

FAO

Technical Assistance Project

Dominican Republic

Sugar Strategy and Rehabilitation

Ethanol Feasibility Study

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Project Objectives

- GODR request (Feb 2001)
- Financial rehabilitation of industry
- Modernize installations and mechanize operations
- Reintegrate industry with all sectors
- Recommendations to improve competitiveness
- Present new policy, legal and institutional framework (and legislation)

- **Explore viable solutions in alcohol and other derivatives for confectionery or feed industry**

Background

- Production in 2001/02 at 600 000 mt
- Traditional producer +/- 1.0 million mt
- Record low of 370 000 in 1999
- Privatization of state owned mills in 1997
- 8 consorcios (10 mills/refiners, 5 ex-CEA mills)
- Most important agricultural export earner
- Consumption +/- 300 000 mt (60:40), ^ white M
- Largest recipient of US preferential quota access (17% or 190,000 mt)
- Molasses, invert syrups and furfural

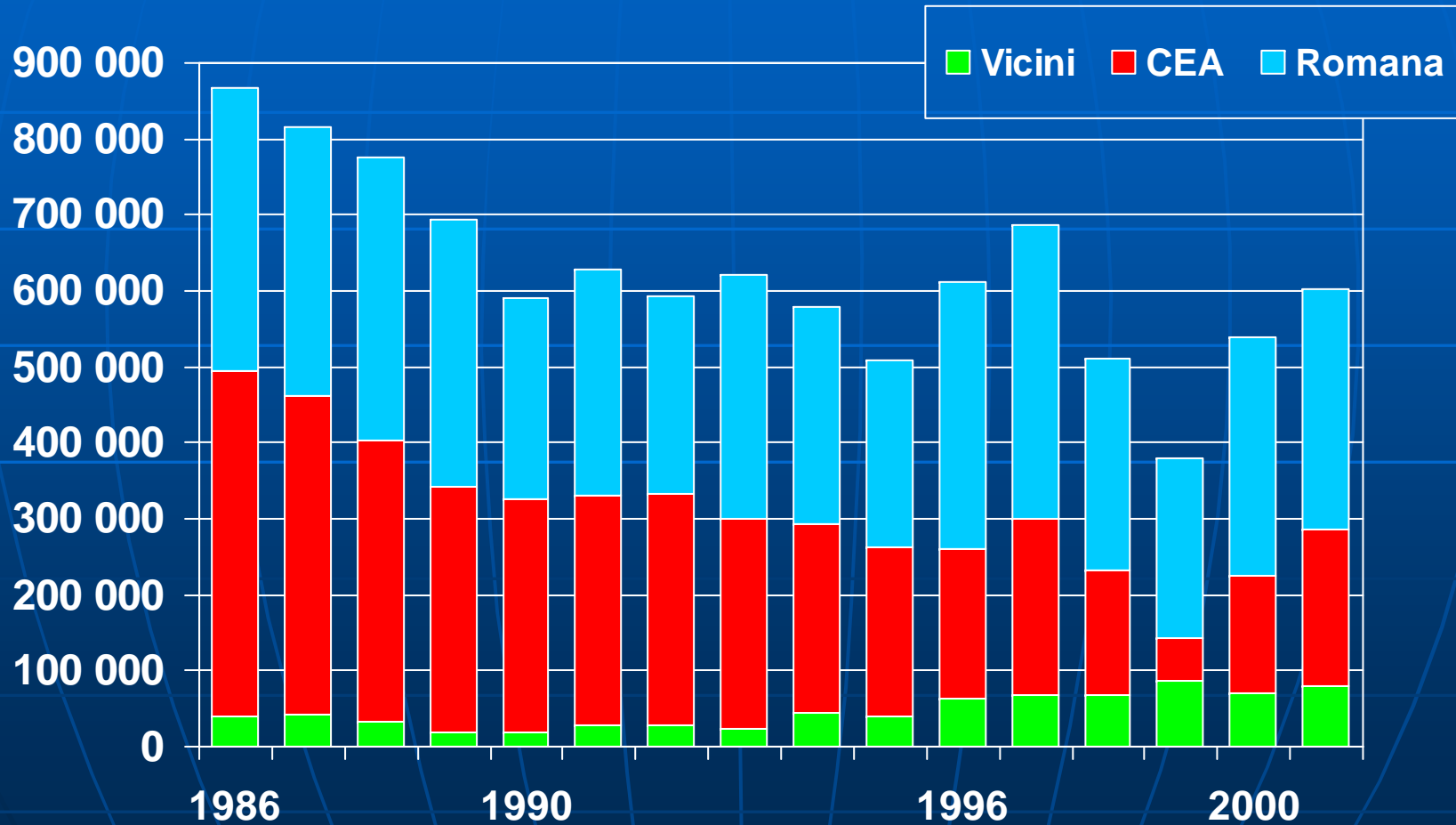
Background

- More than 50% area not irrigated – low yields
- 60,000 full/pt laborers plus > 7000 s/holders
 - Privatization *de facto* exit strategy, 2 500 colonos
- Highly variable yields per hectare
- 10 - 15% cultivated area mechanized
- Highly variable production costs, 15 to 22 c/lb
- 60% production exported in 1995 vs 35% 1999
- Industry capacity use <50% (ex-CEA 38%)
 - DR sugar recovery 8.25% vs low reasonable 10%

Production Cost and Competitiveness Field Survey

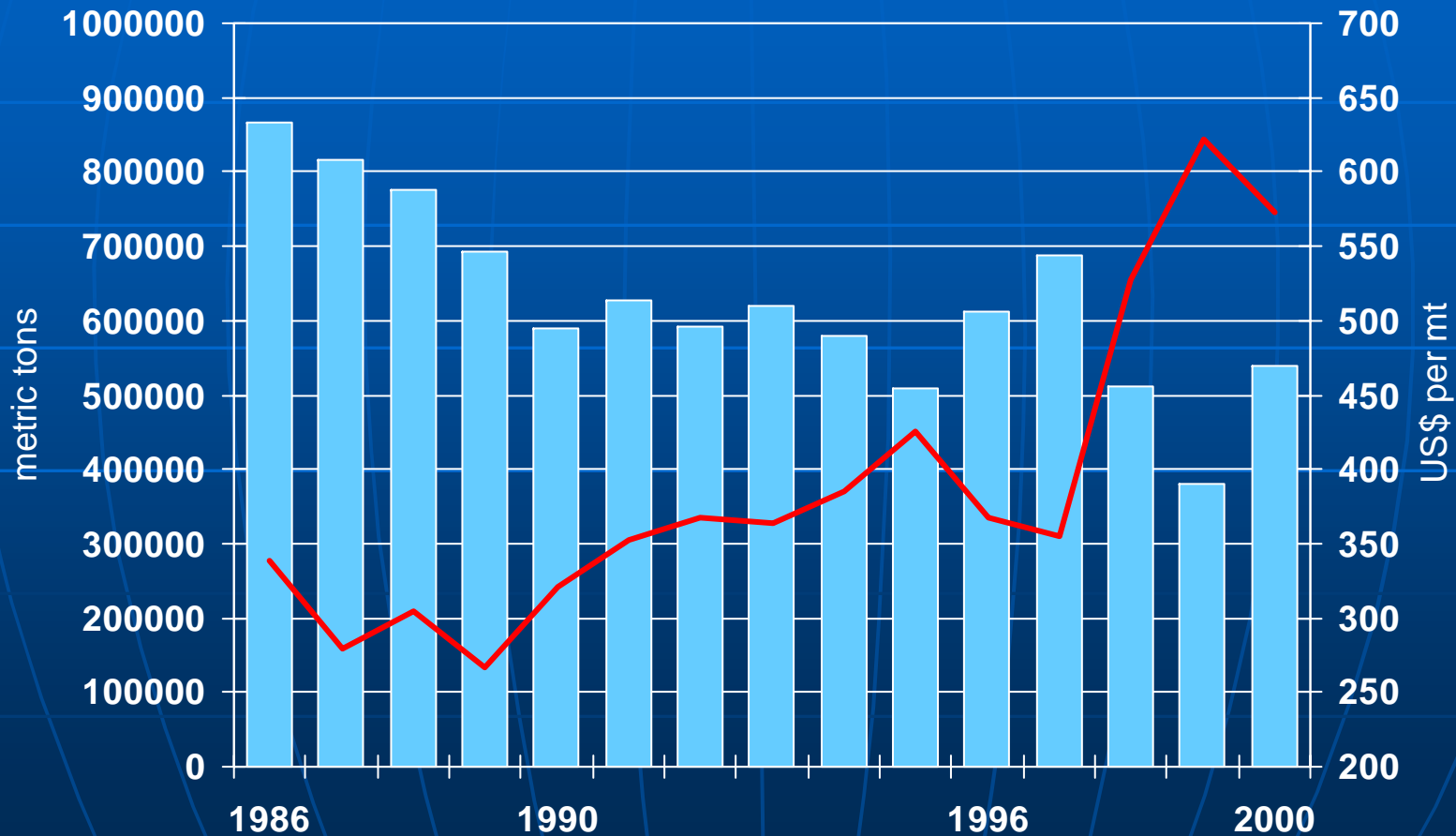
- Surveyed production costs, cultivated area, estimated income from sugarcane and related revenue streams, plus household food expenditures for 1998 – 2000
- Most producers harvested 1998, 2000 only 13
- Average cultivated area = 283 tareas
- Average sugarcane production = 550 toneladas
- Average age = 59 años
- Identify alternative scenarios = how many smallholders < breakeven may have to exit industry? *De facto exit strategy*

DR Sugar Production 1986 - 2001



DR Sugar Production Costs

US\$/mt, FOB, raw value



Challenges

- Need to protect domestic market at higher prices, fulfill quota preferences
- Developed and implemented a national redefinition for sugarcane research and investigation center
- Comprehensive strategies to improve agronomic practice
- Challenge: exit or alternative?
 - INAZUCAR, political pressure to pass ethanol legislation
 - Yet, no feasibility study
 - Possible to create market over short term?

Ethanol?

- Better yields and agronomic practice necessary, important prerequisite
 - DR 32 tons/ha (1990s) vs 80 tons/ha for more competitive international producers
- Initial government subsidies, phased out
 - Increased productivity, co-generation
 - New plants necessary for efficiency
- Legislation necessary to create demand and attract investment
 - Congress prior to feasibility study

Ethanol?

Sugar Production and Consumption Dominican Republic (2002/2003)

Total Production	497.046
Refined Sugar	150.036
Raw Sugar	347.010
Total Domestic Consumption	300.000
Refined Sugar	150.000
Raw Sugar	150.000
Raw Quota Exports to USA	185.346

Ethanol?

- Initial use of ethanol-gasoline mix
 - No modification of vehicle fleet
- Recommended E-10
- Estimated future gasoline demand
- Projected demand at E-10 and E-22
 - 1.033 in 2006 to 1.194 in 2010
- Best plant configuration, primary products plus co-generation

Ethanol? Key Factors

Parameter	Dominican Republic	Target	Where?
Metric tons/ha	31,8	85	Cutting
Recoverable sugar - % from sugarcane	114	140	mill
Purity Sugar solution	83%	88%	mill

Key Factors

Production Feasibility

- Quality and agricultural productivity
- Sugarcane harvest/transport system
- Quality payment, recoverable sugar
- Technology, industrial recovery
- Scale of production, > 1 million tons
- Given serious constraints
 - Capital investment?
 - Production costs?
 - Subsidies? Government support?

Competitive?

- Import parity for gasoline, ethanol sale value US\$ 0.228 per liter
- Issue: competitive if cost of sugar production < US\$ 12 per ton
- Short term, unlikely without more investments at field level
- More feasible with co-generation of electric energy surplus

Subsidies? Yes. Competitive? Not yet.

Price of Sugar Cane	US\$/t	10,00	12,00	15,00	20,00
Cost of Ethanol	US\$/l	0,235	0,261	0,300	0,364
Price (20% margin)	US\$/l	0,294	0,326	0,375	0,455
Average Cost of Gasoline	US\$/l	0,229	0,229	0,229	0,229
Unitary Subsidy	US\$/l	0,065	0,098	0,146	0,226
Ethanol Consumption E-10 (2006)	m3	164.3	164.3	164.3	164.3
Total value of subsidy	US\$x 1000	10.706	16.044	24.053	37.195
Subsidy as % of taxes	%	4,7%	7,0%	10,5%	16,2%

Note: Autonomous distillery producing anhydrous ethanol, self-sufficient electric, 180 day milling cycle, 153 full-out, daily cane crush, 6.500 tons, 14% sugar, capital investment, US \$40.2 million, turn-key

Break-even point?

Year		2006	2007	2008	2009	2010
Ethanol demand	m3	164.3	227.6	290.9	354.2	417.5
Production of Ethanol (1 mmt distillery)	m3	77.6	77.6	77.6	77.6	77.6
Number of distilleries	unid.	2	3	4	5	5
Agricultural productivity	tm/ha	31,8	38,9	45,9	53,0	60,0
Necessary cane area	ha	62.9	77.2	87.1	94.4	83.3
Investment	US\$ mm	80	40	40	40	0

Co-generation

- Scenario improved by selling surplus electricity (co-generation)
- Subsidies at 18% (even at high costs, low yields) drop to 12% by 2006
- By 2010, with higher yields, lower costs, subsidy drops to 1%
- Government subsidy gradually phased out with co-generation

Conclusions

- Agronomic improvement key
- Establish better practice, cane quality payment necessary
- Must invest in new technology (turn-key), old plants not convertible
- Clear, coherent and articulated government policy/legal framework
- Brazil-DR agreement, private investors
- Trade policy risks

Thank you.

- Questions?

For more information, please contact

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