Potentials and Constraints of Biofuel Production in Ethiopia

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INTRODUCTION

- Ethiopia is a land-locked nation with an economy mainly dependent on agriculture
- The transportation sector of the country is totally reliant on imported fuel
- Continuous expansion of feedstock cultivation competes with food production which jeopardizes food security for the growing livestock and human population
- There exists a growing demand for land and strong ambition of biofuel production for the transport sector

OBJECTIVE

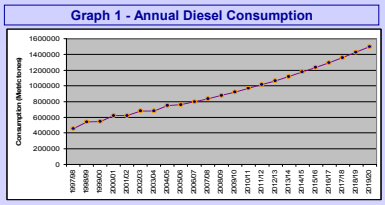
To determine the actual potential and assess the possible constraints of biodiesel production in Ethiopia.

METHODOLOGY

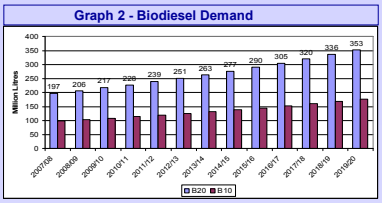
- Gross potential was determined based on FAO data analysis of soil, climate and terrain characteristics for different parts of the country and takes into account different crop type requirements
- Several energy crops were evaluated and compared based on their oil yield and other feasibility criteria
- Detail analysis on potential energy crops was carried out by investigating their production system, current and projected potentials in supplying biodiesel for the transport sector depending on the alternative scenario developed

RESULTS

Graph 1 - Annual Diesel Consumption



Graph 2 - Biodiesel Demand



- Based on the national diesel consumtion rate (Graph 1) and the different options of biofuel blend requirement (B10, B20), the current and projected biodiesel market demand will be as shown in Graph 2.
- Depending on the blend percentatges, land productivity and type of the crop, the total land area required to produce the amount of mandatory biodiesel varies.
- Out of potentially available agricultural land (20.44 Mha), < 10% is suitable for oil crop production (Graph 3).

Land availability

Total land area = **111.5 Mha**

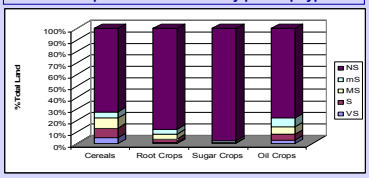
Currently in use for crop production = 15.41 Mha
Potentially available for agriculture = 20.44 Mha
No agricultural potential = 75.65 Mha

FAO

Most of the potential area for biofuel feedstock production consists at large extent marginal lands.

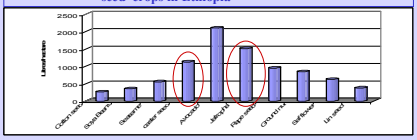
➢ therefore it needs high input to actualize potential

Graph 3 – Land availability per crop type



POTENTIALS

Graph 4 - Potential Biodiesel Yield Per hectare for oil seed crops in Ethiopia



- *Jatropha curcas and castor bean* are best suited for the growing condition of the country (Graph 4). Avocado (*Persea americana)* also shown a good potential with high oil yield (Graph 4), but as it is highly demanded for food and export it will not contribute to biofuel production.
- Cultivating 50% of the current and planned concession covers the demand and provides a surplus ranging from 50.34 to 485.4 mill lt. depending on the blend percentage (see Table).

Table: Present and Projected biodiesel production potential from Jatropha and Castor (mill. Lit)

	25 %	50%	Total Cultivation
Present	**128.17**	**256.34**	**512.57**
B10	**+25.17**	**+153.34**	**+409.57**
B20	**-77.83**	**+50.34**	**+306.57**
Planned	**330.84**	**661.9**	**1323.36**
B10	**+154.34**	**+485.4**	**+1146.86**
B20	**-22.16**	**+308.9**	**+970.36**

CONSTRAINTS

- ❖ Competing demands of land for agriculture and grazing as there is a continuous increase in livestock and human population
- ❖ Highly fragile and vulnerable agro-ecosystem
- ❖ Lack of Market integration
- ❖ Inadequate institutional arrangements

Although land availability may not appear to be the main constraint in the short term, results show that continuous leasing of lowland areas for biofuel production affects the livelihood and food security of small holders and pastoral communities.

Relevant literature

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