Ethiopian Biofuel Development Opportunities

Regional Workshop on climate change in the aviation sector for the African Region

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Hailu T. Tekleab
Director, Biofuel Development Coordination Directorate; Ministry of Water and Energy
hailuorganic@gmail.com; cell. +251-911249158

outline

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- development initiative
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- legal frameworks
- programs and projects
- current status
- Value chain & stakeholders mapping
- conclusion/ theory of change

country context

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covers an area of 1,126,829 km²

population: more than 115 mil. (2020)
second most populous in africa

over 80 languages are spoken

it has its own calendar and alphabet

has the largest livestock population in Africa

a founder & member of the UN, OAU
base for many international/
regional organizations.

has nine UNESCO World Heritage Sites,
seven sites are in UNESCO's tentative list

the first Africans to win olympic gold medal
(**Abebe Bikila,** 1960 maraton, rome.
Derartu Tulu 1992, 10,000m, barcelona)

highest elevation, mount Ras Dashen, 4620 m,
lowest, danakil depression 125 m below sea level

NDC commitment

- has updated its 2nd NDC to the UNFCCC
- committing to reduce GHG emissions by 12.4% in 2030 compared to a BAU scenario, using its domestic resources
- it is a 51.1 $MtCO_2eq$ reduction, limiting GHG emissions at 360.85 $MtCO_2eq$ in 2030 (from a BAU emission level of 412 $MtCO_2eq$)
- emissions reduction target could be further increased to 53.5% with financial backing from the international community;
- this would limit GHG emissions to 242.8 $MtCO_2eq$, i.e. 220.6 $MtCO_2eq$ less than the BAU scenario
- most of the emissions is from agriculture and forestry sector
- the country is among the lowest in the world for CO_2 emissions per capita

biofuel development initiative

- **global and national oil crises** (1973, 1979, 2007, 2008, 202)
- **country's oil demand growth** (population, urbanization, economy)
- **need to alternative/renewable energy** (petroleum substitution)
- **global and national commitments** (SDG, africa agenda 2063, CRGE, NDC…)
- **environment, GHG emission, indoor pollution**…
- **expansion of sugar factories in the country**

- **suitability of climate, land, soil**…
- **need for import substitution/export earning**
- **job opportunity**
- **future petroleum reserve uncertainty**
- **high volume/price of imported petroleum** (4 Bln Liter // 2 Bln USD 20.7% of import share) *Source: 2014/15 Annual Report CBE*
- **abundant feedstock potential**

biofuel dev't objectives

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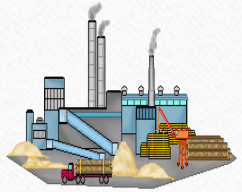
objectives

- petroleum substitution
- encourage domestic production
- reduction of environmental pollution
- reduction of energy poverty in rural areas
- carbon fund (CDM, JI, ETS. EU ETS…)
- SDG/ agenda 2063/ CRGE/NDC commitments
- reforestation & job creation
- foreign exchange saving/ earning
- transport, cooking, lighting, electricity



Legal frameworks

Ethiopian development policy supports the biofuel agro-industrial development and Utilization.

Policy framework:

- **economic policy:** agricultural led industrialization;
- **energy policy:** sustainable energy access, renewable Energy, local source, income, job opportunity, biofuel for land, aviation and cooking;
- **environment policy:** forest/fossil fuel substitution, emission reduction, health, climate change and green economy, land rehabilitation, erosion control, soil and water conservation, income, job opportunity;

… Legal frameworks

key strategies

- **CRGE** (climate resilient green economy) /2014-30, … emphasis on biofuel development mainly in transport, fuel shift in HH cooking, land rehabilitation

- **ethiopian home grown perspective plan** (2021-2030)… CRGE mainstreamed plan

- **biofuel strategy** (Sept. 2007), to be revised again

goal: to produce adequate biofuel energy from domestic resource for substituting imported petroleum products and to export excess products.

objectives:

✓ substituting mineral fuels by locally produced biofuels (save and earn foreign exchange)

✓ ensure rural development by creating jobs in feedstock production, transportation, marketing; biofuel processing and end use services (fuel for transport and cooking)

✓ reducing environment & household pollutions (vehicles/ aircraft exhausts, cooking,…GHG emissions)

… Legal frameworks

laws

- **biofuel development proclamation** (draft)

  expanding biofuel agro-industry development: for fossil fuel substitution, foreign exchange saving/ earning, energy security, encourage domestic production, job opportunity, society wellbeing, environment and emission reduction

- **biofuel development regulation** (under preparation)

programs and projects

biofuel development stakeholders Forum

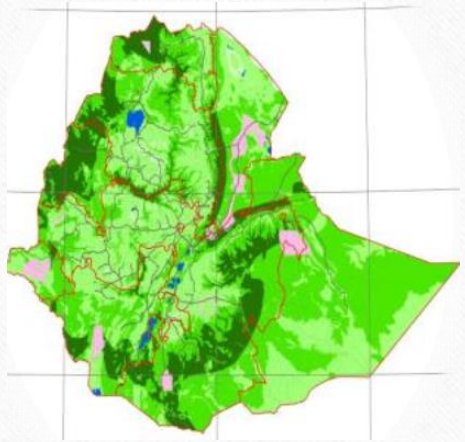
(government, associations, researchers, and private investors)

three pillars

- biofuel R&D, invention, testing and promotion unit,
- investment and agro-industry development and utilization unit,
- development partnership and fund raising support unit,

sustainable aviation fuel (SAF)

10 years SAF roadmap is launched



other studies

- land suitability study
- Value chain analysis/ MRV system
- policy study (Investment proposal /climate fund)

current status

ethanol for transportation (currently stopped)

- **4 sugar factories were started production,** 1 under construction, 60 Mln liter/year
- **8 sugar factories are under construction,** at the end of the projects 380 Mln liters/year can be produced
- **4 blending facilities**, with capacity of 22 trucks/day and storage of 550, 000 liters are built
- **Ethanol Blending E5** were started in 2008, then E10 tested **for transportation.** up to now ~ 64 million liters produced, saving of ~ 54 million USD.

ethanol for cooking

- 3 Private SME producers/ distribute ethanol
- 1 NGO (Gaia Association) distribute for refugee households
- CDM. CPA0003 Ethiopia Estimated 72,420 tCO_2e

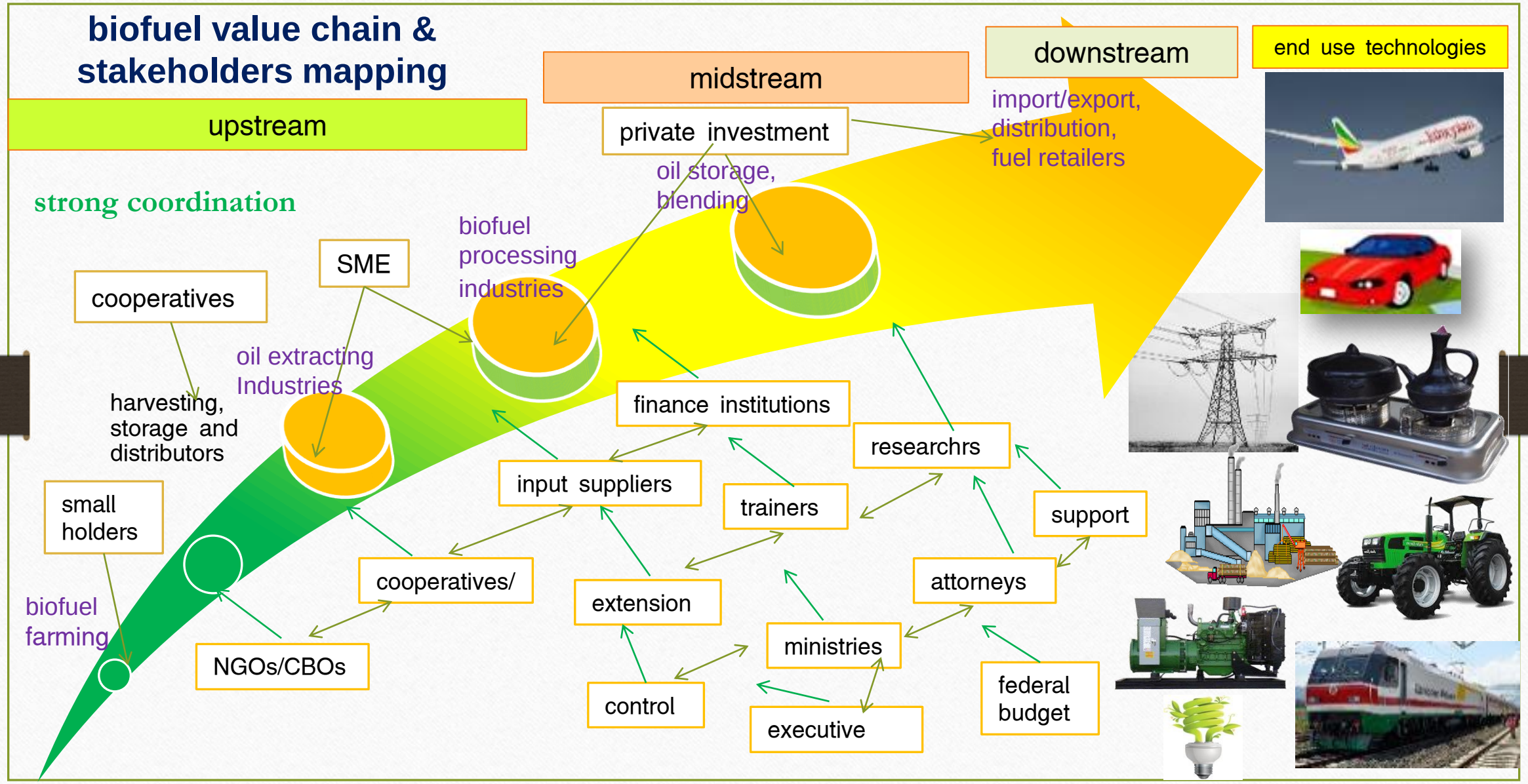
biodiesel

- **R&D is on going to identify the right feedstock** (Jatropha, Castor, Palm, carinata)…)
- **tree plantation**: mainly Jatropha on degraded land, from 2007
- **pilot processing machines constructed:**
  - 300 liters/day capacity, Amhara/Bati district; SME
  - 2000 liters/day capacity, APP Tigrai region; PPP
  - 3000 liter/day capacity, Atrif South region; private

biofuel ethiopia rural development project

- 9103 farmers trained
- 22 million seedlings (cuttings, seeds and direct Sawing) distributed
- 24 million jatropha tree planted on house fence and for the purpose of land rehabilitation
- 6643 hectares of land covered

biofuel value chain & stakeholders mapping



theory of change

Result levels	country level		private sector	
impact	transformation and prosperity		self-sufficient and autonomous company	strategy
outcome	green economy (Clean and Sustainable Energy Access)	macro economy dev't (Job Creation, Investment, Income)	increased revenue; biofuel productivity improved	Phase 3 (10 years) Revenue + carbon
output	renewable energy supplied; technology transferred.	GHG reduction; land rehabilitated; green job/income, currency saved	service provided; revenue; units sold; job created; carbon reduced;	Phase 2 (5 years) Investment + revenue
activities	enabling environment > regulation > capacity building > R&D> financing > incentives > industry/market linkage> promotion > investment > marketing > job creation > income generation > standard > M&E >		establish the company production of biofuel blending / distribution supply appliances carbon farming	Phase 1 (5 Years) Initial investment (loan)
inputs	GOV financing, carbon and other finance sources. auto-grower skim, SME and private sector partnership			

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thank you for your attention