC/ SARI

1.2.23 Variety: Gera (KP-90134.2)  
1.2.23.1 Year of release: 2003  
1.2.23.2 Breeder/Maintainer: ShARC/ ARARI

1.2.24 Variety: Gorebela (CIP-382173.12)  
1.2.24.1 Year of release: 2002  
1.2.24.2 Breeder/Maintainer: ShARC/ ARARI

1.2.25 Variety: Guasa (CIP-384321.9)  
1.2.25.1 Year of release: 2002  
1.2.25.2 Breeder/Maintainer: ADARC/ ARARI

1.2.26 Variety: Jalenie (CIP-37792-5)  
1.2.26.1 Year of release: 2002  
1.2.26.2 Breeder/Maintainer: HARC/EIAR
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<td>HU</td>
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<td>Bedasa (AL-114)</td>
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<td>2001</td>
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<td>Chirro (AL-111)</td>
<td>1997/98</td>
<td>HU</td>
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<td>Wechecha</td>
<td>1997</td>
<td>HARC/EIAR</td>
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<tr>
<td>Tolcha</td>
<td>1993</td>
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<td>Menagesha</td>
<td>1993</td>
<td>HARC/EIAR</td>
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<tr>
<td>Awash</td>
<td>1991</td>
<td>HARC/EIAR</td>
</tr>
<tr>
<td>Alemaya 624</td>
<td>1987</td>
<td>HU</td>
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</table>
2. Sweet potato (*Ipomoea batatas*)

Sweet potato is a dicotyledonous plant that belongs to the family *Convolvulaceae*. Its large, starchy, sweet tasting tuberous roots are an important root vegetable. The young leaves and shoots are sometimes eaten as greens. It is one of the major root crops of Ethiopia, which is cultivated around home for several years and is used for food and feed.

Sweet potato is mostly cultivated in the south, southwest and east of the country. Since this crop prefers hot and non-shade area it doesn't withstand frost. Even though this crop is drought tolerant, it needs sufficient moisture at early stage especially during the first six weeks. This crop needs sandy and well-drained soil; and if the soil has high moisture content, planting in raised bed is preferable. It grows best at an average temperature of 24 °C (75 °F), abundant sunshine and warm nights. Annual rainfalls of 750–1,000 mm (30–39 in) are considered most suitable, with a minimum of 500 mm (20 in) in the growing season. It is not tolerant to water-logging, as it may cause tuber rots and reduce growth of storage roots if aeration is poor.

This crop has high starch and low amount of vitamins and proteins. Even though eating its leaf part at green stages is not accustomed in our country, it has high starch and protein contents. In 2015/16 cropping season, the total area under production reached 41,039.31 hectares and the production is estimated to be over 13,723,268.22 quintals.
2.1. New varieties

- No new variety was released in 2016

### 2.2 Varieties under Production

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<td>Tola (TIS 844-40)</td>
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<td>BARC</td>
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<td>Ma’e (TIS 70357-5)</td>
<td>2010</td>
<td>WARC/EIAR</td>
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<td>Jari (CN-2059-1)</td>
<td>2008</td>
<td>Sirinka ARC/ARARI</td>
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<tr>
<td>Birtukanie (Saluboro)</td>
<td>2008</td>
<td>Sirinka ARC/ARARI</td>
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<tr>
<td>BERKUME (TIS 8250-2)</td>
<td>2007</td>
<td>Haromaya University</td>
</tr>
<tr>
<td>ADU (Cuba-2)</td>
<td>2007</td>
<td>Haromaya University</td>
</tr>
<tr>
<td>Balo (Koka-18)</td>
<td>2006</td>
<td>BARC/OARI</td>
</tr>
<tr>
<td>Ordollo (192009 IX)</td>
<td>2005</td>
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<td>Kero (TIS 8250)</td>
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<td>Tulla (CIP 420027)</td>
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<td>Kulfo (Lo-323)</td>
<td>2005</td>
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</tr>
<tr>
<td>Dimitu</td>
<td>2005</td>
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<td>Temesgen (192009 VIII)</td>
<td>2004</td>
<td>AwARC/SARI</td>
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<td>Beletech (192026 II)</td>
<td>2004</td>
<td>AwARC/SARI</td>
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<tr>
<td>Belela (192040 I)</td>
<td>2002</td>
<td>AwARC/EIAR &amp; ADARC/ARARI</td>
</tr>
<tr>
<td>Awassa-83</td>
<td>1997/98</td>
<td>AwARC/SARI</td>
</tr>
<tr>
<td>Dubo (I-444)</td>
<td>1997</td>
<td>AwARC/SARI</td>
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<tr>
<td>Variety</td>
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<td>Breeder/Maintainer</td>
</tr>
<tr>
<td>--------------</td>
<td>----------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>Falaha (TIS-3017(2)</td>
<td>1997</td>
<td>AwARC/SARI</td>
</tr>
<tr>
<td>Kudadie (TIS 1499)</td>
<td>1997</td>
<td>AwARC/SARI</td>
</tr>
<tr>
<td>Damota (Guralowlow)</td>
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<tr>
<td>Ogan Sagan</td>
<td>-</td>
<td>MOA</td>
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<tr>
<td>Bereda (Var 375)</td>
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</tr>
<tr>
<td>Guntutie (AJAC-1)</td>
<td>1997</td>
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<td>Koka 12</td>
<td>-</td>
<td>AwARC/SARI</td>
</tr>
<tr>
<td>Koka 6</td>
<td>-</td>
<td>AwARC/SARI</td>
</tr>
</tbody>
</table>
3. Taro (*Colocasia esculenta*)

It is a root crop of secondary importance grown in many parts of the wet tropics, and does best on a moist or even slightly swampy soil. It is known as taro in the Pacific Islands, eddo or dasheen in the West Indies and as old cocoyam in West Africa.

The part eaten is the corm which is formed underground by a thickening of the base of the stem. The crop is propagated by cutting from the top part of the corm or by planting cormels. The plants grow 2-3 feet high, rarely flower, and produce very large leaves of the same shape.

In 2015/16 cropping season, the total area under production is about 48,523.71 hectares and the production is estimated to be over 12,112,217.6 quintals in this cropping year.
3.1 New varieties

- No new variety released in 2016.

### 3.2 Varieties under production

<table>
<thead>
<tr>
<th>Variety</th>
<th>Year of release</th>
<th>Breeder/Maintainer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kiyaq 33/79</td>
<td>2005</td>
<td>JARC/EIAR</td>
</tr>
<tr>
<td>Denu 33/79</td>
<td>2000</td>
<td>JARC/EIAR</td>
</tr>
<tr>
<td>Boloso-1 (ARC/064/96)</td>
<td>2004</td>
<td>ARARC/SARI</td>
</tr>
</tbody>
</table>
4. Cassava (*Manihot esculenta*)

Cassava is widely cultivated in many parts of the world. The carbohydrate rich but low in protein storage roots represent an important energy source and are a staple foodstuff for more than 500 million people throughout tropical Africa, Latin America and parts of Asia. Cassava can grow under poor soil conditions and can withstand drought. It is therefore usually considered as an important famine reserve crop in countries with unreliable rainfall.

Cassava is a perennial shrub, with latex in all its parts, which produces enlarged tuberous root. There are over 100 cultivars and there is great variation in the form of the plant. Great variation is shown in the number, shape and size of the tubers and the angle at which they penetrate the ground. There are usually 5-10 tubers per plant, cylindrical or tapering. The optimum temperature range for cassava is 25-30°C, and the approximate boundaries for its culture are latitudes 30°N and 30°S.

Light sandy loam soil of medium fertility give the best results, but cultivars can be grown successfully on soils ranging from stiff marine clays with a pH of 8-9, to sands or loose late rites with a pH of 5-5.5. Cassava can be grown from sea level up to about 1000m in equatorial regions though at the highest altitudes growth is slow and yields are reduced. Cassava is ready for harvest from 12-15 months after planting. Unless, cassava tuber be utilized or processed within a day or two after harvest, it will deteriorate. So to avoid the deterioration, farmers are advised to harvest as a piece-meal depending upon utilization. Cassava is propagated by stem cutting 20-30cm long, usually planted 90 cm between cuttings within rows and 90-100 cm apart between rows.
4.1 New varieties

4.1.1 Variety: Chichu (TMS 191/0427)

4.1.1.1 Agronomic and morphological characteristics

- Adaptation area:
  - Altitude (masl):
  - Rain fall (mm):
  - Soil type:

- Seed rate (cuttings/ha):
- Planting time:
- Fertilizer rate (kg/ha):
  - P$_2$O$_5$:
  - N:
- Tuber maturity (months):
- Plant height (cm):
- Petiole color:
- Leaf color:
- Color of leaf vein:

- Orientation of petiole
- Color of stem cortex:
- Color of stem epidermis:
- Color of stem exterior:
- Growth habit of stem:
- Color of end branches of adult plant:
- Branching habit:
- Shape of plant:
- Storage root skin color:
- Storage root flesh color:
- Crop pest reaction: -
- Tuber yield (qt/ha):
  - Research field:
  - Farmers field:

4.1.1.2 Year of release
2016

4.1.1.3 Breeder/Maintainer
Awassa ARC/SRARI/
4.1.2 Variety: **Hawassa 4 (MM 96/7151)**

4.1.2.1 Agronomic and morphological characteristics

- **Adaptation area:** Hawassa, Dilla, Areka, Gofa, Amaro, and similar agro-ecology
  - **Altitude (masl):** 1200-1800
  - **Rainfall (mm):** 980-1500
  - **Soil type:** Nitosol
- **Seed rate (cuttings/ha):** 15625
- **Planting time:** Onset of main rain (June)
- **Fertilizer rate (kg/ha):**
  - **P$_2$O$_5$:** -
  - **N:** -
- **Tuber maturity (months):** 16-18
- **Plant height (cm):** 158
- **Petiole color:** Greenish red
- **Leaf color:** Light green
- **Color of leaf vein:** Green
- **Orientation of petiole:** Horizontal
- **Color of stem cortex:** Light green
- **Color of stem epidermis:** Dark brown
- **Color of stem exterior:** Green yellowish
- **Growth habit of stem:** Straight
- **Color of end branches of adult plant:** Green purple
- **Branching habit:** Trichotomous
- **Shape of plant:** Compact
- **Storage root skin color:** Light brown
- **Storage root flesh color:** Pale yellow
- **Crop pest reaction:** -
- **Tuber yield (qt/ha):**
  - **Research field:** 420.8
  - **Farmers field:** 325

4.1.2.2 Year of release: 2016

4.1.2.3 Breeder/Maintainer: Awassa ARC/SRARI/
<table>
<thead>
<tr>
<th>Variety</th>
<th>Year of release</th>
<th>Breeder/Maintainer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qulle (104/72 Nigeria red)</td>
<td>2005</td>
<td>AwARC/ SARI</td>
</tr>
<tr>
<td>Kello (44/72 red)</td>
<td>2005</td>
<td>AwARC/ SARI</td>
</tr>
</tbody>
</table>
5. Enset (*Ensete ventricosum* (Welw.) Cheesman)

Enset is commonly known as "false banana" for its close resemblance to the domesticated banana plant. It is Ethiopia's most important root crop, a traditional staple crop in the densely populated south and southwestern parts of Ethiopia. Enset provides more amount of foodstuff per unit area than most cereals. It is estimated that 40 to 60 enset plants occupying 250-375 square meters can provide enough food for a family of 5 to 6 people.

Enset is a perennial, herbaceous and monocarpic crop belonging to the family *Musaceae*. The root is the main edible portion as its fruit is not edible. Each plant takes four to five years to mature, at which time a single root will give 40 kg of food. Due to the long period of time from planting to harvest, plantings need to be staggered over time, to ensure that there is enset available for harvest in every season. Enset tolerates drought better than most cereal crops. The crop represents 65% of the total crop production in the southern regions of Ethiopia. The highly carbohydrate rich corm and pseudo stem of enset serves as staple and co-staple food for about 20% of the Ethiopian population living in the southern and south-western parts of the country.

The types of food obtained from enset are kocho, bulla and amicho. Enset fiber which is the by-product of enset, has an excellent structure and strength and used for various used including making bags, ropes, twines, cordage, and mat. Enset leaves and dried leaf sheaths are also used for wrapping materials and to feed cattle especially in dry seasons when feed is scares. Some of the enset clones are used as local medication for different illness for both human being and animals.
5.1. New varieties

- No new variety are released in 2016

5.2 Varieties under production

5.2.1. Variety: Zerietta (Ashura)
5.2.1.1 Year of release: 2010
5.2.1.2 Breeder/Maintainer: Areka ARC/SARI

5.2.2. Variety: Mesena (ESKURIS)
5.2.2.1 Year of release: 2010
5.2.2.2 Breeder/Maintainer: Areka ARC/SARI

5.2.3. Variety: Kelisa (WELLANCHIE)
5.2.3.1 Year of release: 2010
5.2.3.2 Breeder/Maintainer: Areka ARC/SARI

5.2.4. Variety: Endale (Manduluka)
5.2.4.1 Year of release: 2009
5.2.4.2 Breeder/Maintainer: Areka ARC/SARI

5.2.5. Variety: Yanbule (Digomerza)
5.2.5.1 Year of release: 2009
5.2.5.2 Breeder/Maintainer: Areka ARC/SARI

5.2.6. Variety: Gewada (Henuwa)
5.2.6.1 Year of release: 2009
5.2.6.2 Breeder/Maintainer: Areka ARC/SARI
6. Yam (*Dioscorea spp*)

Yam, any of several plant species of the genus *Dioscorea* (family *Dioscoreaceae*) is native to warmer regions of both hemispheres. This thick, tropical-vine tuber is popular in Africa, the West Indies, and parts of Asia, South and Central America. By virtue of its excellent palatability, it is a high value crop. Yams are cultivated throughout the tropics, and in parts of the sub-tropics and temperate zones. In West Africa and New Guinea, the yam is a primary agricultural commodity.

People consume yams, sweet in flavor, as a cooked vegetable. In West Africa it is often pounded into a thick paste after boiling and is eaten with soup. Yams are also processed into flour that is used in the preparation of the paste. Virtually all production is used for human food. Yam is a preferred food and a food security crop in some sub-Saharan African countries. Unlike cassava, sweet potato, and aroids, one can store yam tubers for periods of up to 4 or even 6 months at ambient temperatures. This characteristic contributes to the sustaining of food supply, especially in the difficult (food scarce) period at the start of the wet season.

Yams constitute a multi-species crop. Though they can be similar in size and shape to sweet potatoes, yams are not as rich in vitamins A and C as sweet potatoes. However yams tend to be higher in protein and minerals like phosphorus and potassium. Most yams contain an acrid principle that is dissipated in cooking. *D. rotundata* and *D. alata* are the edible species most widely diffused in tropical and subtropical countries. *D. esculenta*, grown on the subcontinent of India, in southern Vietnam, and in the South Pacific islands, is one of the most nutritious yams.
6.1 New variety

- No new variety released in 2016

6.2 Varieties under production

6.2.1. Variety:
6.2.1.1 Year of release: 2012
6.2.1.2 Breeder/Maintainer: BARC

6.2.2. Variety:
6.2.2.1 Year of release: 2012
6.2.2.2 Breeder/Maintainer: BARC

6.2.3. Variety:
6.2.3.1 Year of release: 2010
6.2.3.2 Breeder/Maintainer: SARI/AWARC

Lalo (BRC-7L) Bulcha (BRC-8S)
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 *Solanaceae*. 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°C and 26°C and temperature above 32°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 2015/16 cropping season, the total area under production reaches 9,524.42 ha and the production is estimated to be over 591,563.36 quintals.
7.1 New variety
7.1.1. Variety: **EMERALD F1**

### 7.1.1.1. Agronomic and Morphological characteristics

- **Adaptation area:**
  - Altitude (masl): 700-2000
  - Temperature (°C): 18-30

- **Spacing**
- **Soil type:** Sandy loam
- **Fertilizer (kg/ha):**
  - Urea: 79
  - NPS: 142
- **Leaf coverage:** High
- **Leaf color:** Green
- **Fruit maturity (days):** 60-65 days after transplanting
- **Growth habit:** Determinate
- **Stem strength:** Strong
- **Number of fruit/cluster:** 4-5
- **Fruit shape:** Oval
- **Fruit size (gm):** 80-100
- **Cracks:** None
- **Color before maturity:** Green to orange
- **Color of ripen skin:** Bright red
- **Color of fruit flesh:** Deep red
- **Fruit firmness:** Firm
- **Fruit quality**
  - TSS%: 4
  - Acceptability: High
- **Outstanding values:** Uniform, suitable for long distance transportation

- **Crop pest reaction**
  - Intermediate resistance to TLCV and bacterial wilt diseases

- **Yield in qt/ha**
  - Research field: 768
  - Farmers field: 307

### 7.1.2. Year of release
- 2016

### 7.1.3. Breeder/Maintainer
- Sakata/Joytech Plc
7.2 Varieties under production

7.2.1. Variety:
7.2.1.1. Year of release
7.2.1.2. Breeder/Maintainer

Monica
2015
DAWNT PLC

7.2.2. Variety:
7.2.2.1. Year of release
7.2.2.2. Breeder/Maintainer

Tesha
2015
GREEN LIFE PLC

7.2.3. Variety:
7.2.3.1. Year of release
7.2.3.2. Breeder/Maintainer

Momtanz
2015
SYNGENTA PLC

7.2.4. Variety:
7.2.4.1. Year of release
7.2.4.2. Breeder/Maintainer

Chibli
2015
SYNGENTA PLC

7.2.5. Variety:
7.2.5.1. Year of release
7.2.5.2. Breeder/Maintainer

Gelilema (Oval red)
2015
MARC/EIAR

7.2.6. Variety:
7.2.6.1. Year of release
7.2.6.2. Breeder/Maintainer

Ilu-harar (CLN2498)
2015
Bako ARC/OARI

7.2.7. Variety:
7.2.7.1 Year of release
7.2.7.2. Breeder/Maintainer

Sire (CLN2400B)
2015
Bako ARC/OARI

7.2.8. Variety:
7.2.8.1. Year of release
7.2.8.2. Breeder/Maintainer

Komto (CLN2123E)
2015
Bako ARC/OARI

7.2.9. Variety:
7.2.9.1. Year of release
7.2.9.2. Breeder/Maintainer

Venise F1
2015
MARKOS PLC

7.2.10. Variety:
7.2.10.1. Year of release
7.2.10.2. Breeder/Maintainer

Agro-34/AS-198/Awassa
2015
MEKAMBA PLC
<table>
<thead>
<tr>
<th>Variety</th>
<th>Year of release</th>
<th>Breeder/Maintainer</th>
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</thead>
<tbody>
<tr>
<td>7.2.11.1</td>
<td>2015</td>
<td>MEKAMBA PLC</td>
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<td>7.2.11.2</td>
<td>2015</td>
<td>CLN-5915-93-D4 (Tekeze -1)</td>
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<td>7.2.12.1</td>
<td>2013</td>
<td>Humera ARC/TAR</td>
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<td>7.2.12.2</td>
<td>2013</td>
<td>Shanty PM F1</td>
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<td>7.2.13.1</td>
<td>2012</td>
<td>Hazera Gentic ltd</td>
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<tr>
<td>7.2.13.2</td>
<td>2012</td>
<td>(Greenline Trading PLC.)</td>
</tr>
<tr>
<td>7.2.14.1</td>
<td>2012</td>
<td>STH – 808(JEWEL) (Hybrid)</td>
</tr>
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<td>7.2.14.2</td>
<td>2012</td>
<td>Vibha Seeds Ethiopia</td>
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<tr>
<td>7.2.15.1</td>
<td>2012</td>
<td>Private Limited Company</td>
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<tr>
<td>7.2.15.2</td>
<td>2012</td>
<td>STH – 805(SYNO) (Hybrid)</td>
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<td>7.2.16.2</td>
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<td>7.2.17.1</td>
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<td>7.2.18.1</td>
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<td>7.2.18</td>
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<td>7.2.17</td>
<td>2011</td>
<td>Hazera genetics ltd.</td>
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<tr>
<td>Variety</td>
<td>Year of release</td>
<td>Breeder/Maintainer</td>
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<tr>
<td>------------------</td>
<td>-----------------</td>
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<tr>
<td>Anna F1</td>
<td>2011</td>
<td>MOGNO, MARIA RITA</td>
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<tr>
<td>EDEN F1</td>
<td>2011</td>
<td>BECK, BUNN, TERESA</td>
</tr>
<tr>
<td>TOPSPIN F1</td>
<td>2011</td>
<td>Bejo seed B.V.-Crop grow crop production PLC</td>
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<tr>
<td>Barnum</td>
<td>2011</td>
<td>Markos PLC</td>
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<td>Shanty</td>
<td>2009</td>
<td>Hazera genetics ltd. (Axum GreenlineTradingPLC)</td>
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<tr>
<td>Irma</td>
<td>2009</td>
<td>Hazera genetics ltd (Axum GreenlineTradingPLC)</td>
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<tr>
<td>CHALI (Riogrande)</td>
<td>2007</td>
<td>MARC/EIAR</td>
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<tr>
<td>COCHORO (Pace setter)</td>
<td>2007</td>
<td>MARC/EIAR</td>
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<tr>
<td>MIYA (Floralou)</td>
<td>2007</td>
<td>MARC/EIAR</td>
</tr>
<tr>
<td>Variety</td>
<td>Year of release</td>
<td>Breeder/Maintainer</td>
</tr>
<tr>
<td>---------</td>
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<tr>
<td>Lakku(CLN-657-BC-F_{2}--274-0-15)</td>
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<td>Sirinka-I (Cardinal)</td>
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<td>Mersa (Carman)</td>
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<td>Woyno (Fireball)</td>
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<td>Bishola (Floradado)</td>
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<td>Metadel (Caraibo)</td>
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<tr>
<td>Eshete (Calypso)</td>
<td>2005</td>
<td>MARC/EIAR</td>
</tr>
<tr>
<td>Melka Shola (Red Pear)</td>
<td>1997/98</td>
<td>MARC/EIAR</td>
</tr>
<tr>
<td>Melka Salsa (Serio)</td>
<td>1997/98</td>
<td>MARC/EIAR</td>
</tr>
</tbody>
</table>
8. Garlic (*Allium Sativum.*)

Garlic (*Allium sativum* L, 2n=16) belongs to the family Alliaceae and is the second most widely used *Allium* next to onion. It is originated on the northwestern side of the Tien-Shan Mountains of Kirgizia in the arid and semi arid areas of central Asia (Kazakhstan). There is evidence that it has been in use in Egypt before 2000 B.C, in India and China for more than 5000 years. Garlic is one of the most ancient cultivated herbs, and is vegetatively propagated from cloves. This mode of clone propagation allows the production of a uniform crop that preserves quality traits, such as flavor and the nutritive properties of the plant.

Garlic is used as a seasoning in many foods worldwide, without garlic many of our popular dishes would lack the flavor and character that make them favorites. Garlic's volatile oil has many sulfur containing compounds that are responsible for the strong odor, its distinctive flavor and pungency as well as for its healthful benefits. Medicinal activity seems to be highest in fresh garlic or garlic oil with high allicin content.

In Ethiopia, small growers in the highlands grow garlic traditionally but due to faulty cultural practices, yields are generally low. The yield in large-scale production with irrigation is expected to be about 10 tons per hectare. Garlic is adapted to cool climates and should not generally be planted at an altitude below 2000 m.a.s.l. Amount of rainfall during the growing period (4.5 to 6 months) should be 600 mm to 700 mm. The optimum temperature for growing garlic lies between 12°C and 24°C. Garlic withstands moderate frost. On well-drained soils, rain fed crops may be planted on flat beds; but on heavy soils, which are poorly drained during the rains; it is advisable to plant on ridges as for irrigated crops. It is essential to select land with high fertility or to apply considerable quantities of manure or fertilizers to obtain good yields.

During 2015/16 cropping season, the total area under production reaches 11,845.53 ha and the production is estimated to be 1,077434.57 quintals.
8.1 New varieties

- No new variety released in 2016

8.2 Varieties under production

8.2.1. Variety:
  8.2.1.1. Year of release
  8.2.1.2. Breeder/Maintainer

8.2.2. Variety:
  8.2.2.1. Year of release
  8.2.2.2. Breeder/Maintainer

8.2.3. Variety:
  8.2.3.1. Year of release:
  8.2.3.2. Breeder/Maintainer:

8.2.4 Variety:
  8.2.4.1 Year of release:
  8.2.4.2 Breeder/Maintainer:

8.2.5 Variety:
  8.2.5.1 Year of release:
  8.2.5.2 Breeder/Maintainer:

8.2.6 Variety:
  8.2.6.1 Year of release:
  8.2.6.2 Breeder/Maintainer:

8.2.7 Variety:
  8.2.7.1 Year of release:
  8.2.7.2 Breeder/Maintainer:

- Holeta (G - HL)
  2015
  Debre Zeit ARC/EIARI/

- Chefe (G – 104-1/94)
  2015
  Debre Zeit ARC/EIARI

- Chelenko I’ (G-147-2/94)
  2014
  Haramaya University

- Kuriftu (Acc no-G-59-2/94)
  2010
  DZARC/EIAR

- Qoricho (W-027)
  2006
  SARC/OARI

- Bishoftu Netch (W-014)
  1999/00
  DZARC/EIAR

- Tsedey 92 (G-493)
  1999/00
  DZARC/EIAR
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° C and 23° C.

During 2015/16 cropping season, the total area under production reaches over 29,517.01 hectares and the production is estimated to be over 2,648,493.54 quintals.
9.1 New variety

- No new variety released in 2016

9.2 Varieties under production

9.2.1. Variety:
9.2.1.1. Year of release
9.2.1.2. Breeder/Maintainer:

9.2.2. Variety:
9.2.2.1. Year of release
9.2.2.2. Breeder/Maintainer

9.2.3. Variety:
9.2.3.1. Year of release
9.2.3.2. Breeder/Maintainer

9.2.4. Variety:
9.2.4.1. Year of release
9.2.4.2. Breeder/Maintainer

9.2.5. Variety:
9.2.5.1. Year of release:
9.2.5.2. Breeder/Maintainer:

9.2.6. Variety:
9.2.6.1. Year of release:
9.2.6.2. Breeder/maintainer

Sirus
2015
GAWT INTERNATIONAL BUSINESS PLC/ENZA
ZADEN B.V

Regent
2015
GAWT INTERNATIONAL BUSINESS PLC/ENZA
ZADEN B.V

Red Coach
2015
GAWT INTERNATIONAL BUSINESS PLC/ENZA
ZADEN B.V

Malbec
2015
GAWT INTERNATIONAL BUSINESS PLC/ENZA
ZADEN B.V

Russet F1
2013
Hazera Gentic ltd
(Greenline Trading PLC.)

Ada F1
2013
Hazera Gentic ltd
(Greenline Trading PLC.)
9.2.7. Variety:
9.2.7.1. Year of release: 2012
9.2.7.2. Breeder/Maintainer: Vibha Seeds Ethiopia Private Limited Company

9.2.8. Variety:
9.2.8.1. Year of release: 2012
9.2.8.2. Breeder/Maintainer: Impact Mundial Agri PLC

9.2.9. Variety:
9.2.9.1. Year of release: 2012
9.2.9.2. Breeder/Maintainer: Impact Mundial Agri PLC

9.2.10. Variety:
9.2.10.1. Year of release: 2011
9.2.10.2. Breeder/Maintainer: Bejo seed B.V.-Crop grow crop production PLC

9.2.11. Variety:
9.2.11.1. Year of release: 2011
9.2.11.2. Breeder/Maintainer: Hazera genetics ltd (Greenline Trading PLC.)

9.2.12. Variety:
9.2.12.2. Breeder/Maintainer: Jones Rick

9.2.13. Variety:
9.2.13.2. Breeder/Maintainer: Markos PLC

9.2.14. Variety:
9.2.14.2. Breeder/Maintainer: MARC/ELAR

9.2.15. Variety:
9.2.15.1. Year of release: 2009
9.2.15.2. Breeder/Maintainer: Hazera genetics ltd. (Greenline Trading PLC)
9.2.16 Variety:
9.2.16.1 Year of release:
9.2.16.2 Breeder/Maintainer:

9.2.17 Variety:
9.2.17.1 Year of release:
9.2.17.2 Country of Origin:
9.2.17.3 Breeder/Maintainer:

9.2.18 Variety:
9.2.18.1 Year of release:
9.2.18.2 Breeder/Maintainer:

Nasik Red
2004
MARC/EIAR

Adama Red
Sudan
MARC/EIAR

Melkam (Pusa Red)
1997/98
MARC/EIAR
10. Shallot (*Allium cepa* var. asculonicum Barker; syn. *A. ascalonicum* auct. non L)

The shallot is believed to have come from Western Asia. It is a perennial and seldom produces seeds, but the bulb when planted divides into a number of cloves, which remain attached at the bottom. It has been in cultivation from a remote period. Bulbs (cloves) are variable in shape, size and color covered with thin red scale leaves. Shallots are important alliaceous crops cultivated in many tropical countries as a substitute for bulb onions (*Allium cepa* L. var cepa). Although bulb onions can be grown in the tropics, farmers in tropical countries prefer shallots for their ability to propagate vegetatively.

Shallots are also preferred for their shorter growth cycle, better tolerance to disease and drought stresses and longer storage life than the common onion and for their distinct flavor that persists after cooking. Shallot plants normally produce clusters of several bulb splits that number from 2 to 20 or more pieces, with an ideal marketable size of about 30-40 mm in diameter. In tropical regions, some shallot genotypes rarely flower and even where seed production is possible, the majority of shallot genotypes are clonally propagated.

Shallots in particular are widely cultivated as a source of income by peasant farmers in many parts of the Ethiopia. They have a wide range of climatic and soil adaptation and are cultivated both under rain-fed and irrigated conditions. They are grown primarily for the bulb, although the green tops may also be consumed. In Ethiopia, shallots and onions are used for flavouring the local stew, ‘wot’ and are used in many households almost daily.

The shallot is tolerant to a wide range of soils with a PH of 6.0-7.0. Loose, sandy soils with a high level of organic matter are preferable, although silt clay loams are often preferred.
10.1 New variety

10.1.1. Variety: Tropics

10.1.1.1. Agronomic and morphological characteristics

- Adaptation area:
  - Altitude (masl): 500-2500
  - Rainfall (mm): 800-1500
  - Temperature (°C): 17-25 (day 10 - night 18)

- Spacing (m):
- Seed rate:
- Fertilizer (kg/ha):
  - Urea:
  - P₂O₅:

- Leaf color:
- Leaf arrangement:
- Fruit maturity (days): 112
- Foliage length (cm): 55
- Bulb shape: Pear somewhat thick flat
- Bulb size:
- Bulb flesh color:
- Bulb skin color:
- Crop pest reaction Tolerant to major pests
- Yield in (qt/ha):
  - Research field: 285-290
  - Farmers field: ---

10.1.1.2. Year of release: 2016

10.1.1.3. Breeder/Maintainer: Melkassa ARC/EIAR

In rift valley and low to mid high land conducive area
200 at transplanting
Deep green
Erect
85-95
Light red
Medium red
---
10.1.2. Variety: **DZSHT-91-2B**

10.1.2.1. Agronomic and morphological characteristics

- **Adaptation area:**
  - Altitude (masl): 1600-2200
  - Rain fall (mm): ---

- **Spacing (m):**
  - 40cm x 20cm x 5cm double rows, rows and plants respectively

- **Fertilizer (kg/ha):**
  - Urea: 200
  - P<sub>2</sub>O<sub>5</sub>: 150

- **Leaf color:** Light green

- **Leaf arrangement:** Semi erect

- **Fruit maturity (days):** 149±22 (Low to highlands)

- **Bulb skin color:** Dark color

- **Bulb flesh color:** Red

- **Bulb shape:** Globe

- **Bulb size (gm):** 24±2

- **Plant height (cm):** 60±4

- **No. of shoots:** 2

- **No. of leaves:** 20.3±3.8

- **Leaf length (cm):** 44.7±1.9

- **Total soluble solids (%):** 13

- **Dry matter yield (%):** 14

- **Bolting (%):** 90

- **Average no. of inflorescence/plant:** 4

- **Average inflorescence length (cm):** 65

- **Average inflorescence diameter (cm):** 13

- **Average no. of florets:** 72

- **Crop pest reaction:** ---

- **Yield (qt/ha):**
  - Research field: 400
  - Farmers’ field: ---

10.1.2.2. Year of release: 2016

10.1.2.3. Breeder/Maintainer: Debreziet ARC/EIAR
10.1.3. Variety: **DZSHT-157-21**

10.1.3.1. Agronomic and morphological characteristics

- **Adaptation area:**
  - Altitude (masl)
  - Rain fall (mm) 1600-2200

- **Spacing (m):**
  - 40cm x 20cm x 5cm double rows, rows and plants respectively

- **Fertilizer (kg/ha):**
  - Urea: 200
  - P$_2$O$_5$: 150

- **Leaf color:**
  - Light green

- **Leaf arrangement:**
  - Erect

- **Fruit maturity (days):**
  - (Low to highlands) 125±19

- **Bulb skin color:**
  - Dark red color

- **Bulb flesh color:**
  - Red

- **Bulb shape:**
  - Globe

- **Bulb size (gm):**
  - 40.8±2

- **Plant height (cm):**
  - 61.4±5

- **No. of shoots:**
  - 4.3±0.6

- **No. of leaves:**
  - 53±14

- **Leaf length (cm):**
  - 50±4

- **Total soluble solids (%):**
  - 13

- **Dry matter yield (%):**
  - 16

- **Bolting (%):**
  - 86

- **Average no. of inflorescence/plant:**
  - 5

- **Average inflorescence length (cm):**
  - 64

- **Average inflorescence diameter (cm):**
  - 11

- **Average no. of florets:**
  - 63

- **Crop pest reaction:**
  - ---

- **Yield (qt/ha):**
  - Research field 350
  - Farmers’ field ---

10.1.3.2. Year of release

10.1.3.3. Breeder/Maintainer

- Debreziet ARC/EIAR
10.2 Varieties under production

10.2.1 Variety: Minjar (DZSHT-164-1B)
10.2.1.1 Year of release: 2009
10.2.1.2 Breeder/Maintainer: EIAR/DZARC

10.2.2 Variety: Yeras (Vethalam)
10.2.2.1 Year of release: 2005
10.2.2.2 Breeder/Maintainer: MARC/EIAR

10.2.3 Variety: Negele (DZSHT-50)
10.2.3.1 Year of release: 2004
10.2.3.2 Breeder/Maintainer: DZARC/EIAR

10.2.4 Variety: Huruta (DZ-SHT-91)
10.2.4.1 Year of release: 1997/98
10.2.4.2 Breeder/Maintainer: MARC/EIAR
11. Sweet/Hot Pepper (*Capsicum annum*) and Chili (*Capsicum frutescens*)

Pepper is a seasonal plant of the family *Solanaceae*. It is grown as an annual crop and produced for its fruits. It is one of the most important vegetable crops for fresh consumption (as chilies), for processing and as a spice (for making stew). It is also a very important crop for spice extraction since it has a lot of Oleoresin for dying of food items. Dried peppers may be reconstituted whole, or processed into flakes or powders. Chili or *C. frutescens* (known as barbaré) is important to the national cuisine of Ethiopia, at least as early as the 19th century, "that it was cultivated extensively in the warmer areas wherever the soil was suitable." Although it was grown in every province, barbaré was especially extensive in Yejju and Mareqo areas.

The fruit of most species of *Capsicum* contains capsaicin (methyl vanillyl nonenamide), a lipophilic chemical that can produce a strong burning sensation in the mouth of the unaccustomed eater. Most mammals find this unpleasant, whereas birds are unaffected. The secretion of capsaicin protects the fruit from consumption by mammals while the bright colors attract birds that will disperse the seeds. Capsaicin is present in large quantities in the placental tissue (which holds the seeds), the internal membranes, and to a lesser extent, the other fleshy parts of the fruits of plants in the genus *Capsicum*. The amount of capsaicin in Capsicums is highly variable and dependent on genetics and environment, giving almost all types of Capsicums varied amounts of perceived heat. The only Capsicum without capsaicin is the bell pepper, a cultivar of *Capsicum annuum*, which has a zero rating on the Scoville scale. The lack of capsaicin in bell peppers is due to a recessive gene that eliminates capsaicin and, consequently, the "hot" taste usually associated with the rest of the Capsicum family.

The plant requires a hot and dry climate free of frost and suitable agro ecological areas. Suitable altitude ranges for optimum production of pepper is between 1000 and 1800 m.a.s.l. During 2015/16 cropping season, the total area cultivated of pepper (Green and Red peppers) was 150,244.75 hectares and the total production was estimated 3,086,445.22 quintals.
11a. Chili pepper (*Capsicum frutescence*)

11a.1. New varieties

11a.1.1. Variety: *Melka dera* (PBC 586)

11a.1.1.1. Agronomic and morphological characteristics

- **Adaptation area:** In rift valley and all irrigable area
  - Altitude (masl): 1000-2200
  - Rain fall (mm): 800-1200
  - Temp (C°): 29/14
  - Soil type: Sandy loam, silt loam
- **Planting time:** Early Jan - early Feb
- **Seed rate (kg/ha):** 0.7-0.8
- **Fertilizer (kg/ha):**
  - Urea: 200 at transplanting
  - P₂O₅: 100 (50% during transplanting & 50% after 1 & 1/2 months)
- **Days to 50% flower:** 46.72
- **Fruit maturity (days):** 118
- **Plant height:** 68.25
- **Growth habit:** Erect
- **Flower color:** White
- **Color at maturity:** Deep green
- **Color of dried pod:** Bright red
- **No. of fruit/plant:** 165
- **Plant canopy (cm):** 65
- **Pungency:** High
- **Crop pest reaction:** 1
- **Acceptability/use:** Fresh market + processing
- **Yield (dry) (qt/ha):**
  - Research field: 25 - 32
  - Farmers field: 18 - 22
- **Year of release:** 2016
- **Breeder/Maintainer:** Melkassa ARC/EIAR
11a.1.2. Variety: **Melka Oli (PBC 142A)**

11a.1.2.1. Agronomic and Morphological characteristics

- **Adaptation area:** In rift valley and all irrigable area
  - Altitude (masl): 1000-2200
  - Rain fall (mm): 800-1200
  - Temp (°C): 29/14
  - Soil type: Sandy loam, silt loam
- **Planting time:** Early Jan - early Feb
- **Seed rate (kg/ha):** 0.7-0.8
- **Fertilizer (kg/ha):**
  - DAP: 200 at transplanting
  - Urea: 100 (50% during transplanting & 50% after 1 & 1/2 months)
- **Days to 50% flower:** 46.66
- **Fruit maturity (days):** 110
- **Plant height:** 62.75
- **Growth habit:** Erect
- **Flower color:** White
- **Color at maturity:** Light green
- **Color of dried pod:** Light red
- **No. of fruit/plant:** 205
- **Plant canopy (cm):** 60
- **Pungency:** Very high
- **Crop pest reaction:**
- **Number of pedicle/axis:** 1
- **Acceptability/use:** Fresh market + processing
- **Yield (dry)(qt/ha):**
  - Research field: 27 - 35
  - Farmers field: 20 - 26

11a.1.2.2. Year of release: 2016

11a.2.2.3. **Breeder/Maintainer:** Melkassa ARC/EIAR
11a.2 Varieties under production

11a.2.1 Variety: Melka Shote (PBC 223)
11a.2.1.1 Year of release: 2006
11a.2.1.2 Breeder/Maintainer: MARC/EIAR

11a.2.2 Variety: Melka Awaze (PBC 600)
11a.2.2.1 Year of release: 2006
11a.2.2.2 Breeder/Maintainer: MARC/EIAR

11a.2.3 Variety: Oda Haro
11a.2.3.1 Year of release: 2005
11a.2.3.2 Breeder/Maintainer: BARC/OARI

11a.2.4 Variety: Melka Zala (PBC 972)
11a.2.4.1 Year of release: 2004
11a.2.4.2 Breeder/Maintainer: MARC/EIAR
11b. Sweet/ Hot Pepper (*Capsicum annum*)

11b.1. New varieties

11b.1.1. Variety: MEXITIZO RZ F1

11b.1.1.1. Agronomic and Morphological characteristics

- **Adaptation area:**
  - Altitude (masl) 1400-2100
  - Rain fall (mm) ***
- **Soil type:** Sandy loam
- **Planting time:** ***
- **Seed rate (kg/ha):** ***
- **Spacing (cm):** 70cm between rows and 30cm between plants
- **Fertilizer (kg/ha):**
  - NPS: 242
  - Urea: 79
- **Days to 50% flower:** 80-90 days after transplanting
- **Fruit maturity:** 50-65
- **Plant height (cm):** Up right
- **Growth habit:** 10-13
- **Pod length (cm):** 1.6-1.8
- **Pods diameter (cm):**
- **Green pod color:** Green to dark green
- **Color of dried pod:** Red to brown
- **No. of pods/plant:** 40-70
- **Pungency:** High
- **Principal use:** Fresh market with good shelf life
- **Crop pest reaction:** ***
- **Yield (qt/ha):**
  - Research field 197
  - Farmers field 121

11b.1.1.2. Year of release 2016

11b.1.1.3. Breeder/Maintainer

Rijk Zwaan Zaadteee en Zaadhandel.B.V/Joytech Plc
11b.2 Varieties under production

11b.2.1. Variety: Kume (223662)
   11b.2.1.1. Year of release: 2015
   11b.2.1.2. Breeder/Maintainer: Bako ARC/OARI

11b.2.2. Variety: Dinsire (224665)
   11b.2.2.1. Year of release: 2015
   11b.2.2.2. Breeder/Maintainer: Bako ARC/OARI

11b.2.3. Variety: Dame (244666)
   11b.2.3.1. Year of release: 2015
   11b.2.3.2. Breeder/Maintainer: Bako ARC/OARI

11b.2.4. Variety: Vigro F1
   11b.2.4.1. Year of release: 2015
   11b.2.4.2. Breeder/Maintainer: MARKOS PLC

11b.2.5. Variety: Harbad F1
   11b.2.5.1. Year of release: 2015
   11b.2.5.2. Breeder/Maintainer: MARKOS PLC

11b.2.6. Variety: Serano
   11b.2.6.1. Year of release: 2015
   11b.2.6.2. Breeder/Maintainer: Mekamba PLC

11b.2.7. Variety: Sahem
   11b.2.7.1 Year of release: 2013
   11b.2.7.2 Breeder/Maintainer: Syngenta seeds
                              B.V./Syngenta Agroservice
                              AG Ethiopia

11b.2.8. Variety: Saidah
   11b.2.8.1 Year of release: 2013
   11b.2.8.2 Breeder/Maintainer: Syngenta seeds
                              B.V./Syngenta Agroservice
                              AG Ethiopia.
11b.2.9 Variety: CAPSI (SCH – 902 F1)
11b.2.9.1 Year of release: 2012
11b.2.9.2 Breeder/Maintainer: Vibha Seeds Ethiopia
Private Limited Company

11b.2.10 Variety: SPICY (SCH -922 F1)
11b.2.10.1 Year of release: 2012
11b.2.10.2 Breeder/Maintainer: Vibha Seeds Ethiopia
Private Limited Company

11b.2.11 Variety: SCH-925 F1
11b.2.11.1 Year of release: 2012
11b.2.11.2 Breeder/Maintainer: Vibha Seeds Ethiopia
Private Limited Company

11b.2.12 Variety: SUPREME (SCH -942 F1)
11b.2.12.1 Year of release: 2012
11b.2.12.2 Breeder/Maintainer: Vibha Seeds Ethiopia
Private Limited Company

11b.2.13 Variety: Serenade
11b.2.13.1 Year of release: 2011
11b.2.13.2 Breeder/Maintainer: Hazera genetics ltd
(Greenline Trading PLC.)

11b.2.14 Variety: Melka Dima (Papri King)
11b.2.14.1 Year of release: 2004
11b.2.14.2 Breeder/Maintainer: MARC/EIAR

11b.2.15 Variety: Melka Eshet (Papri Queen)
11b.2.15.1 Year of release: 2004
11b.2.15.2 Breeder/Maintainer: MARC/EIAR
12. Cabbage (*Brassica oleracea*)

The word cabbage (botanically *Brassica oleracea*, capitata group) refers to several leafy garden plants of the Mediterranean origin. These small plants have a short stem and a globular head of tightly overlapping green to purplish leaves. As far as their heads are concerned they are compact or loose.

The word 'cabbage' originates from the French word caboche, a colloquial term for "head". The Scots termed its stalk as castock, and the British call its head a loaf. It can be cooked in a variety of ways or eaten raw, as in slaw.

As the cabbage plant grows, its leaves increase in number, forming a ball-shaped "head" at the center of the plant. This cruciferous vegetable contains higher concentrations of Vitamin C, minerals, and dietary fiber.

Cabbage has been cultivated for more than 4,000 years and domesticated for over 2,500 years. Cabbage grows well in cool climates, and yields large harvests. Cabbage, both red and green, is one of the least expensive of the vitamin-protective foods, and is one of the most healthful vegetables. It is an excellent source of vitamin C. Cabbage is alkaline in reaction, high in cellulose or roughage, and has very low calorie content and is very effective in helping overcome constipation, and sauerkraut, or sauerkraut juice, is particularly good for a sluggish intestinal tract, and for more serious cases of constipation.

In Ethiopia, the total area covered by head cabbage in 2015/2016 cropping season was 7,197.70 ha and the total production during this season was about 463,177.16 quintals.
12.1 New varieties
12.1.1. Variety: Green boy F1
12.1.1.1. Agronomic and Morphological characteristics

- Adaptation area
  - Altitude (masl) 1200-2500
  - Rain fall (mm) -
  - Temperature (° C) 15 -35
- Planting season: All year round
- Seed rate (kg/ha): 1.8
- Spacing:
  - 60cm between rows
  - 40cm between plants
- Fertilizer (kg/ha)
  - NPS: 242
  - Urea: 79
- Days to maturity: 75-80 after transplanting
- Plant length (cm): 35-40
- Growth habit: Up right
- Head shape: Round
- Leaf color: Green
- Head color: Light green
- Head weight (kg): 2-3
- Head diameter (cm): 16-20
- Head length (cm): 16-18
- Head compactness: Compact
- Color of inner part: Light green-yellow white
- Storability: Good shelf life
- Outstanding values:
  - Very quick growing
  - adaptable and very uniform
  - Tolerant to fusarium yellows
- Crop pest reaction:
- Yield (qt/ha)
  - Research field 646
  - Farmers' field 619
12.1.1.2. Year of release
- 2016
12.1.1.3. Breeder/Maintainer
- Sakata/Joytech Plc
### 12.2 Varieties under production

<table>
<thead>
<tr>
<th>Variety</th>
<th>Year of release</th>
<th>Breeder/Maintainer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bandung F1</td>
<td>2015</td>
<td>MARKOS PLC</td>
</tr>
<tr>
<td>Landini F1</td>
<td>2013</td>
<td>Hazera genetics ltd (Greenline Trading PLC)</td>
</tr>
<tr>
<td>Gloria</td>
<td>2013</td>
<td>Syngenta seeds BV/Syngenta Agro-service AG Ethiopia</td>
</tr>
<tr>
<td>OPTIKO F1</td>
<td>2013</td>
<td>Crop Grow PLC</td>
</tr>
<tr>
<td>K 500</td>
<td>2011</td>
<td>Hazera genetics ltd (Greenline Trading PLC)</td>
</tr>
<tr>
<td>OXYLUS F1</td>
<td>2011</td>
<td>Carl Scholten</td>
</tr>
<tr>
<td>VICTORIA F1</td>
<td>2011</td>
<td>Carl Scholten</td>
</tr>
<tr>
<td>ROTONDA F1</td>
<td>2011</td>
<td>Bejo seed B.V.-Crop grow crop production PLC</td>
</tr>
<tr>
<td>THOMAS F1</td>
<td>2011</td>
<td>Bejo seed B.V.-Crop grow crop production PLC</td>
</tr>
</tbody>
</table>
13. Carrot (*Daucus carota* L.)

The carrot (*Daucus carota* L.) belongs to the family Apiaceae. The carrot originated in Asia. Initially the roots were long and thin, and either purple or yellow in colour. These colours, as well as white and orange, still exist, with the orange or orange-red colours being by far the most popular today. Many shapes of roots also exist, from rather long and thin roots to shorter and thick. Roots may be cylindrical, conical, or even spherical in shape. Carrots are particularly rich in carotene (pro-vitamin A).

They are consumed either fresh, as a salad crop, or cooked. Large quantities are also processed, either alone or in mixtures with other vegetables, by canning, freezing or dehydration. The plant is a biennial, i.e. it grows vegetatively in the first season and produces seed in the second. For root production the plant is grown as an annual. Bolting to seed in spring is possible in carrot plantings grown over the winter period.

In Ethiopia, the area covered by carrot in 2015/16 is about 3,823.41 ha and the total production is estimated to be 167,513.76 quintals.
13.1 New varieties

- No new varieties released in 2016

13.2 Varieties under production

13.2.1 Variety: Haramaya 1 (AUA-108)
13.2.1.1 Year of release: 2014
13.2.1.2 Breeder/Maintainer: Haramaya University

13.2.2 Variety: SAMSON
13.2.2.1 Year of release: 2011
13.2.2.2 Breeder/Maintainer: Bejo seed B.V.-Crop grow crop production PLC
14. Lettuce (*Lactuca sativa*)

14.1 New variety

- No new varieties released in 2016

14.2 Varieties under production

14.2.1 Variety:
14.2.1.1 Year of release
14.2.1.2 Breeder/Maintainer:

14.2.2 Variety:
14.2.2.1 Year of release
14.2.2.2 Breeder/Maintainer:

14.2.3. Variety:
14.2.3.1. Year of release
14.2.3.2. Breeder/Maintainer:

14.2.4 Variety:
14.2.4.1. Year of release
14.2.4.2. Breeder/Maintainer:

14.2.5. Variety:
14.2.5.1 Year of release:
14.2.5.2 Breeder/Maintainer:

14.2.6. Variety:
14.2.6.1 Year of release
14.2.6.2 Breeder/Maintainer:
14.2.7. Variety: Rousso RZ F1
14.2.7.1 Year of release: 2013
14.2.7.2 Breeder/Maintainer: Crop grow PLC

14.2.8. Variety: Levistro RZ F1
14.2.8.1 Year of release: 2013
14.2.8.2 Breeder/Maintainer: Rijk Zwaan Zaadhandel B.V. Burg.

14.2.9. Variety: Concorde NZ F1
14.2.9.1 Year of release: 2013
14.2.9.2 Breeder/Maintainer: Crop grow PLC

14.2.10 Variety: Nation NZ F1
14.2.10.1 Year of release: 2013
14.2.10.2 Breeder/Maintainer: Crop grow PLC

14.2.11 Variety: Aviram F1 (Iceberg type)
14.2.11.1 Year of release: 2013
14.2.11.2 Breeder/Maintainer: Hazera genetics ltd (Greenline Trading PLC.).

14.2.12 Variety: Tesfa/Maya
14.2.12.1 Year of release: 2012
14.2.12.2 Breeder/Maintainer: MekelleARC/TARI
15. Snap bean (*Phaseolus vulgaris* L)

15.1 New varieties

15.1.1. Variety: **Plati**

15.1.1.1. Agronomic and morphological characteristics

- **Adaptation area**
  - Altitude (masl): 1100-1800
  - Rain fall (mm): -
  - Temperature (°C): 18 -30
- **Soil type:** Sandy loam
- **Planting season:** –
- **Seed rate (kg/ha):** 50-60
- **Spacing:**
  - 40cm between rows
  - 10cm between plants
- **Fertilizer (kg/ha)**
  - NPS: 142
  - Urea: 79
- **Days to 50% flowering:** 40-45 after sowing
- **Plant length (cm):** 45-50
- **Growth habit:** Bush
- **Flower color:** White
- **Ground coverage:** High
- **Average pod weight (gm):** 8
- **Pod length (cm):** 12-15
- **Pod diameter (mm):** 6-8
- **Fiber:** None
- **Pod curvature:** Straight
- **Pod shape:** Round
- **Pod color:** Dark green
- **Outstanding value:** Dark green color, straight and fibreless pod
- **Crop pest reaction:** Relatively tolerant to rust
- **Yield (qt/ha)**
  - Research field: 117
  - Farmers' field: 96

15.1.1.2. Year of release

2016

15.1.1.3. Breeder/Maintainer

Melkassa ARC/EIAR
15.2 Varieties under production

15.2.1. Variety: B.C 4.4
15.2.1.1 Year of release: 2012
15.2.1.2 Breeder/Maintainer: MARC/EIAR
16. Water melon (*Citrullus lanatus*)

16.1. New variety

- No new varieties released in 2016

16.2. Variety under production

16.2.1. Variety:
16.2.1.1. Year of release: 
16.2.1.2. Breeder/Maintainer: Polimore

2015
GREENLIFE PLC

16.2.2. Variety:
16.2.2.1. Year of release: 
16.2.2.2. Breeder/Maintainer: Lahat F1

2013
Hazera genetics ltd
(Greenlife Trading PLC )

16.2.3. Variety:
16.2.3.1. Year of release: 
16.2.3.2. Breeder/Maintainer: Augusta

2013
Syngenta seeds
B.V./Syngenta Agroservice AG Ethiopia.

16.2.4. Variety:
16.2.4.1. Year of release: 
16.2.4.2. Breeder/maintainer: Ria (SWMH121)

2013
ViBHA Seed Ethiopia PLC

16.2.5. Variety:
16.2.5.1. Year of release: 
16.2.5.2. Breeder/maintainer: Candy (SWMH 123)

2013
ViBHA Seed Ethiopia PLC
17. Musk melon (*Cucumis melo*)

17.1. New variety

17.1.1. Variety: **Glory F1**

17.1.1.1. Agronomic and morphological characteristics

- **Adaptation area**
  - Altitude (masl): 700-2000
  - Rain fall (mm): -
  - Temperature (°C): 16-25 night, 25-35 day

- **Seed rate (kg/ha):** 2.5-3
- **Spacing (m):** 1.8-2 between rows
  - 0.5m between plants

- **Fertilizer (kg/ha):**
  - NPS: 242
  - Urea: 79

- **Days to maturity:** 70 after transplanting
- **Plant length (m):** 0.5-1
- **Fruit shape:** Round
- **Leaf color:** Green
- **Fruit color:** Yellowish green
- **Fruit weight (gm):** 850
- **Fruit diameter (cm):** 12-15
- **Fruit length (cm):** 13
- **Color of inner part:** Light green
- **Storability:** Long shelf life
- **Outstanding values:** High yield, uniform, single harvest, long shelf life and small seed cavity

- **Crop pest reaction:** -
- **Yield (qt/ha):**
  - Research field: 218
  - Farmers’ field: -

17.1.1.2. Year of release: 2016

17.1.1.3. Breeder/Maintainer: Origene seeds Ltd
  /Joytech Plc
18. Green courgette (*Cucurbita* spp)

18.1. New variety
- No new variety released in 2016

18.2. Variety under production

18.2.1. Variety: Borja
18.2.1.1. Year of release: 2013
18.2.1.2. Breeder/Maintainer: Crop grow PLC

19. Yellow courgette (*Cucurbita* spp)

19.1. New variety
- No new variety released in 2016

19.2. Variety under production

19.2.1. Variety: Soleil
19.2.1.1. Year of release: 2013
19.2.1.2. Breeder/Maintainer: Crop grow PLC

20. Broccoli (*Brassica oleracea*)

20.1. New variety
- No new variety released in 2016

20.2. Variety under production

20.2.1. Variety: Agassi
20.2.1.1. Year of release: 2013
20.2.1.2. Breeder/Maintainer: Crop grow PLC

20.2.2. Variety: LUCKY F1
20.2.2.1. Year of release: 2011
20.2.2.2. Breeder/Maintainer: Bejo seed B.V.-Crop grow crop production PLC
21. Cauliflower (*Brassica oleracea*)

21.1. New variety

21.1.1. Variety: MONEERA RZ F1

21.1.1.1. Agronomic and Morphological characteristics

- **Adaptation area**
  - Altitude (m.a.s.l): 1400-2500
  - Rain fall (mm)
  - Temperature ($^\circ$C): 15-22

- **Planting date**: Year-round

- **Seed rate (seeds/ha)**: 45000

- **Spacing (cm)**: 70 between rows and
  - 40 between plants

- **Fertilizer (kg/ha)**
  - NPS: 242
  - Urea: 79

- **Days to maturity**: 70-85 days after transplanting

- **Plant length**: Short to medium

- **Growth habit**: Upright/erect

- **Head shape**: Round to flat round

- **Leaf color**: Grey green

- **Head color**: Whitish

- **Head weight (kg)**: 1.5

- **Head diameter (cm)**: 17-23

- **Head length (cm)**: 10-13

- **Head compactness**: Compact

- **Color of inner part**: White

- **Storability**: Medium

- **Outstanding values**: Fast growing and good head quality

- **Crop pest reaction**: -

- **Yield in qt/ha**
  - Research field: 540
  - Farmers’ field: 423


21.1.1.3. Breeder/Maintainer: RijkZwaanZaadteelten
  - Zaadhandel B.V/Joytech Plc
21.2. Variety under production

21.2.1. Variety: Novaria
21.2.1.1. Year of release: 2015
21.2.1.2. Breeder/Maintainer: GAWT INTERNATIONAL BUSINESS PLC/ENZA ZADEN B.V FLAMENCO F1

21.2.2. Variety: Crop grow PLC
21.2.2.1. Year of release: 2013
21.2.2.2. Breeder/Maintainer: Crop grow PLC

22. Red beet (*Beta vulgaris*)

22.1. New variety
- No new variety released in 2016

22.2. Variety under production

22.2.1. Variety: BORO F1
22.2.1.1. Year of release: 2013
22.2.1.2. Breeder/Maintainer: Crop grow PLC

23. Snap pea (*Pisum sativum var. macrocarpon*)

23.1. New variety
- No new variety released in 2016

23.2. Variety under production

23.2.1. Variety: QUARTZ
23.2.1.1. Year of release: 2013
23.2.1.2. Breeder/Maintainer: Crop grow PLC

23.2.2. Variety: NORBU
23.2.2.1. Year of release: 2013
23.2.2.2. Breeder/Maintainer: Crop grow PLC
24. Snow pea (*Pisum sativum var. saccharatum*)

24.1. New variety
   - No new variety released in 2016

24.2. Variety under production

24.2.1. Variety: GARNET
24.2.1.1. Year of release: 2013
24.2.1.2. Breeder/Maintainer: Crop grow PLC

24.2.2. Variety: ZIRKON
24.2.2.1. Year of release: 2013
24.2.2.2. Breeder/Maintainer: Crop grow PLC

25. Sweet corn (*Zea mays var. rugosa*)

25.1. New variety
   - No new variety released in 2016

25.2. Variety under production

25.2.1. Variety: NOA F1
25.2.1.1. Year of release: 2013
25.2.1.2. Breeder/Maintainer: Crop grow PLC

26. Fine bush

26.1. New variety
   - No new variety released in 2016

26.2. Variety under production

26.2.1. Variety: ADANTE
26.2.1.1. Year of release: 2013
26.2.1.2. Breeder/Maintainer: Crop grow PLC
26.2.2. Variety:
26.2.2.1. Year of release
26.2.2.2. Breeder/Maintainer:

26.2.3. Variety:
26.2.3.1. Year of release
26.2.3.2 Breeder/Maintainer:

26.2.4. Variety:
26.2.4.1 Year of release
26.2.4.2 Breeder/Maintainer:

LOMAMI
2013
Crop grow PLC

BOSTON
2013
Crop grow PLC

VOLTA
2013
Crop grow PLC
27. Okra (*Abelmoschus esculentus* L. Monech)

Okra (*Abelmoschus esculentus* L Monech) is a vegetable crop that belongs to the genus *Abelmoschus* and family *Malvaceae*. It is a common vegetable crop grown under tropical and subtropical conditions. Okra apparently originated in what the geobotanists call the Abyssinian center of origion of cultivated plants, an area that includes present-day Ethiopia, the mountainous or plateau portion of Erteria, and the eastern, higher part of the Anglo-Egyptian Sudan.

Okra is especially valued for its tender delicious fruits and is a good source of iodine and calcium. Apart from its nutritive value, matured fruits and stems containing crude fiber are used in paper industry. It can be eaten grated raw or cooked. It possesses high nutritive value, which is higher than tomatoes, eggplant and most cucurbits except bitter gourds (Berry *et al.*, 1988) The dried okra pods are also consumed directly and it is also used as flavoring in preparing other food products.

In Ethiopia okra is cultivated for local consumption by small scale farmers in low land parts of Ethiopia like western low land of Tigray, Gambella, Benishangul Gumuz, and Metema areas. However no research effort was made in variety development ad improved agronomic practiecess of the crop.
27.1 New varieties

27.1.1 Variety: Bamya-Humera (Acc#23793)

27.1.1.1. Agronomic and morphological characteristics

- Adaptation area
  - Altitude (m.a.s.l): 609 - 696
  - Rain fall (mm): 563 - 888
  - Temperature (°C): 18.8 - 37.6
- Planting date: Early to mid July
- Seed rate (kg/ha): 45 cm between rows and 30 cm between plants
- Spacing (cm):
- Fertilizer (kg/ha):
  - NPS: 100
  - Urea: 100
- Days to first picking: 45 - 53
- Pod color: Green
- Green pod size (g): 32 - 38
- Plant height (cm): 150 - 170
- Number of pods per plant: 18 - 24
- Crop pest reaction: Relatively tolerant to insect pests
- Green Pod yield (qt/ha):
  - Research field: 184.7
  - Farmers' field: 140 - 160

27.1.1.2. Year of release: 2016
27.1.1.3. Breeder/Maintainer: Humera ARC/TARI

27.2. Variety under production

27.2.1 Variety: Slender (SOH-701)
27.2.1.1 Year of release: 2013
27.2.1.2 Breeder/Maintainer: ViBHA Seed Ethiopia PLC
Group V. Condiments and Medicinal Plants

The history of spices, condiments, and other flavoring material is one of the most romantic in the history of vegetable products.

The majority of spices originated in the Asiatic tropics and was among the 1st objects of commerce between the East and the West. Their aromatic qualities were useful in overcoming the odors of bad food and unwashed humanity. They were used in beverages, in medicine and even in lieu of money.

Spices cannot be classed as foods for they contain little of nutrition value. They do, however, give an agreeable and aroma to food, and add greatly to the pleasure of eating. They stimulate the appetite and increase the flow of the gastric juices, for this reason they are often referred to as food accessories or adjuncts. Whatever value they have is due to the presence of the essential oils, and occasionally to other aromatic principles.
1. Coriander (*Coriandrum sativum* L.)

1.1 New varieties

- No new variety released in 2016.

1.2. Varieties under production

1.2.1 Variety: 
**INDIUM 01**
1.2.1.1 Year of registration: 2008
1.2.1.2 Breeder/Maintainer: DZARC

1.2.2 Variety: 
**Walta-I (229710)**
1.2.2.1 Year of release: 2006
1.2.2.2 Breeder/Maintainer: SARC/OARI

2. Black pepper (*Piper nigrum* L.)

2.1 New varieties

- No new variety released in 2016.

2.2 Varieties under production

2.2.1 Variety: 
**TATO (Srl.3/80)**
2.2.1.1 Year of registration: 2007
2.2.1.2 Breeder/Maintainer: JARC/EIAR

2.2.2 Variety: 
**GACHEB (Pan. 4/80)**
2.2.2.1 Year of registration: 2007
2.2.2.2 Breeder/Maintainer: JARC/EIA
3. Ginger (*Zingiber officinalis* Rosc)

3.1 New varieties

- No new variety released in 2016

3.2 Varieties under production

3.2.1 Variety: YALI (Miz. 180/73)
3.2.1.1 Year of registration: 2007
3.2.1.2 Breeder/Maintainer: JARC/EIAR

3.2.2 Variety: BOZIAB (Mau. 37/79)
3.2.2.1 Year of registration: 2007
3.2.2.2 Breeder/Maintainer: JARC/EIAR

4. Turmeric (*Curcuma domestica*)

4.1 New varieties

- No new variety Released in 2016

4.2 Varieties under production

4.2.1 Variety: DAMEY (Ind. 48/72)
4.2.1.1 Year of registration: 2007
4.2.1.2 Breeder/Maintainer: JARC/EIAR
5. Cardamom (*Elettaria cardamomum*)

5.1 New varieties
- No new variety released in 2016

5.2 Varieties under production

5.2.1 Variety: GENE (Tan. 82/72)
5.2.1.1 Year of registration: 2007
5.2.1.2 Breeder/Maintainer: JARC/EIAR

6. Sweet annie (*Artemisia annua*)

6.1 New varieties
- No new variety released in 2016

6.2 Varieties under production

6.2.1 Variety: WENDO (∩γερ)
6.2.1.1 Year of registration: 2007
6.2.1.2 Breeder/Maintainer: EORC/EIAR

7. Citronella grass (*Cymbopogon winteranius*)

7.1 New varieties
- No new variety released in 2016

7.2 Varieties under production

7.2.1 Variety: Citronella (∣اليابان)
7.2.1.1 Year of registration: 2007
7.2.1.2 Breeder/Maintainer: EORC/EIAR
8. Pyrethrum (*Chrysanthemum cinerariaefolium*)

8.1 New varieties

- No new variety released in 2016

8.2 Varieties under production

8.2.1 Variety: BEKOJI (Clone Ku-59)
8.2.1.1 Year of registration: 2007
8.2.1.2 Breeder/Maintainer: KARC/EIAR

8.2.2 Variety: Workyie (Clone Ku-73)
8.2.2.1 Year of registration: 2007
8.2.2.2 Breeder/Maintainer: KARC/EIAR
9. Black cumin (*Nigella sativa*)

9.1 New varieties


9.1.1.1 Agronomic and morphological characteristics

- Adaptation area: Mid and high lands
  - Altitude (m.a.s.l): 1650-2400
  - Rainfall (mm): 120-500
- Seed rate (kg/ha): 15
- Planting date: September-1st week of November
- Fertilizer rate (kg/ha):
  - N: 60
- Days to flowering: 85
- Days to maturity: 131
- Plant height (cm): 53.81
- Growth habit: Erect and condensed branching and leafy at head
- Average moisture content (%): 5.57
- Oleoresin: 23.8
- Crop pest reaction: No pest was observed
- Yield (qt/ha):
  - Research field: 21.45
  - Farmers' field: --

9.1.1.2 Year of released: 2016

9.1.1.3 Breeder/maintainer: Sinana ARC/OARI
9.1.2. Variety: Gemmachis (MAB-018)

9.1.2.1. Agronomic and morphological characteristics

- Adaptation area: Mid and high lands
  - Altitude (m.a.s.l.): 1650-2400
  - Rainfall (mm): 120-500
- Seed rate (kg/ha): 15
- Planting date: September-1st week of November
- Fertilizer rate (kg/ha):
  - N: 60
- Days to flowering: 87
- Days to maturity: 150
- Plant height (cm): 50.39
- Growth habit: Erect and condensed branching and leafy at head
- Average moisture content (%): 5.67
- Oleoresin: 28.4
- Crop pest reaction: No pest was observed
- Yield (qt/ha)
  - Research field: 19.6
  - Farmers' field: --

9.1.2.2. Year of released: 2016

9.1.2.3. Breeder/maintainer: Sinana ARC/OARI
9.2 Varieties under production

9.2.1 Variety:
  9.2.1.1 Year of release:
  9.2.1.2 Breeder/Maintainer:

9.2.2 Variety:
  9.2.2.1 Year of release:
  9.2.2.2 Breeder/Maintainer:

9.2.3 Variety:
  9.2.3.1 Year of release:
  9.2.3.2 Breeder/Maintainer:

DERSHYE (eníçë) (223071)
  2009
  MARC

ADEN (éë') (Yemen 1)
  2009
  MARC/

Darbera (229806)
  2006
  SARC/OARI
10. Lemmon grass (*Cymbopogon citratus* (DC) Stapf)

Lemmongrass (*Cymbopogon citratus* (DC) Stapf) is a perennial aromatic tropical $C_4$ grass that belongs to the family Poaceae. The genus *Cymbopogon* comprises about 140 species, of which lemongrass (*Cymbopogon citratus* (DC) Stapf) is one of the three aromatic grasses considered economically important for the production of essential oils and aromatic herbs. The name lemongrass is derived from the typical lemon like odor of the EO present in the shoot.

Lemongrass can be used as carminative, insect repellant and widely used as herbal tea. It has a remedial properties and is used to treat bronchitis, sinusitis, cold, fever, malaria, hemorrhoids, toothache, baby oil, massage oil, ointment for body, oil for rheumatism, oil for beauty mask, herbal baths, sop and candle making industries and herbal cooking’s.
10.1 New varieties

- No new varieties released in 2016

10.2 Varieties under production

10.2.1. Variety:  
10.2.1.1. Year of release:  
10.2.1.2. Breeder/Maintainer:  

10.2.2. Variety:  
10.2.2.1. Year of release: 2014  
10.2.2.2. Breeder/Maintainer:  

10.2.3. Variety:  
10.2.3.1 Year of registration:  
10.2.3.2 Breeder/Maintainer:  

11. Peppermint (*Mentha piperita* L.)

11.1 New varieties

- No new variety released in 2016

11.2 Varieties under production

11.2.1. Variety:  
11.2.1.1 Year of registration:  
11.2.1.2 Breeder/Maintainer:  

WG-Lomisar-UA  
2014  
Wondo Genet ARC

WG-Lomisar-Java  
Wondo Genet ARC

LOMISAR-1  
2011  
Wondo Genet ARC

Liyu  
2011  
Wondo Genet ARC
12. Speare mint (*Mentha spicata* L.)

Mints comprise a group of species of the genus *Mentha* belonging to the family Lamiaceae. Among mint species, spearmint (*Mentha spicata* L.) is considered an industrial crop as it is a source of essential oils enriched in certain monoterpenes like carvol, dihydrocarveole, dihydrocarveylacetate, menthol, menthone, caryophyllene, terpineol and cubebene which is widely used in food, flavor, cosmetic and pharmaceutical industries.

Spearmint is well adapted to climatic conditions in tropical and subtropical areas. It can be cultivated in wide range of soils and found in back gardens of homesteads. A climate with adequate and regular rainfall and good sunshine during its growing period ensures a good yield. Mint in general is succulent crop that has a high water requirement during its active growth period. The water requirements of mints differ from location to location depending on soil type, soil fertility status and climatic factors.
12.1 New varieties
- No new varieties released in 2016

12. 2 Varieties under production

12.2.1. Variety: WG-SPM-FRAN
12.2.1.1. Year of release: 2014
12.2.1.2. Breeder/Maintainer: Wondo Genet ARC

12.2.2. Variety: WGSM-03
12.2.2.1 Year of registration: 2011
12.2.2.2 Breeder/Maintainer: Wondo Genet Agricultural Research Center


13.1 New varieties
- No new variety released in 2016

13. 2 Varieties under production

13.2.1. Variety: Wondo-1
13.2.1.1 Year of registration: 2011
13.2.1.2 Breeder/Maintainer: Wondo Genet ARC

African marigold (*Tagetes erecta* L.), which occupies a prominent place in ornamental horticulture, is one of the commercially exploited flower crops belonging to the family Asteraceae. It is native of Central and South America especially Mexico. There are several other important species viz., *Tagetes tenuifolia* L (striped marigold), *Tagetes lucida* L. (sweet scented marigold) and *Tagetes minuta* L (perfume marigold). African marigold, which is the focus of this specific experiment, is a hardy annual plant grows up to one meter and above, bears single or fully double large sized globular heads of yellow, orange and white shades. African marigold (*Tagetes erecta* L.) is a widely cultivated as bedding plants, loose flower, perfume, natural color, pigments, carotinoids, insect and nematodes repellents, nutrient supplement for poultry feed.

Marigold plants in-between rows of onion crop can promote the reduction of aphid, nematode and whitefly populations and virus diseased plants. Different parts of this plant is used widely in traditional medicine for curing various sicknesses like ulcers, fevers, epileptic fits, astringent, carminative, stomachic, scabies, liver complaints and in the treatment of eye diseases. The leaves are used in kidney troubles and in muscular pain. Infusion of plant is used against rheumatism, cold and bronchitis. Internally, they are said to purify blood and flower juice is given as a remedy for bleeding piles. It is also one of the most important natural sources of xanthophylls for use as natural food additive to brighten egg yolks and poultry skin. Moreover, it is also being used effectively to dye fabrics commercially, where its ethanol-based flower extracts produce different colors on fabrics. There is an excessive use of synthetic dyes, estimated at around 10,000,000 tons per annum against the natural dyes of about 15,000 metric tons, the production and application of which release vast amounts of waste and unfixed colorants, causing serious health hazards and disturbing the eco-balance of nature.
This demand gap can be met by extracting the natural dyes from plant source. One popular and potential source in textile industries for dying the fabrics is African marigold.

Currently, ecological considerations are becoming important factors in the selection of consumer goods all over the world. By the early part of this century only a small percentage of textile dyes were extracted from plants, but now, there has been increasing interest in natural dyes, as the public has become aware of ecological and environmental problems related to the use of synthetic dyes. Based on this fact, Marigold cultivation has got strong attention.
14.1 New variety

- No new variety released in 2016

14.2 Varieties under production

14.2.1. Variety: AVT001
14.2.1.1. Year of register: 2013
14.2.1.2. Breeder/Maintainer: Zifo Agritech Plc and WGARC

14.2.2. Variety: AVT 540
14.2.2.1. Year of register: 2013
14.2.2.2. Breeder/Maintainer: Zifo Agritech Plc and Wondo Genet Agricultural Research Center

14.2.3. Variety: AVT 7063 [HEWOYDE]
14.2.3.1. Year of register: 2013
14.2.3.2. Breeder/Maintainer: Zifo Agritech Plc and Wondo Genet Agricultural Research Center
15. Geranium

Rose Scented Geranium (*Pelargonium graveolens* L. Herit)

Rose scented geranium (*Pelargonium graveolens* L. Herit) is a perennial aromatic and medicinal herb/shrub that belongs to the Geraniaceae family. It was originated in South Africa as well as reunion Madagascar, Egypt and Morocco. There are over 700 varieties of cultivated geraniums; however, most are grown for ornamental purposes. The oil producing species are *P. graveolens*, *P. capitatum* and *P. radens*, *P. odorantissimum*, *P. asperum*, *P. crispum*, *P. roseus*, *P. tomentosum*, *P. zonale* and *P. roseum*. Oil bearing geraniums are mainly cultivated in Egypt, China, Comoros, India, France, Morocco, Algeria, Tunisia and South Africa.

From the different oil producing species of geranium, rose scented geranium (*P. graveolens* L. Herit) is the main focus of this document. It is grown for the production of essential oil from its leaves, flowers and stalks through stem or hydro distillation. Its essential oil imparts fine rose, citrus and mint like odors. The main constituents of the essential oil are citronellol, geraniol, linalool, iso-menthone, citronellyl formate, geraniol formate and guaia-6,9-diene.

The essential oil has wide-ranging uses in flavor and fragrance industries, aromatherapy, cosmetic industries, food and pharmaceutical industries. It is one of the best skincare oils because it is good in opening skin pores and cleaning oily complexions. The oil is also used for the treatment of heavy menstrual flows and menopause problems. It is also used for the treatment of dysentery, hemorrhoids, inflammation, cancer, diabetes, diarrhea, gallbladder problems, gastric ulcers, jaundice, liver problems, and useful in reducing pain due to post-herpetic neuralgia followed by shingles. The oil is also useful for mite control, eczema and athlete foot problems. The leaves are used in a form of herbal tea to de-stress, to fight anxiety, to ease tension, to improve circulation and to cure tonsillitis. Due to these potential applications and uses, it is ranked as one of the top ten most expensive essential oil bearing plants in the world.
15.1 New variety

- No new variety released in 2016

15.2 Variety under production

15.2.1 Variety: SHITO [ষিতো]
15.2.1.1 Year of Release: 2013
15.2.1.2 Breeder/Maintainer: Wondo Genet ARC
Chamomile (\textit{Matricaria chamomilla} L.) is an annual herb that belongs to the family Asteraceae. It is a well-known aromatic and medicinal plant often referred to as the "star among medicinal species". It is native to Southern and Western Europe, North and West Asia. It is cultivated commercially in Europe, Former USSR, North Africa Asia, North and South America and New Zealand. It grows widely in various ecological regions of the world. It may be considered as an economic substitute of the field crops, since it has adaptability to a wide range of soil and climatic conditions.

Chamomile is among the widely used aromatic and medicinal plants throughout the world. It has been used in herbal remedies for thousands of years, known in ancient Egypt, Greece, and Rome. The dry flowers of chamomile are also in great demand for use in herbal tea, baby massage oil, for promoting the gastric flow of secretion, and for the treatment of cough and cold. The use of herbal tea preparations eliminated colic in 57% infants. The powder form of chamomile flower can be applied to wounds slow to heal, for skin eruptions, and infections, such as shingles and boils, also for hemorrhoids and for inflammation of the mouth, throat, and the eyes. The aromatic and medicinal value of this plant is for active substances, mainly accumulated in the flowers. The flower of contain apigenine which is used as hair color. It also has medicinal properties such as anti-inflammatory, antispasmodic, antiseptic and therapeutic use and antimicrobial. The essential oil of chamomile used as antibacterial, antifungicidal, as a mild sedative and for digestion problem. In addition to pharmaceutical uses, the oil is extensively used in perfumery, cosmetics, and aromatherapy, and in food industry. Chamomile’s essential oil is also a treatment for malaria and parasitic worm infections, cystitis, colds, and flu. It also recommended by many physicians to treat gastrointestinal spasms and inflammatory diseases of the gastrointestinal tract.
16.1. New variety

- No new variety released in 2016

16.2. Variety under production

16.2.1. Variety: Chamomile-I [American Type]
16.2.1.1. Year of register: 2013
16.2.1.2. Breeder/Maintainer: Wondo Genet ARC

16.2.2. Variety: Chamomile-II [German Type]
16.2.2.1. Year of register: 2013
16.2.2.2. Breeder/Maintainer: Wondo Genet ARC
17. Lemon verbena (*Aloysia triphylla* L.)

Lemon verbena (*Aloysia triphylla* L.) is a perennial shrub that belongs to the family Verbenaceae. It has got its name due to the fact that it has whorls of three (tri) leaves (phylla) at each node. Lemon verbena is locally known as Lominat. It is native to Argentina, Paraguay, Brazil, Uruguay, Chile, Bolivia and Peru.

The leaves of lemon verbena are the most economical part of the plant that can be used anywhere to add a lemony taste in salads, tea, milk, ice creams and jellies. Likewise, the fragrant flowers are also used in tea and culinary concoctions and the essential oil obtained through distillation of the leaves is used in fragrance industries, food flavoring industries, soft drink industries, and folk medicine. Traditionally it is used as folk remedy in treatments of spasms, cold and fever, asthma, flatulence, colic, diarrhoea, indigestion, insomnia and anxiety and as source of analgesic, anti-inflammatory and/or anti-pyretic remedies. The sedative and anxiolytic activities of lemon verbena infusions were not confirmed in clinic trials. Essential oil of lemon verbena has also antibacterial and antifungal properties. Antibacterial and antioxidant activity have been demonstrated for the essential oils, tea, and tinctures. Due to its diverse uses and applications, it has got open and huge market potential for herbal preparation and extraction of essential oils.

17.1. New variety

- No new variety released in 2016

17.2. Variety under production

17.2.1. Variety: LOMINAT-I
17.2.1.1. Year of register: 2013
17.2.1.2. Breeder/Maintainer: Wondo Genet ARC
18. Stevia (*Stevia rebaudiana* Bertoni L.)

Stevia (*Stevia rebaudiana* Bertoni) is a perennial herb that belongs to the family Asteraceae. It is native to subtropical and tropical South America and Central America. The genus stevia contains about 154 species and the most widely utilized ones are *Stevia eupatoria*, *Stevia ovata*, *Stevia plummerae*, *Stevia salicifolia*, *Stevia serrata* and *Stevia rebaudiana*. From these, *Stevia rebaudiana* is the one with significant sweetening properties. The first commercial cultivation of stevia was started in Paraguay in 1964. Currently it is being cultivated in Japan, Taiwan, Philippines, Hawaii, Malaysia and overall South America for food and pharmaceutical products. The property of the species that called attention to the plant was the intense sweet tests of the leaves and aqueous extracts. Dry leaves of this plant are 30 times sweeter than sugar with Zero calories. The leaves of stevia contain sweetening compounds namely Stevioside, Rebaudioside A, Rebaudioside B and Rebaudioside C and six other compounds which have insulin balancing properties. These sweeteners impart 250 times sweetness than table sugar and 300 times more than sucrose. These glycosides are extracted from the Stevia leaf as all-natural zero caloric sweeteners; hence, stevia has been named as calorie free bio-sweetener of high quality with non-fermentable, non-discoloring, maintain heat stability at 100°C and features a lengthy shelf life attributes.

The product has been added to tea and coffee, cooked or baked goods, processed foods, beverages, it can be safely used in herbal medicines, tonics, for diabetes and in the daily usage products like mouthwashes and toothpastes]. It can be used in chocolates and candies not only to meet the market demand by the diabetes, but also to harvest the added advantages of this herb that it does not encourage tooth decay due to its anti-microbial property, unlike the sugar. In the Pacific Rim countries like China, Korea and Japan, stevia is regularly used in preparation of food and pharmaceutical products and currently stevia production is centered in China with major market in Japan.
No negative clinical reports have been published in any of the countries where stevia is readily available. The present scenario is that people are more inclined towards products advertised with a brand name "all natural and low carbohydrate". Hence, stevia will also have wider potential utilizations. Apart from this, stevia is nutrient rich, containing substantial amounts of protein, calcium, and phosphorus.

18.1. New variety
- No new variety released in 2016

18.2. Variety under production

18.2.1. Variety: Sekwar [Â³â€C]
18.2.1.1. Year of register: 2013
18.2.1.2. Breeder/Maintainer: Wondo Genet ARC
19. **Hibiscus (Hibiscus subdarifffa L.)**

Hibiscus (*Hibiscus subdarifffa L.*) is a member of the Malvaceae family and an annual dicotyledonous shrub, which grows to a height of about two meters. It has yellow or white with reddish center flower and its leaves have three to five lobules. Although native to India and Malaysia, *H. sabdarifffa* is also widely available and must have been carried to Africa in early times. Many parts of the plant are of value with the leaves, seeds and calyces widely used as either food or drug. Many phytochemical constituents and diverse medicinal activities such as Infusions of the leaves or calyces are regarded as diuretic, cholerectic, febrifugal and hypotensive, decreasing the viscosity of the blood and stimulating intestinal peristalsis decreased the rate of absorption of alcohol and so lessened its effect on the system. In Guatemala, roselle "ade" is a favorite remedy for the after effects of drunkenness.

In the Ayurvedic literature of India, different parts of the plant are recommended as remedy for ailments such as hypertension, pyrexia and liver disorders. In some other traditions, the plant is used as antidote to poisonous chemicals (acids, alkali, pesticides) and venomous mushrooms. *H. sabdariffa* contains higher amount of ascorbic acid compared to orange and mango. It is also rich in riboflavin, niacin, calcium and iron. The water extract of the red calyxe of *H. sabdarifffa* is widely used in the preparation of fruit drinks because of its unique and appealing characteristic color and flavor. The claimed medicinal benefits of *H. sabdarifffa* can be attributed to the presence of anthocyaninins, which are the colored product of the flavonoid pathway. The anthocyanins contained in *H. sabdarifffa* have been found to possess antioxidant activity, which offer protection against atherosclerosis and cancer. They are also linked with liver-protective and cholesterol activity enhancement. The antioxidant potential has been shown to have many times more activity than common antioxidants such as ascorbate.
19.1. New variety

- No new varieties under production in 2016

19.2. Varieties under production

19.2.1. Variety:
19.2.1.1. Year of release:
19.2.1.2. Breeder/Maintainer:

19.2.2. Variety:
19.2.2.1. Year of release:
19.2.2.2. Breeder/Maintainer:

WG-HIBISCUS-SUDAN
2014
Wondo Genet ARC

WG-HIBISCUS-JAMICA
2014
Wondo Genet ARC
20. Lavender (*Lavandula latifolia* Medik)

Lavender (*Lavandula angustifolia* L.) is a small, aromatic shrub belongs to the family Lamiaceae. Most lavender originates in the Mediterranean basin, in rocky, calcareous areas and occurs over North Africa, the Mediterranean, Europe and Western India. Lavender was cultivated by the ancient Greeks, Romans and in Elizabethan England. It is an evergreen, fast growing, compact and fragrant. The origins of its name are probably from the Latin word *Lavare* indicating the plant has another use as it means to be washed, and suggests it was regularly used to perfume bathing water. Lavender is a perennial, bushy shrub growing 0.3 to 1.2 m high and the aromatic evergreen leaves are completely opposite and up to 5 cm long. It produces essential oil and the parts used for essential oil distillation are the flowers and leaves. Essential oil from only the flowering tops is of higher quality than oil obtained from the leaves.

Lavender is an incredible and much sought after aromatic plant having significant position in the perfumery trade all over the world. It has multifarious uses and market outlets. Beside its use in fragrance applications, predominantly body care products, Lavender oil and Lavender water has substantial applications in alternative health care practices of aromatherapy. Pure oil can be used without base oil. It can be blended with bergamot, clarysage, jasmine, lemon and rose oil to prepare many formulations for different ailments. It has a remarkable effect on the emotional and mental balance of human being. In addition, it is used in soap making, high-quality perfumes, candles, incense sachets, as a detergent and cleaning agent, as an insect repellent, and also used in bath products such as soap, shampoo, bath oil, lotion, bath salt, repel mice. Its powerful antiseptic properties are able to kill many of the frequent bacteria such as typhoid, diphtheria, streptococcus and pneumococcus, as well as being a powerful antidote to some snake venoms.
It is very useful in the treatment of burns, sunburn, scalds and bites. The essential oil is used in aromatherapy and the leaves are also added to bath water for fragrance and their therapeutic properties.

20.1. New variety

- No new varieties released in 2016

20.2. Varieties under production

20.2.1. Variety: WG-Lavender-I
20.2.1.1. Year of release: 2014
20.2.1.2. Breeder/Maintainer: Wondo Genet ARC
21. Majoram/Oregano (*Origanum vulgare* L.)

Oregano (*Origanum vulgare* L.) is a spice, medicinal and aromatic perennial herb that belongs to the member of the Lamiaceae family and has a complex taxonomy. The genus *Origanum* includes 39 species from which, only *O. vulgare* L. is available in Ethiopia. Oregano is native to the Mediterranean Basin. It grows in different areas at wider ranges of ecologies. The climatic life zone for *O. vulgare* reported to be 5–28°C with an annual precipitation of 0.4–2.7 m and a range of soil pH from 4.5–8.7 is appropriate for its growth. It is cultivated and distributed all over Europe, West and Central Asia up to Taiwan. This indicates the economic significance of the crop in diversified societies and communities of the different countries.

Oregano has been a valuable source of natural products for maintaining human health for a long period of time, especially in the last decades. Oregano plays a primary role among culinary herbs in world trade. The use of oregano as medicinal plant is believed to be due to biological properties of *p*-cymene and carvacrol. The fresh leaves and dried herb of oregano as well as essential oil are used medicinally. The essential oil of oregano has antifungal, antibacterial, antioxidant, antihyperglycaemic, antithrombin and cytotoxic activity. Some authors have reported the effectiveness of oregano extracts to reduce lipid oxidation, color loss, and microbial growth in some types of meats. Herbs and extracts of oregano have been added in a variety of foods to improve their sensory characteristics and extend shelf-life.
21.1. New variety

- No new varieties released in 2016

21.2 Varieties under production

21.2.1. Variety: WG-Oregano
21.2.1.1. Year of release: 2014
21.2.1.2. Breeder/Maintainer: Wondo Genet ARC
22. Sage (*Salvia officinalis* L.)

The genus *Salvia* (sage) is one of the largest and the most important aromatic and medicinal genera of the Lamiaceae family and comprises about 900 species, widespread throughout the world. In *Flora Europaea* 36 taxa are described. *Salvia officinalis*, from Lamiaceae family, is a semi-woody shrub that gets up to 60 cm tall, originates from the Mediterranean region of North Africa, Spain and the Balkans. Modern research has confirmed antiseptic, estrogenic, anti-inflammatory and anti-microbial properties in sage extracts. Very high variability was detected among individual plants, especially in the case of essential oil composition.

Some members of this genus are cultivated to be used as food spices to flavour meats such as pork, sausage and poultry or flavouring agents in perfumery and cosmetics. Several *Salvia* species are used in folk medicine all around the world to treat microbial infections, cancer, malaria, inflammation and to disinfect homes after sickness. Sage (*Salvia officinalis* L.) is one of the most appreciate herbs for its rich essential oil and its plethora of biologically active compounds extensively used in folk medicine.

Essential oil of sage is applied in the treatment of a range of diseases and has been shown to possess antimicrobial, viricidal, cytotoxic, antimutagenic and antifungal activities. As its Latin gender name *Salvia* means “to cure” and species name “officinalis” means medicinal, it is clear that sage has a historical reputation of promoting health and treating ailments. In Ancient Rome, it was even called the sacred plant. Cholinergic, catecholamine, peptidergic, and hormonal systems have been the focus of great attention in learning and memory studies. The cholinergic system plays an important role in learning, memory, arousal, and attentional processes.
However, pharmacologic properties of traditional cognitive- or memory-enhancing plants have not been widely investigated in the content of current models of Alzheimer’s disease. Most traditional plants await proper scientific and medical evaluation for their ability to improve memory retention.

22.1. New variety

- No new varieties released in 2016

22.2 Varieties under production

22.2.1. Variety: WG-SAGE-1
22.2.1.1. Year of release: 2014
22.2.1.2. Breeder/Maintainer: Wondo Genet ARC
23. Rosemary (*Rosmarinus officinalis*)

23.1 New variety

- No new varieties released in 2016

23.2 Varieties under production

23.2.1. Variety: WG-Rosemary-I

23.2.1.1. Year of release: 2015

23.2.1.2. Breeder/Maintainer: Wondo Genet ARC

23.2.2. Variety: WG-Rosemary-II

23.2.2.1. Year of release: 2015

23.2.2.2. Breeder/Maintainer: Wondo Genet ARC

23.2.3. Variety: WG-Rosemary-III

23.2.3.1. Year of release: 2015

23.2.3.2. Breeder/Maintainer: Wondo Genet ARC

24. Lemon scented eucalyptus (*Eucalyptus citriodora*)

24.1 New variety

- No new varieties released in 2016

24.2 Varieties under production

24.2.1. Variety: WG-Shito Bahirzaf-I

24.2.1.1. Year of release: 2015

24.2.1.2. Breeder/Maintainer: Wondo Genet ARC
25. Vanilla (Vanilla planifolia)

Vanilla is a tropical orchid requiring a warm climate with frequent rain. It is native to Central America, southeastern Mexico, the West Indies, and North South America (KAU, 2002 and Kaczynski, 2002). It is a climbing vine that grows naturally on support of forest trees such as Erythrina spp; some fruit trees and Glyricidia, requires light shade, (two thirds to one-half of normal sunshine). Next to saffron, vanilla is the second most expensive spice in the world, cured beans ranging in price in recent years between US$100 and US$500 per kilogram. Popular flavoring substance called vanillin, which is mainly used in flavoring of different food and beverages, and in cosmetics and perfumery industry, condiments and oleoresin . In Ethiopia vanilla showed good adaptability and give yield and quality comparable to that of Indian, Madagascar, Uganda, therefore, it is a potential spices as a cash crop for producers and exporters in Ethiopia. Currently it is well adapted in south west Ethiopia (Tepi and Bebeka) where there is high humidity and high rainfall condition.
25.1. New variety

- No new varieties released in 2016

25.2 Varieties under production

25.2.1. Variety:
25.2.1.1. Year of release:
25.2.1.2. Breeder/Maintainer:

Yeki 1 (Van 1/1993)
2015
Tepi National Spices Research Center/TNSRC/
Crop Variety Register

1.2.9 Variety: Poyo
1.2.9.1 Year of registration: 2006
1.2.9.2 Breeder/Maintainer: MARC/EIAR

1.2.10 Variety: Giant Cavandish
1.2.10.1 Year of registration: 2006
1.2.10.2 Breeder/Maintainer: MARC/EIAR

1.2.11 Variety: Dwarf Cavandish
1.2.11.1 Year of registration: 2006
1.2.11.2 Breeder/Maintainer: MARC/EIAR

1.2.12 Variety: Ducasse Hybrid
1.2.12.1 Year of registration: 2006
1.2.12.2 Breeder/Maintainer: MARC/EIAR
2. Mango (*Mangifera indica* L.)

Mango is a fruit which is indigenous to the Indian subcontinent,[1] belonging to the genus *Mangifera*, consisting of numerous species of tropical fruiting trees in the flowering plant family *Anacardiaceae*. *Mangifera indica* L. is the only mango tree commonly cultivated in many tropical and subtropical regions, and its fruit is distributed essentially world-wide. Mango trees grow 35–40 m tall, with a crown radius of 10 m. The mango tree is long-lived, as some specimens still fruit after 300 years. In deep soil, the taproot descends to a depth of 6 m and the profuse, wide-spreading feeder roots also send down many anchor roots, which penetrate several feet of soil. The flowers are produced in terminal panicles 10–40 cm long; each flower is small and white with five petals 5–10 mm long. The fruit takes three to six months to ripen. The ripe fruit is variable in size and color. Cultivars are variously yellow, orange, red or green, and carry a single flat, oblong pit that can be fibrous or hairy on the surface, and which does not separate easily from the pulp. Mango is a fruit of frost free tropical and warmer sub-tropical climates. Nowadays it is produced more than any other fruit crop around the world.

In Ethiopia, it is mainly produced in the upper Awash valley with altitudes ranging from 1000-1500 m.a.s.l. and also in Dedessa, Assossa, Gambella, Arba Minch and Harrar. During 2015/16 cropping season, the total area under mango plantations is about 14,791.23 hectares of land and the production is estimated to be 1,003,514.90 quintals. A healthy and well-managed tree can stay for about 100 years, but giving good yield every two years for as long 40 years.

Mango can best be produced on a non-fertile drained soil of PH 5.5-7.5. For good flowering and then productivity, however, the tree needs 3 months of dry period. The edible part (mesocarp) has a 60-75% share of total fruit weight, and is rich in starch, protein and vitamins. It can be used in the form of juice, squash, jams, jellies, prickles, chutneys; culinary.Fruit butter can also be prepared from the stems of a mango tree.
## 2.1 New varieties

- No new variety released in 2016

## 2.2 Varieties under production

<table>
<thead>
<tr>
<th>Variety</th>
<th>Year of release</th>
<th>Breeder/maintainer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tommy Atkins</td>
<td>2013</td>
<td>Melkasa ARC</td>
</tr>
<tr>
<td>Kent</td>
<td>2013</td>
<td>Melkasa ARC</td>
</tr>
<tr>
<td>Keitt</td>
<td>2013</td>
<td>Melkasa ARC</td>
</tr>
<tr>
<td>APPLE MANGO</td>
<td>2007</td>
<td>MARC/EIAR</td>
</tr>
</tbody>
</table>
3. Pineapple (*Ananas comosus*)

Pineapple is indigenous to South America, the natives of southern Brazil and Paraguay spread the pineapple throughout South America, and it eventually reached the Caribbean.

The pineapple is an herbaceous short-lived perennial plant which grows to 1.0 to 1.5 meters tall. The plant only produces one fruit and then dies. Commercially suckers that appear around the base are cultivated. It has 30 or more long, narrow, fleshy, trough-shaped leaves with sharp spines along the margins that are 30 to 100 centimeters long, surrounding a thick stem. In the first year of growth the axis lengthens and thickens, bearing numerous leaves in close spirals. After 12 to 20 months the stem grows into a spike-like inflorescence up to 15 cm long with over 100 spirally arranged, trimerous flowers, each subtended by a bract. Flower colours vary, depending on variety, from lavender, through light purple to red.

The ovaries develop into berries which coalesce into a large, compact, multiple accessory fruit. The fruit of a pineapple is arranged in two interlocking helices, eight in one direction, thirteen in the other, each being a Fibonacci number. In commercial farming, flowering can be induced artificially, and the early harvesting of the main fruit can encourage the development of a second crop of smaller fruits. Once removed during cleaning, the top of the pineapple can be planted in soil and a new plant will grow. Slips and suckers are planted commercially. Pineapple is eaten fresh or canned or juiced.

The popularity of the pineapple is due to its sweet-sour taste containing 15% sugar and malic and citric fruit acids. It is also high in vitamin B1, B2, B6 and C. Its protein-digesting enzyme bromelain seems to help digestion at the end of a high protein meal. During 2015/16 cropping season, the total area under Pineapple plantations is about 236.37 hectares of land and the production is estimated to be 2,762.01 quintals.
Thompson Seedless: Predominantly grown for raisin production of the world (50%). It is the principal raisin variety and the leading table grapes. Bunches are large, shouldered, long conical, well filled. Berries are medium sized, firm and tender in texture and sweet.

4.1 New varieties

- No new variety released in 2016

4.2 Varieties under production

4.2.1 Variety: Muscat of Alexander
4.2.1.1 Year of release: 2013
4.2.1.2 Breeder/Maintainer: D/Zeit ARC

4.2.2 Variety: Black Corinth
4.2.2.1 Year of release: 2013
4.2.2.2 Breeder/Maintainer: D/Zeit ARC

4.2.3 Variety: Thompson
4.2.3.1 Year of release: 2013
4.2.3.2 Breeder/Maintainer: D/Zeit ARC

4.2.4 Variety: Grenache noir
4.2.4.1 Year of release: 2004
4.2.4.2 Breeder/Maintainer: DZARC/EIAR

4.2.5 Variety: Grenache Blanch
4.2.5.1 Year of release: 2004
4.2.5.2 Breeder/Maintainer: DZARC/EIAR

4.2.6 Variety: Ugni Blanc
4.2.6.1 Year of release: 2004
4.2.6.2 Breeder/Maintainer: DZARC/EIAR
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<tr>
<th>Variety</th>
<th>Year of release</th>
<th>Breeder/Maintainer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black Hamberg</td>
<td>2004</td>
<td>DZARC/EIAR</td>
</tr>
<tr>
<td>Cannonano</td>
<td>2004</td>
<td>DZARC/EIAR</td>
</tr>
<tr>
<td>Dodom Alietico</td>
<td>2004</td>
<td>DZARC/EIAR</td>
</tr>
</tbody>
</table>
5. Avocado (*Persea americana* M.)

Avocados were first cultivated in South America with later migration to Mexico. It was believed that a Mayan princess ate the very first avocado and that it held mystical and magical powers. European sailors traveling to the New World used avocados as their form of butter. Avocados were first seen in the United States in the early 1800's. California is currently the largest producer of avocados stateside. There are more than 80 varieties, with the "Hass" variety dominating the crop share. A single mature avocado tree can produce more than 400 pieces of fruit in a year.

Avocados are loaded with nutrients such as dietary fiber, vitamin B6, vitamin C, vitamin E, potassium, magnesium, and folate. They're also cholesterol and sodium free. Avocados contain 60% more potassium per ounce than bananas. This fruit is an excellent source of monounsaturated fat.

During 2015/16 cropping season, the total area under production may reach 13,665.45 hectares and the production is estimated to be over 538,245.79 quintals.
## 5.1 New varieties

- No new variety released in 2016

### 5.2 Varieties under production

<table>
<thead>
<tr>
<th>Variety</th>
<th>Year of Registration</th>
<th>Breeder/ maintainer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hass</td>
<td>2008</td>
<td>Melkassa Research Center</td>
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<tr>
<td>Ettinger</td>
<td>2008</td>
<td>Melkassa Research Center</td>
</tr>
<tr>
<td>Pinkerton</td>
<td>2008</td>
<td>Melkassa Research Center</td>
</tr>
<tr>
<td>Nabal</td>
<td>2008</td>
<td>Melkassa Research Center</td>
</tr>
<tr>
<td>Fuerte</td>
<td>2008</td>
<td>Melkassa Research Center</td>
</tr>
<tr>
<td>Bacon</td>
<td>2008</td>
<td>Melkassa Research Center</td>
</tr>
</tbody>
</table>
6. *Ziziphus (kurkura) (Ziziphus jujuba)*

6.1. **New varieties**
- No new variety released in 2016

6.2. **Varieties under production**

6.2.1. Variety:
6.2.1.1 Year of release: 2013
6.2.1.2 Breeder/Maintainer:

6.2.2. Variety:
6.2.2.1 Year of release: 2013
6.2.2.2. Breeder/Maintainer:

7. **Fig (Ficus carica L)**

7.1 **New varieties**
- No new variety released in 2016

7.2 **Variety under production**

7.2.1 Variety:
7.2.1.1 Year of release: 2012
7.2.1.2 Breeder/Maintainer:

7.2.2 Variety:
7.2.2.1 Year of release: 2012
7.2.2.2. Breeder/Maintainer:
8. Papaya (*Carica papaya* L.)

8.1 New variety

- No new variety released in 2016

8.2. Variety under production

8.2.1. Variety: Braz-HS1 (CMF 078-L56)
- Year of release: 2015
- Breeder/Maintainer: Melkassa ARC/EIAR

8.2.2. Variety: Koka-HM1 (KK 103-L446)
- Year of release: 2015
- Breeder/Maintainer: Melkassa ARC/EIAR

8.2.3. Variety: Meki-HL1 (MK 121-L516)
- Year of release: 2015
- Breeder/Maintainer: Melkassa ARC/EIAR
9. Peach (*Prunus persica*)

9.1 New variety
- No new variety released in 2016

9.2. Variety under production

9.2.1. Variety: 90-19H  
9.2.1.1. Year of release: 2015  
9.2.1.2. Breeder/Maintainer: Holetta and Kulumssa Agricultural Research Centers

9.2.2. Variety: Tropic beauty  
9.2.2.1. Year of release: 2015  
9.2.2.2. Breeder/Maintainer: Holetta and Kulumssa Agricultural Research Centers
Group VII. Forage and Pasture Crops

Feed shortage and primitive type of feeding are the major limiting factors in animal production. In the high lands and semi-high lands of the country, it is estimated that natural pasture accounts for 80% and the agricultural related industrial by products accounts for 20% of the annual forage production while in the low land regions natural pasture is the sole forage source.

In order to get highest animal production (product), it is important to use improved forage plants and the industrial and agricultural by products that have highest feed value.

1. Tree lucerne (*Chamaecytius prolifer*)

1.1 New varieties

- No new variety released in 2016

1.2 Varieties under production

1.2.1. Variety:
1.2.1.1 Year of release: 1992
1.2.1.2. Breeder/Maintainer: HARC/EIAR

2. Elephant grass (*Pennisetum purpureum*)

2.1 New varieties

- No new variety released in 2016

2.2 Varieties under production

2.2.1 Variety: ILCA-16984
2.2.1.1 Year of release: 1984
2.2.1.2 Breeder/Maintainer: ILRI
3. Rhode (*Chloris gayana*)

3.1 New varieties

- No new variety released in 2016

3.2 Varieties under production

3.2.1 Variety: Massaba
3.2.1.1 Year of release: 1984
3.2.1.2 Breeder/Maintainer: HARC/EIAR

4. Panicum (*Panicum colloratum*)

4.1 New varieties

- No new variety released in 2016

4.2 Varieties under production

4.2.1 Variety: Colloratum
4.2.1.1 Year of release: 1984
4.2.1.2 Breeder/Maintainer: HARC/EIAR
5. Dolicos lablab (Lablab purpureus)
5.1 New varieties
5.1.1. Variety: Gebis -17 (ILRI-Acc # 14417)
5.1.1.1 Agronomic and morphological characteristics

- Adaptation area: Western Oromia (Bako, Bilo, Gute, Chewaka) and areas with similar agro-ecologies
  - Altitude(m.a.s.l): 1500-2100
  - Rainfall(mm): 800-1200
- Seed rate(kg/ha): 25-30 (row planting)
- Spacing(cm): 40cm between rows and 20cm between plants
- Planting date: End of June Early July
- Fertilizer rate(kg/ha):
  - P₂O₅: 46
  - N: 18
- Days to forage harvesting (50% flowering): 94-102
- Days to maturity: Intermediate *
- Plant height at forage harvest(cm): 138.07
- Flower color: White
- 1000 seed weight (gm): 253
- Seed color: Dark red
- Seed shape: Oval
- Crop pest reaction: ---
- Forage quality:
  - DM(%): 62.93
  - CP(%): 26.46
  - Ash(%): 5.32
  - OM(%): 57.61
  - NDF(%): 25.61
  - ADF(%): 21.20
  - Lignin(%): 2.30
  - IVOMD(%): 48.33
- Maturity group: Late
- Yield(qt/ha):
  - Research field: 84.3 (Forage yield)
  - Farmers’ field: 17.33 (Seed yield)
- Year of released: 2016
- Breeder/maintainer: Bako ARC/OARI

*It goes up to three pecks first harvest will be started after 5 months of planting and subsequent harvesting can be made after 2 weeks of the first harvest*
5.1.2. Variety: Beresa-55 (ILRI-Acc # 14455)
5.1.2.1. Agronomic and morphological characteristics

- Adaptation area:
  - Altitude (m. a. s. l.):
  - Rainfall (mm):
- Seed rate (kg/ha):
- Spacing (cm):
- Planting date:
- Fertilizer rate (kg/ha):
  - P₂O₅:
  - N:
- Days to forage harvesting (50% flowering):
- Days to maturity:
- Plant height at forage harvest (cm):
- Flower color:
- 1000 seed weight (gm):
- Seed color:
- Seed shape:
- Crop pest reaction:
- Forage quality:
  - DM (%):
  - CP (%):
  - Ash (%):
  - OM (%):
  - NDF (%):
  - ADF (%):
  - Lignin (%):
  - IVOMD (%):
- Special advantage:

Suitable for intercropping with cereal crops (Maize) climbing type then Gebis-17

- Maturity group:
- Yield (qt/ha)
  - Research field:
  - Farmers’ field:

5.1.2.2. Year of released:
2016

5.1.2.3. Breeder/maintainer:
Bako ARC/OARI

Western Oromia (Bako, Bilo, Gute, Chewaka) and areas with similar agro-ecologies
1500-2100
800-1200
25-30 (row planting)
40cm between rows and 20cm between plants
End of June - Early July

46
18
87-96
Intermediate (three pecks)

146.13
White
253
Dark yellow
Oval

61.94
24.86
5.42
56.52
25.31
22.00
2.17
50.48

Maize climbing type then Gebis-17
Late

83.7 (Forage yield)
17.96 (Seed yield)

---
2016

Bako ARC/OARI
5.2 Varieties under production

5.2.1 Variety: 
5.2.1.1 Year of release: 1984
5.2.1.2 Breeder/Maintainer: HARC/EIAR

6. Phalaries (Phalaries aquatica)

6.1 New varieties

- No new variety released in 2016

6.2 Varieties under production

6.2.1 Variety: Sirosa
6.2.1.1 Year of release: 1982
6.2.1.2 Breeder/Maintainer: HARC/EIAR

7. Trifolium (Trifolium quartinianum)

7.1 New varieties

- No new variety released in 2016

7.2 Varieties under production

7.2.1 Variety: 
7.2.1.1 Year of release: 1976
7.2.1.2 Breeder/Maintainer: HARC/EIAR

8a. Vetch (Vicia dasycarpa)

8a.1 New varieties

- No new variety released in 2016

8a.2 Varieties under production

8a.2.1 Variety: Lana
8a.2.1.1 Year of release: 1976
8a.2.1.2 Breeder/Maintainer: HARC/EIAR
8b. Vetch (*Vicia villosa* L.)

8b.1 New varieties

- No new variety released in 2016

8b.2 Varieties under production

8b.2.1 Variety: Lalisa (IG.No 6792D Lot-2)
8b.2.1.1 Year of release: 2011
8b.2.1.2 Breeder/Maintainer: SARC/OARI

8c. Vetch (*Vicia sativa* L.)

8c.1 New variety

- No new variety released in 2016

8c.2 Varieties under production

8c.2.1 Variety: Gebisa (IG.No 62632)
8c.2.1.1 Year of release: 2011
8c.2.1.2 Breeder/Maintainer: SARC/OARI

8d. Vetch (*Vicia narbonensis*)

8d.1 New varieties

- No new variety released in 2016

8d.2 Varieties under production

8d.2.1 Variety: Abdeta (IG.No 118)
8d.2.1.1 Year of release: 2011
8d.2.1.2 Breeder/Maintainer: SARC/OARI
9. Cow pea (*Cowpea unguiculata*)

9.1 New varieties

- No new varieties released in 2016

9.2 Varieties under production

9.2.1 Variety: Temesgen (*Temenesgen*) (12668)
9.2.1.1 Year of release: 2014
9.2.1.2 Breeder (Maintainer): Humera ARC (TARI)

9.2.2 Variety: Sewinet (*Sewinet*) (ITS 93 KD 596)
9.2.2.1 Year of release: 2009
9.2.2.2 Breeder/ Maintainer: Pawe ARC

10. Andropogon (*Andropogon gayanus*)

10.1 New varieties

- No new variety released in 2016

10.2 Varieties under production

10.2.1 Variety: Dirki Ayifera (*Dirki Ayifera*) (Andropogon gayanus 12465)
10.2.1.1 Year of release: 2009
10.2.1.2 Breeder/ Maintainer: Pawe ARC
11. Pigeon pea (*Cajanus Cajan* L.)

11.1 New varieties

- No new varieties released in 2016

11.2 Varieties under production

11.2.1. Variety: Kibret (h-lz-f) (11555)
   11.2.1.1. Year of release: 2014
   11.2.1.2. Breeder /Maintainer: Humera ARC (TARI)

11.2.2. Variety: Tsegab (d-f-t) (11566)
   11.2.2.1. Year of release: 2014
   11.2.2.2. Breeder /Maintainer: Humera ARC (TARI)

11.2.3 Variety: DURSA (ICEAP87091)
   11.2.3.1 Year of release: 2009
   11.2.3.2 Breeder/ Maintainer: EIAR/MARC
12. Oats (*Avena sativa*)

12.1 New varieties

- No new varieties released in 2016

12.2 Varieties under production

12.2.1 Variety: SRCPX80Ab2806
12.2.1.1 Year of release: 2015
12.2.1.2 Breeder/Maintainer: HARC/EIAR

12.2.2 Variety: SRCPX80Ab2291
12.2.2.1 Year of release: 2015
12.2.2.2 Breeder/Maintainer: HARC/EIAR

12.2.3 Variety: CI-8251
12.2.3.1 Year of release: 2013
12.2.3.2 Breeder/Maintainer: HARC/EIAR

12.2.4 Variety: Bonsa (IAR-P1.79AB384)
12.2.4.1 Year of release: 2011
12.2.4.2 Breeder/Maintainer: SARC/OARI

12.2.5 Variety: Bona-bas (IAR-P1.1660)
12.2.5.1 Year of release: 2011
12.2.5.2 Breeder/Maintainer: SARC/OARI

12.2.6 Variety: CI-8237
12.2.6.1 Year of release: 1976
12.2.6.2 Breeder/Maintainer: HARC/EIAR
13. Sesbania (*Sesbania macrantha*)

13.1 New variety

- No new variety released in 2016

13.2 Varieties under production

13.2.1 Variety: DZF 092
13.2.1.1 Year of release: 2012
13.2.1.2 Breeder/Maintainer: DZARC/EIAR

14. Pennisetum polystachion

14.1. New variety

- No new varieties released in 2016

14.2. Variety under production

14.2.1. Variety: Nechsare (Chefer bekoa)
14.2.1.1 Year of release: 2014
14.2.1.2 Breeder/Maintainer: Pawe ARC/EIAR/

15. Panicum maximum

15.1. New variety

- No new varieties released in 2016

15.2. Varieties under production

15.2.1. Variety: Degun geziya
15.2.1.1 Year of release: 2014
15.2.1.2 Breeder/Maintainer: Pawe ARC/EIAR/
16. Lupin (*Lupinus spp.*)

Wild lupines are believed to be originated and are concentrated in two large areas: The old world or Mediterranean region and the new world or Americas Because of the diverse species, the genus Lupinus is found widely distributed in different parts of the world in several agroclimatic conditions; from the sub-arctic climate, through Mediterranean and semi-desert climates, to the highlands of East Africa, Mexico, and finally the sub-tropical lowlands of eastern South America and southeastern USA. Among the four large seeded annual lupin species, three of the species, i.e. white lupin, blue lupin and yellow lupin, have originated in the Mediterranean basin.

White Lupin is one of the common pulse crops grown in Ethiopia. It is an ancient traditional multipurpose crop being cultivated particularly in the North-western part of Ethiopia. In Ethiopia lupin is believed to have originated and introduced into Ethiopia from Egypt. It is also believed that the Amharic local name of lupin in Ethiopia, Gibto, has been derived from the Amharic name of Egypt, Gibtsi. It is produced by small holder farmers in two regional states of Ethiopia; Amhara and Benishangul gumuz, the former being the largest producer. In 2015/16 cropping season, the total area under cultivation is estimated to be 16,788.20 ha of land from which 187,166.88 quintals are produced.

The crop is known as a very easy crop to grow with a relatively high yield and minimal agronomic practice. It grows from the warm mid-altitude areas of South Gondar up to the cool and humid high-altitude areas of West Gojjam. The major soil types in these areas are Nitosol and Acrisol. The ability of the crop to be grown in acidic soils is one of the major important features of the crop in the traditional lupin growing area of Ethiopia. However, this traditional pulse crop has low food value and unpalatable to livestock due to its high alkaloid content.
On the other hand, 'sweet' lupin (*Lupinus angustifolius*), which is safe for human consumption as an important source of protein, because of low alkaloid content, is not grown in Ethiopia.

Introducing hardy crops like 'Sweet' into soil acidity prone areas where other legume crops cannot be grown is considered as an important approach to combat the protein-malnutrition and for enhancing soil fertility restoration.
16.1. New varieties
16.1.1. Variety: Welela (SW-001)

16.1.1.1. Agronomic and morphological characteristics

- Adaptation area:
  - Altitude(m.a.s.l): 1800-2600
  - Rainfall(mm): 700-1200
- Seed rate(kg/ha): 80
- Spacing (cm): 40cm between and 10cm between plants
- Planting date: Mid June
- Fertilizer rate(kg/ha):
  - N: 18
  - P₂O₅: 46
- Days to flowering: 68
- Days to maturity: 156
- Plant height(cm): 61
- Growth habit: Bushy and determinate
- Flower color: White
- Crop pest reaction:*
- Crude protein content (%): 25.55g/100g
- Seed Alkaloid content(g/100g): 1.52±0.08
- Seed size(g/1000): 95.29
- Yield(qt/ha)
  - Research field: 17-29 (X = 23.33)
  - Farmers' field: 15-30 (X = 19.40)

16.1.1.2. Year of released: 2016
16.1.1.3. Breeder/maintainer: Holetta ARC/EIAR

*IImidalm T.450 WS (Imidacloprid+Thiram) at the rate of 40g per quintal was used as a seed dresser for the control of two insect pests, cutworm and bean stem maggot
16.2 Varieties under production

16.2.1. Variety:
16.2.1.1. Year of release: Sanabor
16.2.1.2. Breeder seed maintainer: 2014
   ARARI and Andassa ARC

16.2.2. Variety:
16.2.2.1. Year of release: Vitabor
16.2.2.2. Breeder seed maintainer: 2014
   ARARI and Andassa ARC
17. Alfalfa (*Medicago sativa*)

17.1. New variety

17.1.1 Variety: Alfalfa-1086

17.1.1.1 Agronomic and morphological characteristics:

- Adaptation area: Lower to higher altitude areas of the country under rain fed and supplementary irrigation conditions.
  - Altitude (m.a.s.l): 750-3000
  - Rainfall (mm): 850-1200
  - Soil type: Nitosol and clay loam
- Seeding rate (kg/ha): 10-20
- Spacing inter row (cm): 20
- Planting date: Early June
- Fertilizer rate (kg/ha):
  - DAP: 100 DAP
  - Urea: ----
- Plant height at forage harvest (cm): 60-75
- Days to harvesting (50% flowering): 80-90
- Leaf to stem ratio: 1.10
- Yield per cut (ton/ha)
  - Forage dry matter: 3-5
  - CP yield: 1.15
  - Digestible yield: 2.88
- Fodder quality (%):
  - Ash: 12.61
  - CP: 29.39
  - NDF: 44.49
  - ADF: 33.43
  - ADL: 4.63
  - IVDMD: 73.82

17.1.1.2 Year of release: 2016

17.1.1.3 Breeder/Maintainer: ELFORA Agro-Industries Plc/HARC/EIAR
17.1.2 Variety: **Alfalfa-ML-99**

17.1.2.1 Agronomic and morphological characteristics:

- **Adaptation area:**
  - Altitude (m.a.s.l): Lower to higher altitude areas of the country under rain fed and supplementary irrigation conditions.
  - Rainfall (mm): 750-3000
  - Soil type: Nitosol and clay loam

- **Seeding rate (kg/ha):** 10-20
- **Spacing inter row (cm):** 20
- **Planting date:** Early June
- **Fertilizer rate (kg/ha):**
  - DAP: 100 DAP
  - Urea: 100 DAP

- **Plant height at forage harvest (cm):** 60-70
- **Days to harvesting (50% flowering):** 85-95
- **Leaf to stem ratio:** 1.04
- **Yield per cut (ton/ha):**
  - Forage dry matter: 3-5
  - CP yield: 1.04
  - Digestible yield: 2.74
- **Fodder quality (%):**
  - Ash: 13.63
  - CP: 28.19
  - NDF: 44.56
  - ADF: 33.75
  - ADL: 4.87
  - IVDMD: 74.07

17.1.2.2 Year of release: 2016

17.1.2.3 Breeder/Maintainer: ELFORA Agro-Industries Plc/HARC/EIAR
17.2. Varieties under production
17.2.1. Variety: Alfalfa DZF-552
17.2.1.1. Year of release: 2014
17.2.1.2. Breeder/Maintainer: DZARC/EIAR/

18. Pennisetum sphacelatum

18.1. New variety

- No new varieties released in 2016

18.2. Varieties under production

18.2.1. Variety: Shebela sar
18.2.1.1. Year of release: 2014
18.2.1.2. Breeder/Maintainer: DZARC/EIAR/

19. Perennial grass

19.1. New variety

- No new varieties released in 2016

19.2. Varieties under production

19.2.1. Variety: DZF-265
19.2.1.1. Year of release: 2015
19.2.1.2. Breeder/Maintainer: DZARC/EIAR/

19.2.2. Variety: DZF-483
19.2.2.1. Year of release: 2015
19.2.2.2. Breeder/Maintainer: DZARC/EIAR/

19.2.2. Variety: Brachiaria mutica
19.2.2.1. Year of release: 2015
19.2.2.2. Breeder/Maintainer: DZARC/EIAR/
Group VIII. Fiber 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. At the national level in 2013/14 cropping season 55,523 ha of land is covered by both cottons and over 83,284 quintals of seed cotton is produced. It is used to manufacture a wide variety 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

- No new varieties released in 2016

1.2. Varieties under production

1.2.1 Variety:
1.2.1.1 Year of released: -
1.2.1.2 Breeder/maintainer: -

1.2.2 Variety: -
1.2.2.1 Year of released: -
1.2.2.2 Breeder/maintainer: -

1.2.3 Variety -
1.2.3.1 Year of released: -
1.2.3.2 Breeder/maintainer: -

1.2.4 Variety:
1.2.4.1 Year of release:
1.2.4.2 Breeder/Maintainer:

1.2.5 Variety:
1.2.5.1 Year of release:
1.2.5.2 Breeder/Maintainer:

1.2.6 Variety:
1.2.6.1 Year of release:
1.2.6.2 Breeder/Maintainer:

- Sisikuk-02/CCRI 12 /
  2015
  Werer ARC

- Weyto – 07 / Guru F5#1-2/
  2015
  Werer ARC

- Werer-50 /Arba X Cucurova
  1518F5#1-3/3 /
  2015
  Werer ARC

- STG-14
  2014
  ELSE ADDIS
  INDUSTRIAL
  DEVELOPMENT PLC

- Candia
  2014
  ELSE ADDIS
  INDUSTRIAL
  DEVELOPMENT PLC

- Claudia
  2014
  ELSE ADDIS
  INDUSTRIAL
  DEVELOPMENT PLC
1.2.7 Variety: Gloria  
1.2.7.1 Year of release: 2014  
1.2.7.2 Breeder/Maintainer: ELSE ADDIS INDUSTRIAL DEVELOPMENT PLC

1.2.8 Variety: VBCHB 1203  
1.2.8.1 Year of Release: 2013  
1.2.8.2 Breeder/Maintainer: ViBHA Seed Ethiopia PLC

1.2.9 Variety: VBCH 1527  
1.2.9.1 Year of Release: 2013  
1.2.9.2 Breeder/Maintainer: ViBHA Seed Ethiopia PLC

1.2.10 Variety: YD-670  
1.2.10.1 Year of Release: 2013  
1.2.10.2 Breeder/Maintainer: Hazera Genetics ltd/ Greenline Trading PLC/

1.2.11 Variety: YD-195  
1.2.11.1 Year of Release: 2013  
1.2.11.2 Breeder/Maintainer: Hazera Genetics ltd/ Greenline Trading PLC/

1.2.12 Variety: YD206  
1.2.12.1 Year of Release: 2011  
1.2.12.2 Breeder/Maintainer: Hazera Genetics ltd/ Axum Greenline Trading plc

1.2.13 Variety: YD211  
1.2.13.1 Year of Release: 2011  
1.2.13.2 Breeder/Maintainer: Hazera Genetics ltd/ Axum Greenline Trading plc

1.2.14 Variety: YD223  
1.2.14.1 Year of Release: 2011  
1.2.14.2 Breeder/Maintainer: Hazera Genetics ltd/ Axum Greenline Trading plc
1.2.15 Variety: Ionia
1.2.15.1 Year of Release: 2008
1.2.15.2 Breeder/Maintainer: WARC/EIAR

1.2.16. Variety: NEBAH (Stam-59A)
1.2.16.1 Year of release: 2007
1.2.16.2 Breeder/Maintainer: WARC/EIAR

1.2.17 Variety: Sille-1 (Stoneville 1324)
1.2.17.1 Year of release: 1997/98
1.2.17.2 Breeder/Maintainer: WARC/EIAR

1.2.18. Variety: Teysie (Cucurova) 1518)
1.2.18.1 Year of release: 1995
1.2.18.2 Breeder/Maintainer: WARC/EIAR

1.2.19. Variety: Enat (Caroline queen)
1.2.19.1 Year of release: 1995
1.2.19.2 Breeder/Maintainer: WARC/EIAR

1.2.20. Variety: Tate (Cu-Okra)
1.2.20.1 Year of release: 1995
1.2.20.2 Breeder/Maintainer: WARC/EIAR

1.2.21. Variety: Deltapine 90
1.2.21.1 Year of release: 1989
1.2.21.2 Breeder/Maintainer: WARC/EIAR

1.2.22 Variety: Bulk 202
1.2.22.1 Year of release: 1989
1.2.22.2 Breeder/Maintainer: WARC/EIAR

1.2.23 Variety: Arba
1.2.23.1 Year of release: 1987
1.2.23.2 Breeder/Maintainer: WARC/EIAR

1.2.24. Variety: Acala SJ 2
1.2.24.1 Year of release: 1986
1.2.24.2 Breeder/Maintainer: WARC/EIAR
1.2.25 Variety: Werer 1-84
1.2.25.1 Year of release: 1984
1.2.25.2 Breeder/Maintainer: WARC/EIAR

1.2.26 Variety: Acala 1517/70
1.2.26.1 Year of release: Before 1974
1.2.26.2 Breeder/Maintainer: WARC/EIAR

1.2.27 Variety: Reba B.50
1.2.27.1 Year of release: Before 1970
1.2.27.2 Breeder/Maintainer: WARC/EIAR

1.2.28 Variety: A-333-57
1.2.28.1 Year of release: Before 1970
1.2.28.2 Breeder/Maintainer: WARC/EIAR

1.2.29 Variety: Albar 637
1.2.29.1 Year of release: Before 1970
1.2.29.2 Breeder/Maintainer: WARC/EIAR
2. Kenaf (*Hibiscus spp*)

Kenaf (*Hibiscus cannabinus* L.) is an annual plant, native to central Africa, and related to hibiscus (*Hibiscus hibiscum* L.) okra, (*Hibiscus esculentus*), hollyhock (*Althaea Rosea*) and cotton (*Gossypium hirsutum* L.) (Scott and Talyor, 1988) individual plant can grow up to 18ft or more with few side branches. When grow in dense stands, Kenaf is being developed as a non wood fiber crop. The bark, which contains long soft bast fibers, makes up 30 to 40% of the dry weight of the stem, is an ideal blend of long short fibers.

Kenaf is a tropical plant and is well-adapted to the hot humid conditions. It needs a soil temperature of around 55 °F for germination and growth. Kenaf is adapted with a wide range of soils. It grows in areas receiving an annual rain fall of 500-1700 mm and the most favorable temperature for kenaf production is 16-32°C. Under conventional production system, the fiber yield is usually 1-2 ton per hectare, however under favorable conditions and optimum management practices yield as high as 3-3.5 ton per hectare can be obtained.

The importance of kenaf fiber in Ethiopia was realized on several occasions since in 1970 when the National Fiber Work Corporation (NFWC) organized a meeting in Addis Abada for the first time and created a forum for Researchers, development workers and processors to come together and deliberate in depth regarding increased production of kenaf in Ethiopia.

G-Seven PLC which owns Meher and Ethiopia fiber products processing factories is presently the sole producer of different natural fiber products in the country. The two factories owned by the company use jute, sisal and enset (domestic sources) fiber as row materials for the manufacturing of sacks, ropes, twines and other packaging materials at the moment more than 90% of the row material is being imported from abroad. The country investing an estimated amount of Birr 63,786,600.00 for the import of fiber from abroad annually.
In general, for the demand for organic packaging materials produced by the company is increasing from time to time and despite concerted efforts being made, the company is unable to satisfy the ever increasing demand by different customers. The major challenges which the company faces in this connection include dependency on external sources for its raw fiber supply, frequent delays in delivery and exorbitant price for raw fiber which tends to increase from time to time making the cost of production relatively high. Factory demand will be attained, if and only if the variety registered by the research center, is demonstrated and scaled out till the producer level.

2.1 New variety

- No new variety released in 2016

2.2 Varieties under production

2.2.1 Variety: Sojat-Dangur (G-2)
2.2.1.1 Year of release: 2012
2.2.1.2 Maintainer: PARC/G-7 P.L.C
Group IX. Stimulant Crops

1. Coffee (Coffea arabica L.)

Coffee is the most important agricultural commodity and beverage enjoyed throughout the world. Coffee grows at various altitudes, ranging from 550 to 2750 meters above sea level. However, Arabica best thrives and produced between altitudes of 1300 and 1800 m a.s.l, with annual rainfall amount ranging from 1500 to 2500 mm with an ideal minimum and maximum air temperatures of 15 and 25 °C, respectively. But, for extremes and some cases, it grows up to 550 m a.s.l (like Bebeka) and in areas where annual rainfall ranges from 1000 to 2000 mm.

Ethiopia is the home of Arabica coffee and there exists extremely diverse genetic reserves in the montane rainforests of southwest and south east of the country. About 5,800 Arabica coffee accessions are conserved as ex-situ and 25,000 ha of forest lands have been preserved as in-situ forest coffee conservation. Many important characteristics were identified in the Ethiopian Arabica coffee such as resistance to orange leaf rust and coffee berry disease. Variations in green bean caffeine, chlorogenic acid and sucrose, and trigonelline contents variation were also observed. There is also variation in the size and shape, bean size, shape, color and cup quality. The distinct attributes such as resistant to coffee diseases, adaptable to diverse environmental conditions (drought) also indicates the existence of diverse C. arabica genetic resources in the country. There are four types of production system in Ethiopia: forest coffee, semi-forest coffee, garden coffee and plantation coffee. Ninety-five per cent of the coffee produced under these systems is organic.

Under the Ethiopian condition, control of CBD (Coffee Berry Disease) with resistant variety was recognized and therefore, a program was initiated to select resistant genotypes. As a result, a number of CBD
resistant Coffee Cultivars have been released. During 2015/16 cropping season, the total area under production reaches 653,909.76 hectares and the production is estimated to be 4,145,964.55 quintals.
1.1 New variety

1.1.1 Variety: EIAR50/CH

1.1.1.1 Agronomic and morphological characteristics:

- Adaptation area:
  - Altitude (m.a.s.l): 1200-1750
  - Rainfall (mm): >1400
  - Temperature (°C): 11-30
- Population (trees/ha): 2500
- Spacing at field (m): 2 X 2
- Planting time: Start of main rain season
- Fertilizer rate (kg/ha):
  - DAP: 312.5
  - Urea: 202.5
- Years from nursery to first crop: Three
- Growth habit (Canopy nature): Medium
- Canopy diameter (cm): 195
- Plant height (cm): 285
- Stem and branch nature: Erect
- Number of main stem nodes: 40
- Leaf tip color: Green
- Leaf margin:
- Mature leaf color:
- Leaf apex shape: Acuminate
- Stipule shape:
- Clayx limp persistence: Abscent
- Crop pest reaction:
- Over all quality:
  - Typicity:
  - Standard: Acceptable quality
- 100 seed weight at 11% moisture content (gm): 20.9
- Clean coffee yield (qt/ha):
  - Research field: 20.9
  - Farmers’ field: 20.9

1.1.1.2 Year of release: 2016
1.1.1.3 Breeder/Maintainer: Jimma ARC/EIAR

* Moderately resistant to coffee berry disease & coffee leaf rust and low infection of bloch leaf miner.
1.1.2 Variety: **Melko-Ibsitu**

1.1.2.1 Agronomic and morphological characteristics:

- **Adaptation area:**
  - Altitude (m.a.s.l.): 1200-1750
  - Rainfall (mm): >1400
  - Temperature (°C): 11-30

- **Population** (trees/ha): 2500

- Spacing at field (m): 2 x 2

- **Planting time:** Start of main rain season

- **Fertilizer rate** (kg/ha):
  - DAP: 312.5
  - Urea: 202.5

- **Years from nursery to first crop:** Three

- **Growth habit** (Canopy nature): Open

- **Canopy diameter** (cm): 215

- **Plant height** (cm): 326

- **Stem and branch nature:** Erect

- **Number of main stem nodes:** 42

- **Leaf tip color:** Bronze

- **Leaf marigin:**

- **Mature leaf color:** Green

- **Leaf apex shape:** Acuminate

- **Stipule shape:** Ovate

- **Clayx limp persistence:** Abscent

- **Crop pest reaction:**

- **Over all quality:**
  - **Typicity:**
  - **Standard:** Acceptable quality

- **100 seed weight at 11% moisture content (gm):**

- **Clean coffee yield** (qt/ha):
  - Research field: 19.3
  - Farmers’ field: --

1.1.2.2 Year of release: 2016

1.1.2.3 Breeder/Maintainer: Jimma ARC/EIAR

*Moderately resistant to coffee berry disease & coffee leaf rust and low infection of bloch leaf miner*
1.1.3 Variety: **Tepi HC5**

1.1.3.1 Agronomic and morphological characteristics:

- **Adaptation area:**
  - Altitude (m.a.s.l): 1200-1750
  - Rainfall (mm): >1400
  - Temperature (°C): 11-30
- **Population (trees/ha):** 2500
- **Spacing at field (m):** 2 X 2
- **Planting time:** Start of main rain season
- **Fertilizer rate (kg/ha):**
  - DAP: 312.5
  - Urea: 202.5
- **Years from nursery to first crop:** Three
- **Growth habit (Canopy nature):** Medium
- **Canopy diameter (cm):** 221
- **Plant height (cm):** 314
- **Stem and branch nature:** Flexible
- **Number of main stem nodes:** 46
- **Leaf tip color:** Light bronze
- **Leaf marigin:** --
- **Mature leaf color:** Green
- **Leaf apex shape:** Acuminate
- **Stipule shape:** Ovate
- **Clayx limp persistence:** Abscent
- **Crop pest reaction:** *Moderately resistant to coffee berry disease & coffee leaf rust and low infection of block leaf miner*
- **Over all quality:** Acceptable quality
- **100 seed weight at 11% moisture content (gm):** --
- **Clean coffee yield (qt/ha):**
  - Research field: 20.1
  - Farmers' field: --

1.1.3.2 Year of release: 2016

1.1.3.3 Breeder/Maintainer: Jimma ARC/EIAR

* *Moderately resistant to coffee berry disease & coffee leaf rust and low infection of bloch leaf miner*
<table>
<thead>
<tr>
<th>Variety Code</th>
<th>Variety Name</th>
<th>Year of Release</th>
<th>Breeder/Maintainer</th>
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<tr>
<td>971</td>
<td>Fayate</td>
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<td>2010</td>
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<td>Menesibu</td>
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<td>H-674/98</td>
<td>Harusa</td>
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<td>H-823/98</td>
<td>Mercha-1</td>
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1.2.10 Variety:
1.2.10.1 Year of release:
1.2.10.2 Breeder/Maintainer:

Bultum (H-857/98)
2010
JARC/EIAR
/MCARC,OARI

1.2.11 Variety:
1.2.11.1 Year of release:
1.2.11.2 Breeder/Maintainer:

Mocha (H-739/98)
2010
JARC/EIAR
/MCARC/OARI

1.2.12 Variety:
1.2.12.1 Year of release:
1.2.12.2 Breeder/Maintainer:

Merdacheriko (8136)
2006
JARC/EIAR

1.2.13 Variety:
1.2.13.1 Year of release:
1.2.13.2 Breeder/Maintainer:

Buno-washi 2-05 (7416)
2006
JARC/EIAR

1.2.14 Variety:
1.2.14.1 Year of release:
1.2.14.2 Breeder/Maintainer:

Yachi-1-05 (7576)
2006
JARC/EIAR

1.2.15 Variety:
1.2.15.1 Year of release:
1.2.15.2 Breeder/Maintainer:

Wushwush 2-05(7414)
2006
JARC/EIAR

1.2.16 Variety:
1.2.16.1 Year of release:
1.2.16.2 Breeder/Maintainer:

Angafa 5-05(1377)
2006
JARC/EIAR

1.2.17 Variety:
1.2.17.1 Year of release:
1.2.17.2 Breeder/Maintainer:

Gawe (74110xF-59)
2002
JARC/EIAR

1.2.18 Variety:
1.2.18.1 Year of release:
1.2.18.2 Breeder/ Maintainer:

Me'oftu (F-35)
2002
JARC/EIAR
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<td>JARC/EIAR</td>
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<tr>
<td>744</td>
<td>1988</td>
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1.2.29 Variety: 740
1.2.29.1 Year of release: 1988
1.2.29.2 Breeder/Maintainer: JARC/ EIAR

1.2.30 Variety: 74148
1.2.30.1 Year of release: 1988
1.2.30.2 Breeder/Maintainer: JARC/ EIAR

1.2.31 Variety: 74110
1.2.31.1 Year of release: 1987
1.2.31.2 Breeder/Maintainer: JARC/ EIAR

1.2.32 Variety: 74112
1.2.32.1 Year of release: 1987
1.2.32.2 Breeder/Maintainer: JARC/ EIAR

1.2.33 Variety: 74140
1.2.33.1 Year of release: 1987
1.2.33.2 Breeder/Maintainer: JARC/ EIAR

1.2.34 Variety: 74158
1.2.34.1 Year of release: 1987
1.2.34.2 Breeder/Maintainer: JARC/ EIAR

1.2.35 Variety: 74165
1.2.35.1 Year of release: 1987
1.2.35.2 Breeder/Maintainer: JARC/ EIAR

1.2.36 Variety: 741
1.2.36.1 Year of release: 1986
1.2.36.2 Breeder/Maintainer: JARC/EIAR