

Stevia for Tobacco – a global approach

Dr. Udo Kienle

Department of Agricultural Engineering

University of Hohenheim, Stuttgart, Germany

Background on Stevia

- Work on Stevia since 1983, first field trials in 1987 to 1993
- **FAIR:** Optimized production and harvesting technique of the alternative crop *Stevia rebaudiana* Bertoni; EU Research Contract FAIR5-CT97-3751 (1998 – 2002);
- **DIVTOB:** Diversification for Tobacco Growing Regions in the Southern European Union; EU Research Contract SSPE-CT-2006-022739 (2006-2008).
- **DIVAS:** Diversification for Tobacco Growing Farms by the alternative crop *Stevia rebaudiana* Bertoni; EU Research Contract DIVAS 232250 (2009-2012);
- **Go4Stevia:** *Stevia rebaudiana* as a diversification alternative for European Tobacco Farmers to strengthen the European Competitiveness; EU Research Contract Go4Stevia 315192 (2013-2016)

What is Stevia ?

Stevia rebaudiana Bertoni

Stevia rebaudiana is a subtropical leafy crop
In its leaves sweet low-calorie molecules are produced
The leaves itself tastes sweet

Positive health effects:

- Compliant for people suffering Diabetes mellitus II
- Tooth friendly
- Option for people with food intolerance
- Low calorie
- High anti-oxidative potential
- High amount of micro-nutrients, vitamins and essential elements

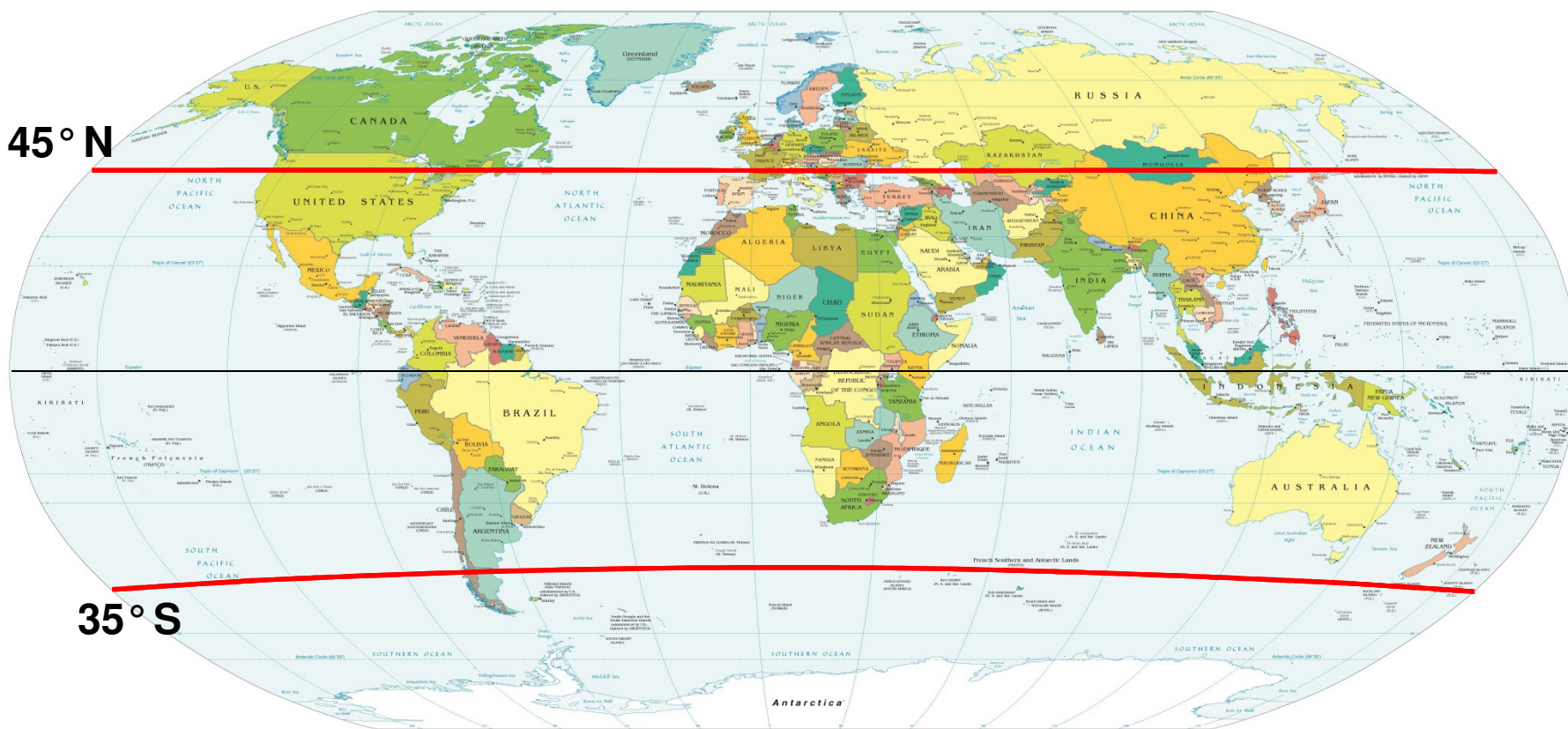


Legal Status

- The JECFA Committee of the WHO gave green light in July 2008 for the use of Steviolglycosides as Food Additive
- Codex Alimentarius adopted maximum use levels in foods and beverages
- Approved in the USA since December 2008
- EU approved the use of Steviolglycosides in December 2011
- **Legal documents: Codex Alimentarius**

Where can you cultivate Stevia ?

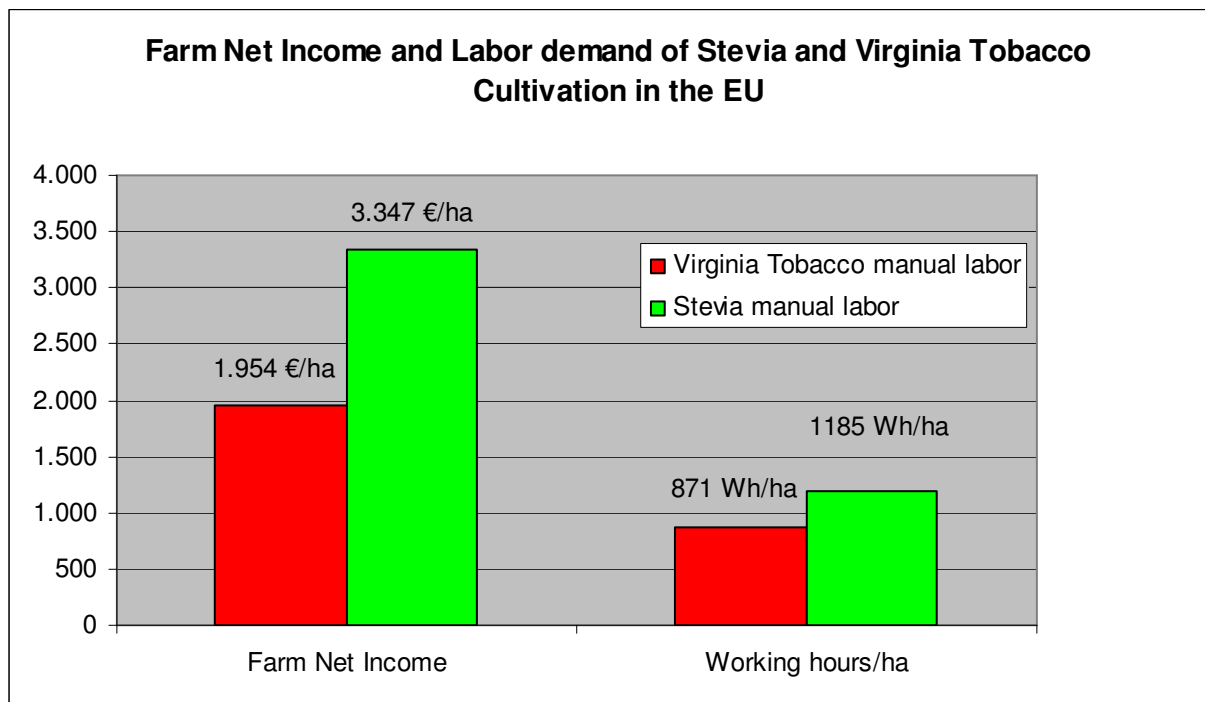
Stevia covers about of 99% of Tobccao cultivation possibilites



Cultivation Features

- First harvest about 10 weeks after transplant
- 2 to 6 harvests per year
- Yield from 2500 kg to 6000 kg/ha per year
- Perennial crop up to 5 years
- Cultivation techniques likely to Tobacco
- Low fertilization needs, Incidence of pests and diseases are low
- About same manual labour input as tobacco

Economics of Stevia production



Labor demand for Tobacco in e.g. African countries are up to 1395 working hours/ha

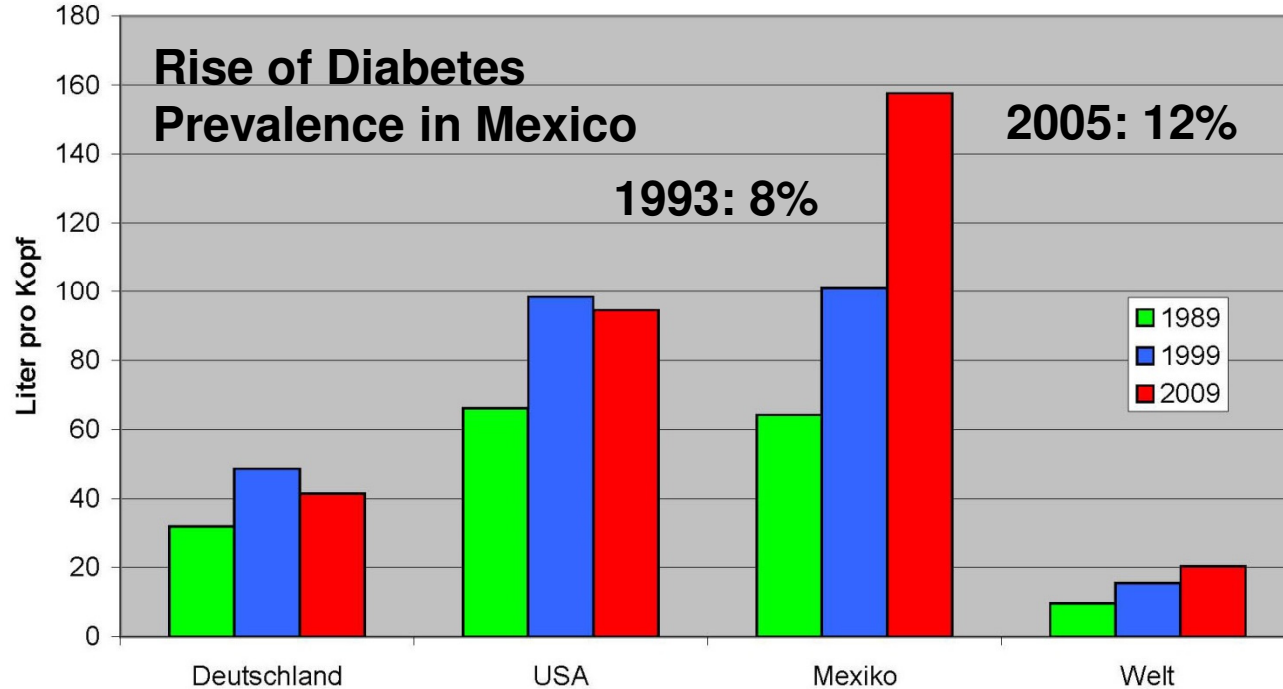
Why to cultivate Stevia?

Coca-Cola Company warns about the use of its own soft-drinks

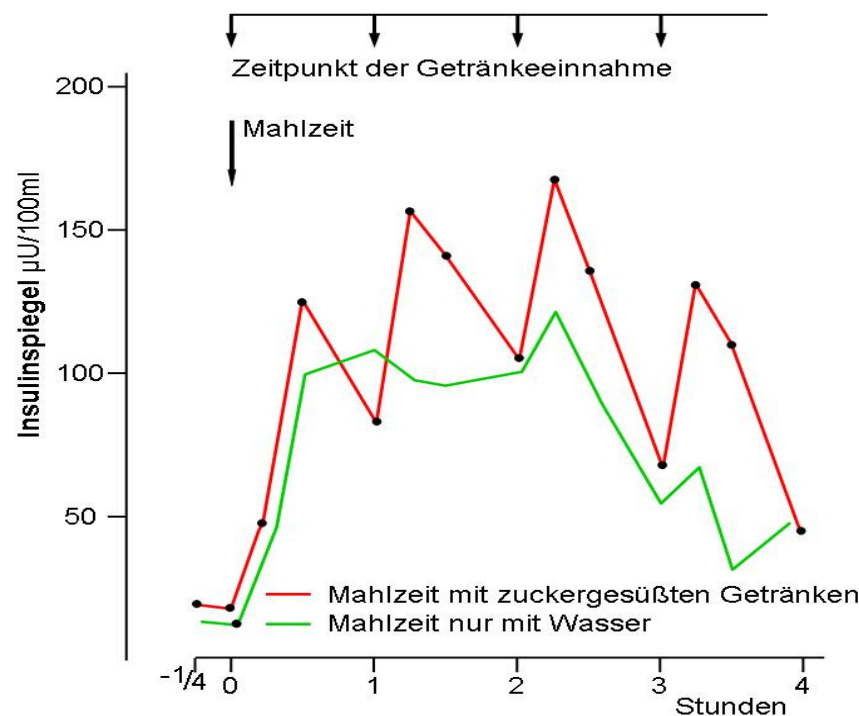


Soft Drink Consumption and Diabetes Prevalence

Pro-Kopf-Verbrauch von Getränken "The Coca Cola Company"
in auserwählten Ländern



Influence of sugar sweetend beverages on the release of insulin in human body



Red Line shows insuline release after drinking of 100 gram sugared water divided in four portions

Green Line shows insuline release after eating a cake with 100 grams of sugar

Difference in insulin release at same amount of sugar ingested.

In four hours 28% more insulin release when sugar is in liquid form!

Macroeconomic Features

From 118 Tobacco producing countries about 57 may benefit from the Stevia for Tobacco approach

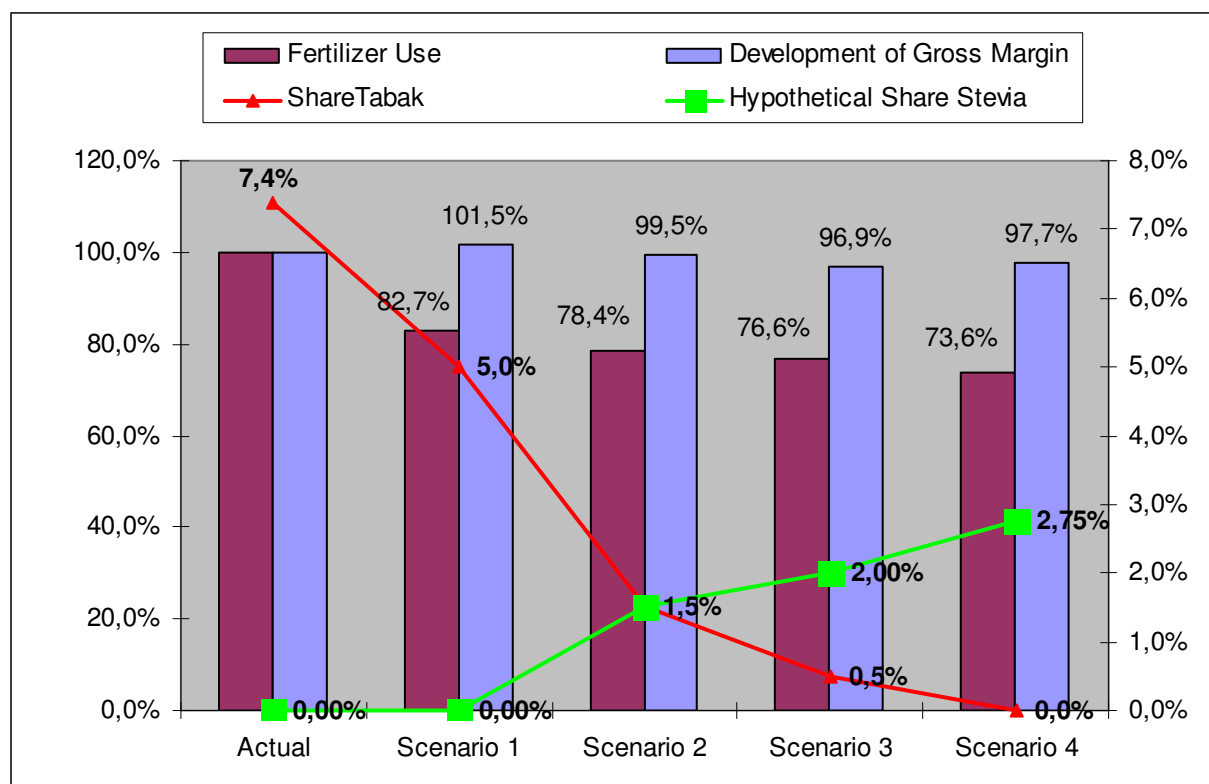
Country	Tobacco cultivated area (ha)	Possible substitution in % of tobacco cultivated area	Substituted Tobacco Production (tons)	Possible loss of Tobacco sales volume (US-\$)	Sugar Equivalent produced on Tobacco field (tons)	Substitution of sugar import in US-\$	Macroeconomic gain for Tobacco substitution (US-\$)
Pakistan	50.861 ha	31%	32.222 tons	53.321.000	634.926 tons	279.991.000	226.670.000
USA	144.070 ha	34%	120.741 tons	450.613.000	1.947.579 tons	917.143.000	466.530.000
Kyrgyzstan	5.848 ha	36%	5.171 tons	3.870.000	83.841 tons	34.549.000	30.679.000
Indonesia	194.517 ha	38%	63.985 tons	147.587.000	2.972.785 tons	1.040.194.000	892.607.000
Cameroon	2.838 ha	41%	3.354 tons	5.232.000	67.078 tons	38.174.000	32.942.000
Kenya	13.379 ha	43%	4.793 tons	5.666.000	230.013 tons	108.543.000	102.877.000
Cambodia	7.277 ha	70%	9.543 tons	18.825.000	203.611 tons	67.495.000	48.670.000
Bangladesh	30.699 ha	90%	35.461 tons	23.943.000	1.111.397 tons	407.182.000	383.239.000
Mexico	6894 ha	100%	13.008 tons	27.818.000	266.913 tons	133.264.000	110.223.000
Nigeria	19.000 ha	100 %	9.000 tons	4.909.000	760.000 tons	262.248.000	257.339.000
Total	475.383 ha	43%	297.278 tons	741.784.000	8.278.143 tons	3.288.783.000	2.551.776.000

Does Stevia harm Sugar Industry?

- No!
- Stevia brings innovation to sugar
- Beyond 2025 more fuel energy or green chemicals may be needed from renewables
- Sugar is the most efficient renewable
- Any plastic or synthetic textile fibre can be produced from sugar
- 1 Mio. hectare of Tobacco replaced by Stevia can produce the „additional sugar“ required until 2025 due to the increase of world population without the need to cut 1 hectare of forest down!

Stevia and Environment

A step-wise phasing out of Tobacco will not necessarily mean that the gross-margin of a farm decrease dramatically, but it could reduce the fertilizer use in a given region



Conclusions

- The Stevia crop can replace tobacco to a great extent
- **Farmers do not need any investment!**
- Local production is possible with very low investment requirements
- Improves the Macroeconomic Conditions of a Country beyond Tobacco
- Helps to fight against obesity and diabetes
- **The implementation of Stevia in Tobacco farms brings the farmer to a new quality – the protection of human health!**

Thank you!

For further questions

udo.kienle@uni-hohenheim.de