

Water Productivity & Sugar Cane Production

WaterPIP
Water Productivity Improvement in Practice

Development and operation of sugar industry
in Ethiopia (priority, opportunity and challenges)

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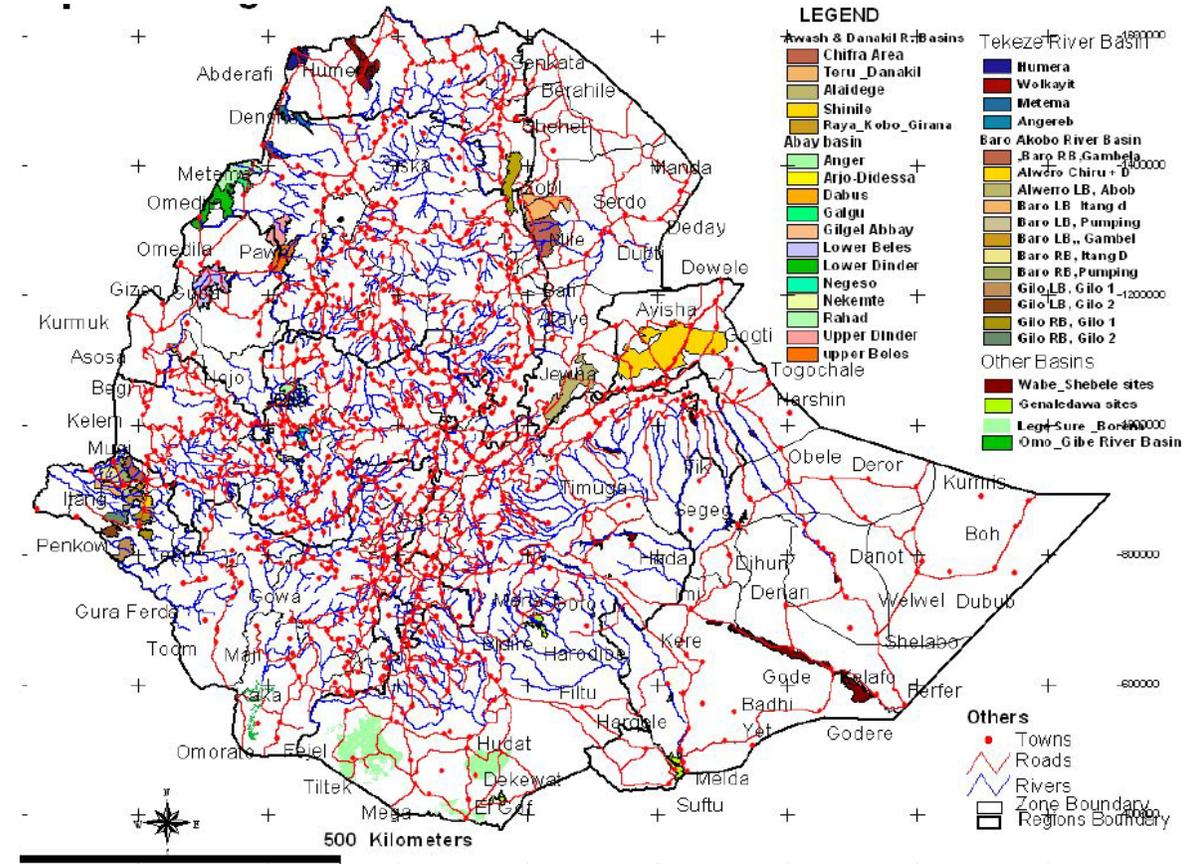
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Potentials and Opportunities (1/3)

- Ethiopia has four million hectares irrigable land suitable for cane development as well as abundant resource of water and labor force. However, the total area developed for the production of sugar cane is only about 2.5%.
- These enable the nation to broaden export-oriented sugar manufacturing industry sector and its productivity.
- Sugar development sector is one among other huge projects which enables industry to take a leading role in the nation's economy in the near future.



Potentials and Opportunities (2/3)

- The government has given higher attention to the sector and it is working for further development of it.
- A national sugar policy that will set direction for sugar import, export and consumption in the country has been under preparation and promote the country's potentials.
- Attractive investment incentives
- There is a policy shift towards privatizing fully or partially existing sugar factories.
- As of January 2019, 30 companies have shown interest and presented their profiles to work in joint ventures with Sugar Corporation.

Potentials and Opportunities (3/3)

Potential Irrigation Sites For Sugar Cane Development

Basin	Site No.	Site	Water source	Gross Area	Net Suitable area
Awash	1	Angelele Balhamo	Awash	11,000	8,600
	2	Maro Gala	Awash	14,700	6,600
	3	Kasem Kebena	Kasem	17,600	13,600
Blue Nile	4	Arjo Dedesa	Dedesa	139,000	16,800
	5	Anger Valley	Anger	65,500	30,200
	6	Upper Beles	Beles	65,000	55,300
	7	Upper Dinder	Dinder	80,000	58,300
	8	Rahad	Rahad	100,000	
Tekeze	9	Angereb	Angereb	45,600	38,800
	10	Tekeze	Setit	68,550	50,550
Omo Gibe	11	Lower Omo	Omo	58,000	29,000
Baro	12	Abob/Ubala	Gilo	46,900	39,400
	13	Itang	Baro		21,000
Nile	14	Dabus	Dabus		5,100
Omo	15	Gojeb	Gojeb	12,000	

Development Status (1/2)

- Sugarcane has been cultivated by smallholder farmers since 16th century in Ethiopia.
- The country has more than fifty years of experience of producing sugar for commercial production.
- It was at Wonji in 1951 that modern sugar industry started in Ethiopia by then the Netherland's H.V.A. Company; with initial production of 140 tons of sugar a day
- Till 2014, there were only three factories with the capacity of producing 75,000 tons of sugar per annum from irrigated sugar cane farm of 28,000ha.
- Ten huge sugar development projects that require high investment are under construction in the lowland areas of the country.



Development Status (1/2)

- Currently:
 - About 103 thousand hectares of land is covered with sugarcane and there are eight operational factories that have over hundred thousand of employees.
 - Production has passed the 500 thousand tons of sugar per annum mark. Power generation and millions of liters of ethanol production are added benefits.
 - When all projects are completed the annual sugar production will be boosted to 3.9-4.17 million tons, ethanol production will be 181 million liters and the factories contribute 709 MW electric power to the national grid.
 - More than 15 thousand members are organized in 70 sugarcane outgrowing and providing associations on 17 thousand hectares of land.



Development Challenges (1/2)

- The Government Goal is: to satisfy the local demand and become one of the top ten sugar exporting countries.
- However the sector has numerous challenges to meet set goals:
 - Growing population, associated growing demand and the increasing number of industries which use sugar as an input, have made the sugar demand and supply incompatible (~500t/y vis a vis ~700t/y).
 - Implementation capacity, finance, foreign exchange, spare part as well as machinery supply.

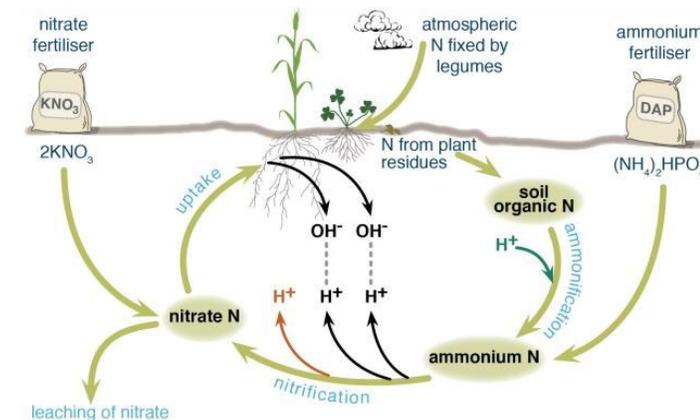
Domestic Production and sales of sugar (ton)

Year	Production	Consumption/Sales	Per Cent Sold
1996/92	172,217	145,357	84.4
1997/98	172,571	184,528	106.9
1998/99	234,987	198,164	84.3
1999/00	250,869	246,364	98.2
2000/01	251,349	245,498	97.7
2001/02	248,152	203,246	81.9
2002/03	268,008	283,300	105.7
2003/04	198,762	276,400	139.1
2004/05	274,836	273,777	99.6
Total	2,071,751	2,056,634	99.4

Source:- CSA, Statistical Abstract of Ethiopia, 2006.

Development Challenges (2/2)

- Water shortage during drought years
- Increased salinity and water logging caused by poor water management practice and the underlying soil conditions.
- Poorly managed high agricultural run-off, and effluent – liquid waste or sewage – from processing which is affecting complex water systems.
- Lack of improved technologies that can alleviate the existing production challenges such as: lack of high yielding modern cane varieties, prevalence of diseases and pests, reduced land productivity, rise of soil and water management related problems, etc.



Land productivity (1/2)

- It is possible to cultivate 162 tons of sugarcane/hectare on average in 15 months.
- Experiences of existing sugar factories show that because of the suitable soil, adequate water and conducive climate, an average sugar cane production per hectare per month of the land under irrigation is very high as compared to other countries (i.e.9-11 tons/hectare against 6-8 tons/hectare).
- However, there is an evident gap between the potential yield and the yield level achieved so far though productivity of the plantations.



Land productivity (1/2)

- Land productivity across the sugar estates is largely dependent on the agroclimate regime, water and soil conditions.
- Those sugar estates in lower altitude are relatively more productive due to the warmer temperature and the more fertile fluvial soils.
- Although it is possible to produce 10.8 tons of sugarcane in Ethiopia per month poor land and water management practices are lowering land productivity over significant portions of existing farms.



Water productivity (1/1)

- Water productivity largely depend on the agroclimatic zone, soil condition, irrigation water management; including the amount of water, irrigation technology, irrigation schedule,
- This may be attributed to the combined impact of limited management creativity and use of limited improved technological developed in situ or abroad.
- Existing sugar mills, particularly, Wonji-Shoa, Metahara and Finchaa do not attain the best (state of art) design standards and efficiency and have required either to be replaced or upgraded in order to improve ([Shimelis Kebede](#) et al 2013).

	<i>Units</i>		<i>Metehara</i>	<i>Wonji-Shoa</i>	<i>Fincha</i>
Irrigation water consumption	m ³ /ha	Current	24,210	12,500	20,400
		Min	23,180	12,103	19,000
		Max	24,600	13,420	20,800

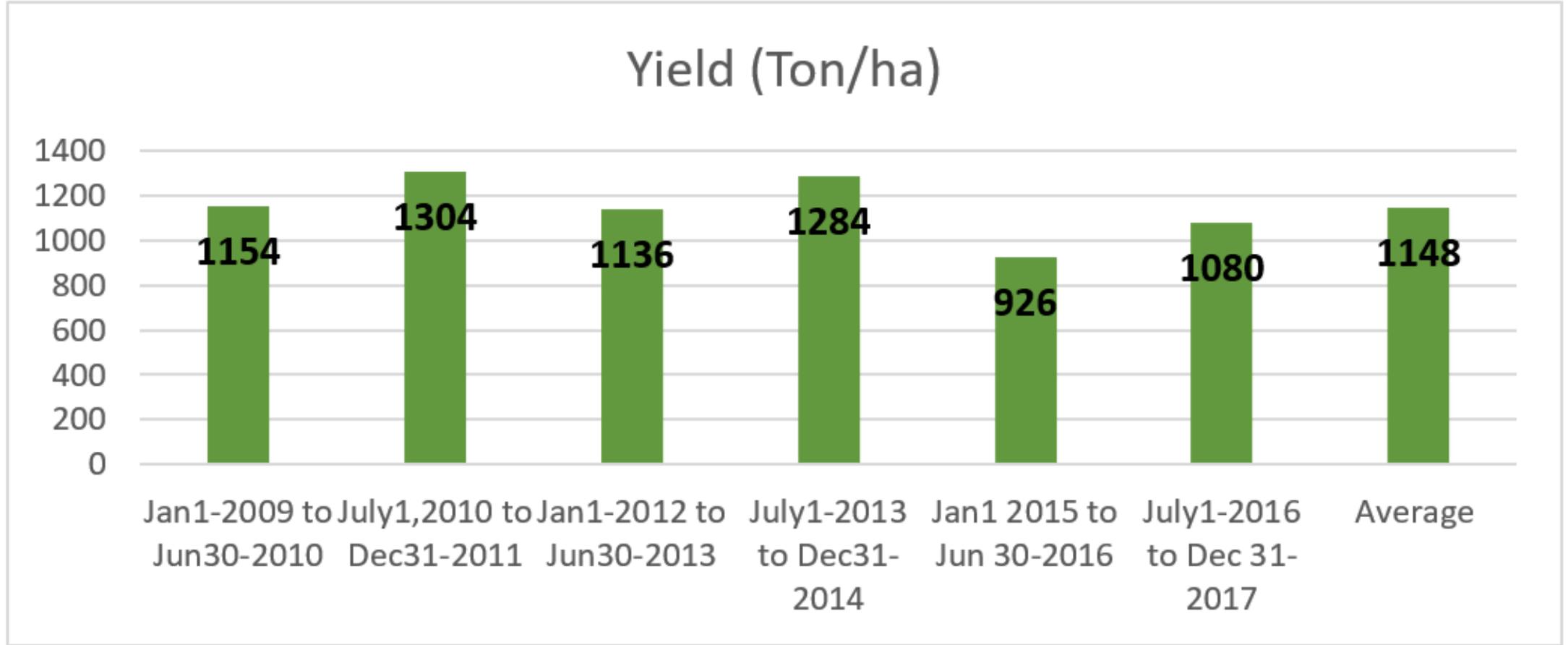
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The need for application of WaPOR

- Managing extensive cane farm with the conventional method is a big challenge.
- As the farm size increased modern management tools are sought by the corporation to manage irrigation fields, irrigation water, monitor growth and diseases; and forecast production .
- Remote sensing method is seen as a vital tool.
- So far no significant progress is made.
- Application of WaPOR could be among the important source of information to satisfy these needs.
- There is a possibility to work together with the sugar research centre that has set up research posts in Wonji Shoa, Metahara, Fincha, Tendaho, Arjo Diddessa and Kesseem sugar factories as well as Tana Beles, Omo Kuraz and Welkayit sugar development projects.
- The sugar research centre is conducting sugar technology researches to improve productivity.

The need for application of WaPOR



Ethiopian Sugar Corporation

- The Ethiopian Sugar Corporation was established at the end of 2010 to undertake the responsibility of the entire Ethiopian Sugar sector development.
- It plays a leadership role in the development, management and marketing of sugar and its byproducts.
- Following its establishment the Sugar Corporation has launched short and long term capacity building programs targeted to support the large scale sugar development in the country.
- In distributing sugar in Ethiopia, ESC maintain a priority system.

WaterPIP

Water Productivity Improvement in Practice

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