

3rd International Conference Aix-en-Provence, Oct. 29-31, 2014
Biodiversity and Food Security: from Trade-offs to Synergies
From Production to Consumption: Loss of Biodiversity by Export - Import
Market Mechanisms - Focus tropical fruits.

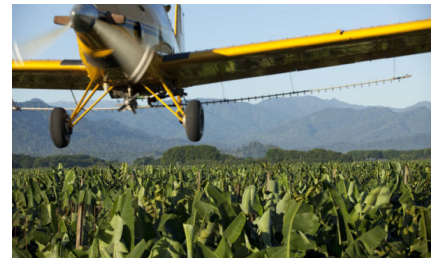
Gundolf H. Kohlmaier, Goethe University, Frankfurt Main, Institute Atmosphere and Environment and GEE-21, Global Energy and Environment in the 21st Century, Hawaii



Exports from fruit producing countries have led to a **selection and reduction of a few plant cultivars**, which suffer least from transport, **which are known and appreciated by the consumer of the import country** and which have a **high market value**, and which, in case of bananas and pineapple, are grown only **under the heavy use of pesticides and fertilizers**. The export market is dominated by three International Fresh Fruit Companies, leaving only some room for **sustainable production and Fair Trade**.

Chiquita-Fyffes 32,000 employees, workers, farmers, sales 4.6 Billion US-\$, operating in 70 countries, 180 Mill. Boxes (22,8 kg) of bananas www.chiquita.de/
Fresh Del Monte Produce , 44,000 employees, sales 3,5 billion US-\$, 117 Mill. boxes bananas www.freshdelmonte.com/
DOLE , 40,000 employees, workers, farmers, sales 4.5 Billion US-\$, 110 Mill. boxes of bananas Informative Web: www.dole.de
All are growing and marketing bananas of the cultivar group: Cavendish , derived from wild "Musa acuminata", needing about 50 treatments of agricultural pesticides per year (Precursor Banana Gros Michel)

Bananas	2010	Country Pop Mil.	Export Mt	Product. Mt	Consum. Mt	per-cap kg/a
Ecuador		15.0	5.734	7.931	1.528	98.5
Costa Rica		4.7	1.909	2.020	0.135	0.4
Colombia		46.5	1.692	2.020	0.323	6.3
Phillipines		93.4	1.590	9.101	7.511	51.2
Guatemala		14.3	1.400	2.637	1.239	4.5
Pineapple	2010					
Costa Rica		4.7	1.963	1.980	0.168	36.1
Phillipines		93.4	0.749	2.169	1.186	12.7



- Four Reasons for Reduction of Agro-Biodiversity**
1. Export-Import market relations necessarily lead to a reduction of plant cultivars and never span the agro-biodiversity of the country of origin. This is true for non-tropical fruits like apples (e. g. only three cultivars from New Zealand are imported) as for tropical fruits like bananas.
 2. In case of the export banana, the International Fresh Fruit Companies have focused on the **cultivar group of the Cavendish banana**, which is extremely susceptible to the dangerous **Black Sigatoka Fungus**, which spreads very quickly. But it is this **taste of the pampered banana**, the customers like, and the production system is adapted to.
 3. About **40-50 airborne treatments** with the extremely **poisonous pesticide Paraquat** are necessary for the 5 m high Cavendish banana plants, with similar treatments for pineapple fields. Unfortunately, despite human protection, there are reported many **cases of illness of the field workers**, beginning with breathing difficulties and skin irritations to infertility, miscarriage and cancer.
In addition, the **agro-biodiversity of the ecosystem is damaged** severely by the pesticides.
 4. **Land use and land use change LULUC** of forests and original farmland to support **cash crops as exotic fruits, tea, coffee and cacao, soybeans or palm oil** in general reduce the original biodiversity.



Some international fruit companies like to leave the impression that care for the environment is their first choice, saying that "**Somos Verdes**". Not now, in general, but, hopefully soon with the pressure of the consumers.

FUTURE- a Positive Outlook!

1. **Follow the entire chain from production to consumption**, starting with the support of small farmers, allied in farm cooperatives, as e.g. in Ecuador which use **traditional organic farming methods, and which receive fair prices for their produce**, backed up by fair trade organizations, as e.g. in Switzerland by the **Max-Havelaar Foundation**, succeeding that 55% in the home consumer markets are **Fair Trade bananas**.
2. **Education of the consumer in "biodiversity and fair trade"**. In the positive response to some German consumers the supermarket chains REWE and Edeka offer a variety of bio-organic products ("**Biodiversity in good Company**").
3. **Research**. A) The cultivation of new cultivars from **wild fertile bananas (Crop Wild Relatives CWR, ref. SoWPGR-2)**, immune to the fungus, has succeeded e.g. by FHIA, Honduras.
B) **The banana genome sequence** of the wild relative to the Cavendish banana, the Musa acuminata, by French researcher Angélique D'Hont, Cirad, in Montpellier will open doors to gene transfer, and
C) **Gene technology** on bananas was already successful in Australia (Queensland University of Technology) and Israel.