

## THE STATE OF SCIENCE AND TECHNOLOGY IN ETHIOPIAN AGRICULTURE AWG/EAS

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#### **1. POTENTIAL OF ETHIOPIAN AGRICULTURE**

1.1 Land Potential

Over 112 mill ha, 60 % suitable
for agricultural activities
Over 3.5 mill ha. Suitable for
irrigated agriculture



Bimodal rainfall in many areas for rain-fed agriculture
Lakes, rivers and underground sources for irrigated agriculture







### 1. THE POTENTIAL.....(Cont'd)

# 1.3 livestock potential – Huge number & diversity of Animal resources:

Cattle	49 mill
• Sheep	25 mill
• Goats	22 mill
Camels	1 mill
• Equine	7 mill

# 1.4 Agro-climatic resources potential

- Eight major zones and 62 sub-zones





### **2. CURRENT UTILIZATION**

#### 2.1 AGRICULTURAL LAND USE (CSA 2007/08)

USE CATEGORY	AREA (HA)
ANNUAL CROPS	11,343,121
PERENNIAL CROPS	1,039,314
SUB-TOTAL	12,382,435
FALLOW LAND	1,635,337
GRAZING LAND	1,529,603
WOOD LAND	187,394
OTHER LAND USE	422,172
SUB-TOTAL	3,774,506
TOTAL	16,156,941 (14.4 %)



# 2. CURRENT...(CONT'D)

### **2.2 CROP PRODUCTION AND PRODUCTIVITY**

CROP GROUP	AREA (HA)	YIELD (Q/HA)
CEREALS	8,770,000	16.5
FOOD LEGUMES	1,585,000	12.4
OILSEEDS	855,000	7.7
VEGETABLES	162,000	37.0
FRUITS	48,000	73.2
ROOT CROPS	146,000	83.1
ENSET	278,000	20.0
OTHER CASH CROPS	569,000	NA



#### **3. CURRENT UTILIZATION OF POTENTIALS**

3.1 Agricultural land development

- Crop land not adequately expanded
- Cultivated land not efficiently used
- Less than 10 % of irrigable land used
- Serious land degradation
- Soil fertility depleted
- Serious deforestation



# 3. CURRERNT ....(CONT'D)

- Improved seed use: less than 10% cropland
- fertilizer use:
   35% of cropland



 Improved animal breed: less than 1% of national herd



#### **3. CURRERNT STATE....(CONT'D)**

#### **3.2 Animal resources development**

- Number above carrying
  - capacity of land
- Poor genetic potential
  - of local breeds
- Too low off take rate
- Poorly developed animal feeds & forage
- Inadequate animal health service
- Poorly developed marketing and value chains infrastructure







#### 4. CAUSES FOR LOW LEVEL OF UTILIZATION OF POTENTIALS

4.1 Inadequate S&T application

4.2 Inadequate R&D services

4.3 Inadequate trained human resources

**4.4 Inadequate financial resources** 

4.5 Inadequate technical support services



#### 5. S&T DEVELOPMENT: HISTORICAL PERSPECTIVE

- 5.1 The beginning of agriculture in Ethiopia:- over 3000 years, still age-old technologies/practices
- 5.2 Historical development of R&D:- France in 1834, England in 1843, the USA in 1877.
- 5.3 R&D in eastern part of SSA :- the Sudan, followed by Kenya, in 1902 and 1903, respectively.



#### 5. S&T DEVELOPMENT.....(CONT'D)

#### **5.4 In the Ethiopian Context:**

 The Ministry of Agriculture first established in 1990 by Emperor Menilik II. Eucalyptus trees were imported into Ethiopia during that time.

Italians tried some experimental activities during the five-year (1935-41) war, but no record exists

 Reestablished MOA in 1943:- sheep breeding (Menz and Bale) and forestry



#### 5. S&T DEVELOPMENT.....(CONT'D)

- Systematic agricultural experimentation in Ethiopia started with :
- Establishment of agricultural high schools at Ambo and Jimma in the late 1940s to early 1950s.
  - Establishment of the former Alemaya College of Agriculture and Mechanical Arts and its experiment station at Debre Zeit in the mid-1950s



### 5. S & T ...(CONT'D)

- Establishment of development projects (CADU, WADU, SORADEP, etc): in early 1960s.
- Establishment of the former IAR, in the mid-1960s.
- Establishment of Ethiopian Science and Technology Commission (1970s)
- Creation of agricultural professional associations or societies (since the late 1970s)
- Establishment of EAS in 2010



#### 6. CURRENT STATE OF SCIENCE & TECHNOLOGY IN ETHIOPIA

#### 6.1 FORMULATION OF SCIENCE AND TECHNOLOGY POLICY AND STRATEGY

- A STRONG NATIONAL POLICY SUPPORT FOR THE DEVELOPMENT OF SCIENCE AND TECHNOLOGY IN AGRICULTURE.
- FORMULATION OF NATIONAL STRATEGY FOR SCIENCE AND TECHNOLOGY POLICY
- FORMULATION OF NATIONAL AGRICULTURAL RESEARCH POLICY.



#### 6. CURRENT STATE OF.....(CONT'D)

#### **6.2 INSTITUTIONS DEVELOPMENT**

6.2.1 ESTABLISHMENT OF AGRICULTURAL RESEARCH CNTERS

- FEDERAL RESEARCH CENTERS (EIAR):-
- **REGIONAL RESEARCH CENTERS** :
  - AMARA REGION :
  - OROMIA REGION
  - SOUTHERN REGIO:-
  - TIGRAI REGION:-
  - OTHER REGIONS:-

14

8

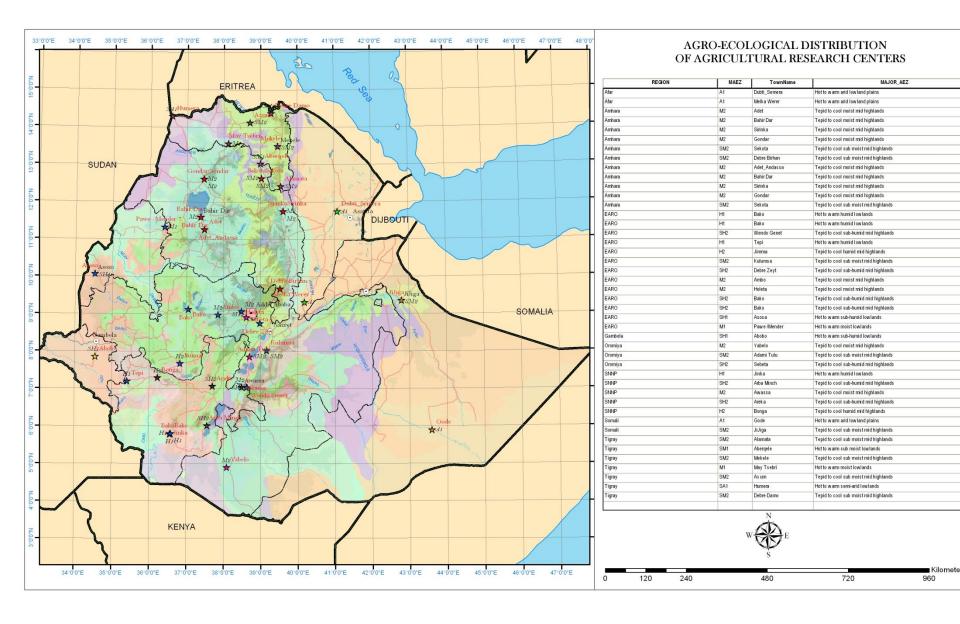
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### 6. CURRENT STATE..... (CONT'D)6.2.2 HIGHER LEARNING INSTITUTIONS (HLIS)

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6

6.2.2 Universities with colleges/faculties of agriculture/related fields:-

6.2.3 international agricultural research centers:-

6.2.4 NGOs:- Some such as FARM Africa

6.2.5 Private organizations:- mainly seed companies



#### 6. CURRENT STATE..... (CONT'D)

6.3 Agro-ecology coverage:

6.3.1 High potential rain-fed areas:6.3.2 Low potential rain-fed areas:6.3.3 Pastoral/agro-pastoral areas:6.3.4 Irrigated areas:-



### 6. CURRENT STATE (CONT'D)

**6.4 RESEARCH PROGRAMS DEVELOPMENT** 6.4.1 Crops:- comprises of improvement, management, protection, fertilization, Field crops:- cereals, food legumes and oil seeds -Horticultural crops:- fruits, vegetables, roots/tubers, spices -Cash/industrial crops:- coffee, tea, cotton, sugar cane, MABPs



6.4.2 livestock:- comprises of improvement, management, health, feeds and nutrition,
Cattle, shoats, poultry, camels, fishery, apiary, equine



### 6. CURRENT STATE (CONT'D)

6.4.3 Natural resources:includes studies and experiments on many disciplines, including Forestry, soil fertility, soil/water –conservation, agro meteorology



#### 6.4.4 Irrigation:-

deals with water management systems on various commodities such as cotton, sugar cane, fruits and vegetables, etc.



#### 6. CURRENT STATE (CONT'D)

6.4.5 Agricultural mechanization:- includes development and testing of machinery and tools

–Land preparation, seeding/fertilization, weeding, harvesting/threshing, processing (enset), transport (on-farm), storage

6.4.6 Socio-economics

–Benefit/cost analysis, marketing, production factor/constraints studies, etc

6.4.7 Research-Extension Linkage



### **7. ACHIEVEMENTS/UTILIZATION**

#### **7.1 INSTITUTION BUILDING**

- Agricultural colleges/faculties
- Agricultural research centers

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Agricultural extension services:- ATVETs (22), FTCs (1500), SMSs, DAs (63,000), Vets(xx) AND VET Assistants(xx)

 Agricultural support services:- seed enterprises (40), fertilizer importers/distributers (xx), animal breeding centers (xx), agro-chemical /drugs suppliers (xx)



# 7. ACHIEVEMENTS....(Cont'd)

517

555

7.2 Human Resource Development (Researchers i.e. B. Sc. and above):-

- Federal research centers 700

 Regional research centers (ARARI, TRARI, SRARI only)

 Universities
 (Ambo, Jima, Hawasa, Haramaya, Wolega only)



# 7. ACHIEVEMENTS.... (Cont'd)

#### **7.3 SCIENTIFIC Literature**

- -Books:-
- Refereed journals:- by professional societies and HLIs
- Discipline related articles:- by research workers
- Conference proceedings:- national, regional, international
- Research reports:- by research institutes



#### 7. ACHIEVEMENTS... (CONT'D)

7.4 Technology Development
7.4.1 CROPS
•Field crops: 463 var
•Horticultural crops:- 125 var
•Cash & industrial crops:- 30 var
•Animal feed & forage crops

7.4.2 Livestock
Dairy cattle (improved local breeds, cross-bred animals)
Poultry (several exotic breeds)
Apiary (mainly hives and managed)





#### 7. ACHIEVEMENTS... (CONT'D)

7.4.3 Natural Resources

Soil and water conservation methods
Soil fertility and fertilization methods

7.4.4 Agricultural tools and implements



#### 7. ACHIEVEMENTS.... (CONT'D)

# 7.5 Technology Support Services 7.5.1 Seed multiplication and distribution 7.52 Agro-chemical supply services 7.5.3 Artificial insemination centers 7.5.4 Animal feeds processing centers 7.5.5 Forestry seedling 7.5.6 Agricultural marketing system



#### **8. GAPS AND CHALLENGES**

8.1 Development /implementation of policies and Strategies

- Development of priorities for crops research
- Policy and strategy for livestock development
- Forestry development policy
- Water resources development policy
- Land use and management policy



8. GAPS .....(Cont'd)

#### 8.2 Institutional

- Frequent restructuring of institutions, eg MOA, forestry/wildlife
- Need for dedicated institutions for certain areas, eg., Animal resources, forest resources ???
- Weak institutions for technology generation, promotion and dissemination
- Poor linkage among institutions along the value chain, eg., Federal vs regional research centers, education-researchextension
- Inadequate number and quality of technology support services, eg., Seed systems, animal breeding centers, AI centers, animal health equipment and drugs supply centers, , farmers' organizations, input supply, output marketing



### 8. GAPS .....(Cont'd)

 Inadequate support for the private sector in technology generation and dissemination

Poor usage of the media for technology promotion

Poorly developed culture of scientific writing

#### **8.3 Human Resources**

- Inadequate number and quality of research staff
- High management/staff turnover/attrition:incentive, tenure, unsatisfactory working environment



#### 8. GAPS .....(CONT'D)

#### 8.4 Technology dissemination

- -Inadequate quality of extension staff
- Poor communication between researchers and extension staff
- Inadequate supply of funds and logistics support for technology transfer



# 8. GAPS .....(CONT'D)

8.5 inadequate impact of generated technologies
 – Crop and animal productivity much below observed potential

- Crops:-
  - GrainsVegetablesFruits
- 1.2 -2.5 t/ha vs 4.0-10.0 t/ha 2.5-3.0 t/ha vs 20.0-30.0 t/ha 1.5-2.5 t/ha vs 15.0-20.0 t/ha

- Livestock:-
  - -Milk
  - -Meat
  - –Eggs

1.5 lit/day vs 15 lit/day



#### 9. The WAY FORWARD

- 9.1 Develop institutional arrangement and coordination mechanisms of the federal/regional/HLIs research programs
- 9.2 Establish an external review mechanism for agricultural research performance
- 9.3 Review the organizational arrangement for selected sub-sectors in agriculture, eg forestry, livestock, etc.



#### 9. THE WAY FORWARD .....(CONT'D)

9.4 Further encourage and support private sectors' participation in all areas of agricultural development

9.5 Improve the quality of training of agricultural professionals and develop mechanisms for their effective utilization

9.6 Further support and strengthen the institutions for technology generation, promotion and dissemination

