EUNOPS European Network of Palm Scientists

The oil palm: Controversies and research challenges

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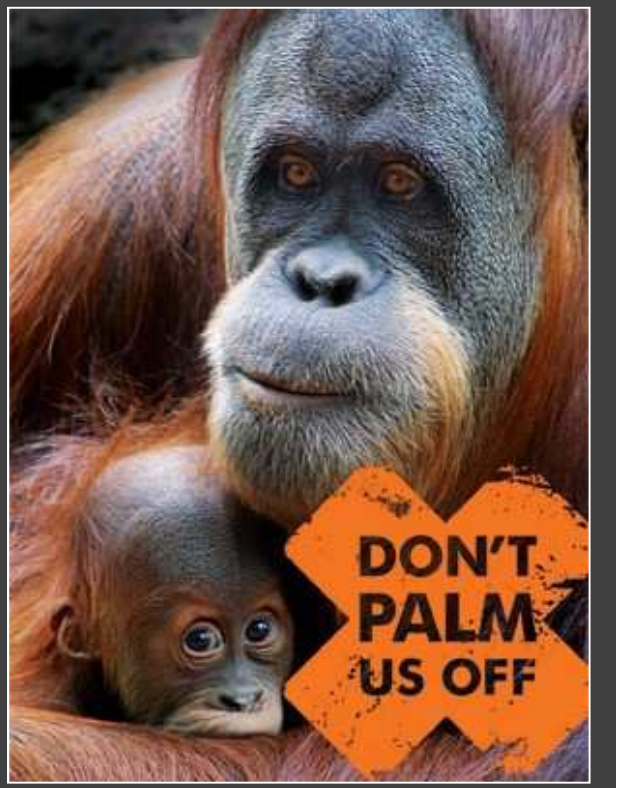
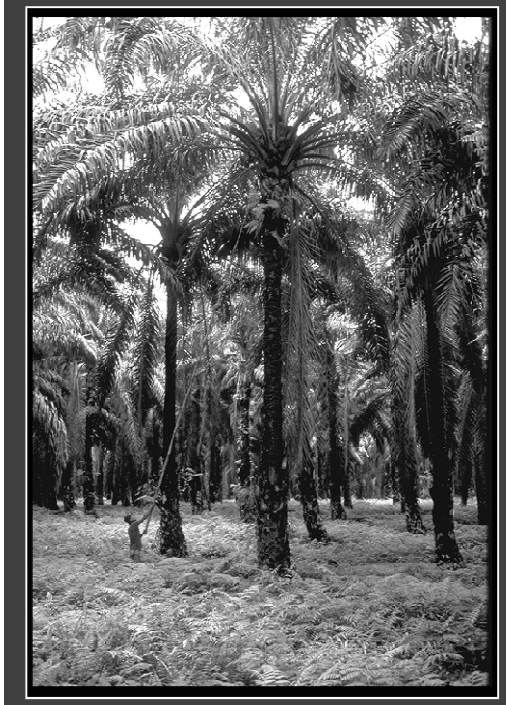
cirad

Sustainability in the public debate



The Four Oil Palm Truths



1. Demand for palm oil will continue to increase in response to a growing and increasingly affluent global population.

2. Oil palm is one of the most profitable land uses in the humid tropics.

3. Oil palm plantations store more carbon than alternative agricultural land uses.

4. Native biodiversity within oil palm plantations is far lower than the natural forests they often replace.

Sayers et al - Global Food Security (2012) .1(2):114-119

The RoundTable on Sustainable Palm Oil

1,239 RSPO members

Banks & Investors	0.9%
Consumer Goods Manufacturers	25.3%
Environmental & Conservation NGOs	2.1%
Palm Oil Growers	9.8%
Palm Oil Processors & Traders	24.9%
Retailers	3.9%
Social & Developmental NGOs	0.8%

GreenPalm SUSTAINABILITY

CERTIFIED
Contains certified sustainable palm oil.
www.rspo.info

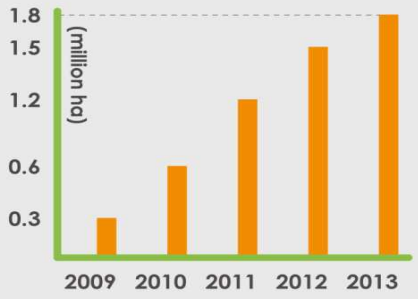
MIXED
Contributes to the production of certified sustainable palm oil.
www.rspo.info

Volume of Certified Sustainable Palm Oil

8.2 million tonnes

Proportion of palm oil globally certified by the RSPO

Plantation area certified by the RSPO



121 Trademark licenses issued by RSPO

24 countries have received licenses

RSPO
Roundtable on Sustainable Palm Oil

Certifying sustainability

8 PRINCIPLES FOR GROWERS TO BE RSPO CERTIFIED

1. Commitment to transparency
2. Compliance with applicable laws and regulations
3. Commitment to long-term economic and financial viability
4. Use of appropriate best practices by growers and millers
5. Environmental responsibility and conservation of natural resources and biodiversity
6. Responsible consideration of employees, and of individuals and communities affected by growers and mills
7. Responsible development of new plantings
8. Commitment to continuous improvement in key areas of activity

Robust and credible Principles & Criteria need a Science-based approach

Sustainability addresses research

- Poverty alleviation
- People's rights
- Workers' rights
- Land grabbing
- Public policies
- Ethical investments
- Public/Private Partnership

- Agroecology
- Breeding
- Waste management
- Precision Agriculture
- Best agricultural practices
- GreenHouse Gas mitigation
- Integrated Pest Management
- Environmental services

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ECOLOGICAL INTENSIFICATION

An original model for Biologists

A perennial Monocot

Arecaceae

Two cultivated species

Elaeis guineensis

Elaeis oleifera

Interspecific hybrid

Two different oils

Palm oil (palmitic)

Kernel oil (lauric)

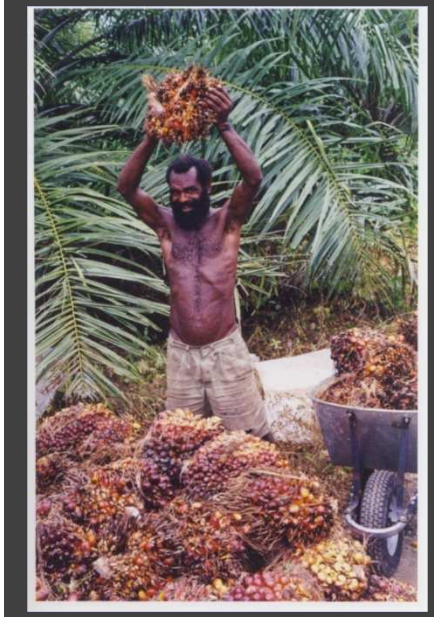
An original model for Agronomists

- The oil factory
  - Almost 10X productivity compared to other oil crops
  - Two different oils for different uses
  - A non-GMO virgin oil

- The robust fellow
  - Adaptable to many different cropping systems
  - No systematic use of pesticides

- The biomass factory
  - Outstanding photosynthetic capacity
  - High productivity of aboveground/underground biomass
  - Impact on soil biology and structure
  - Bunches account for 5% only of total biomass

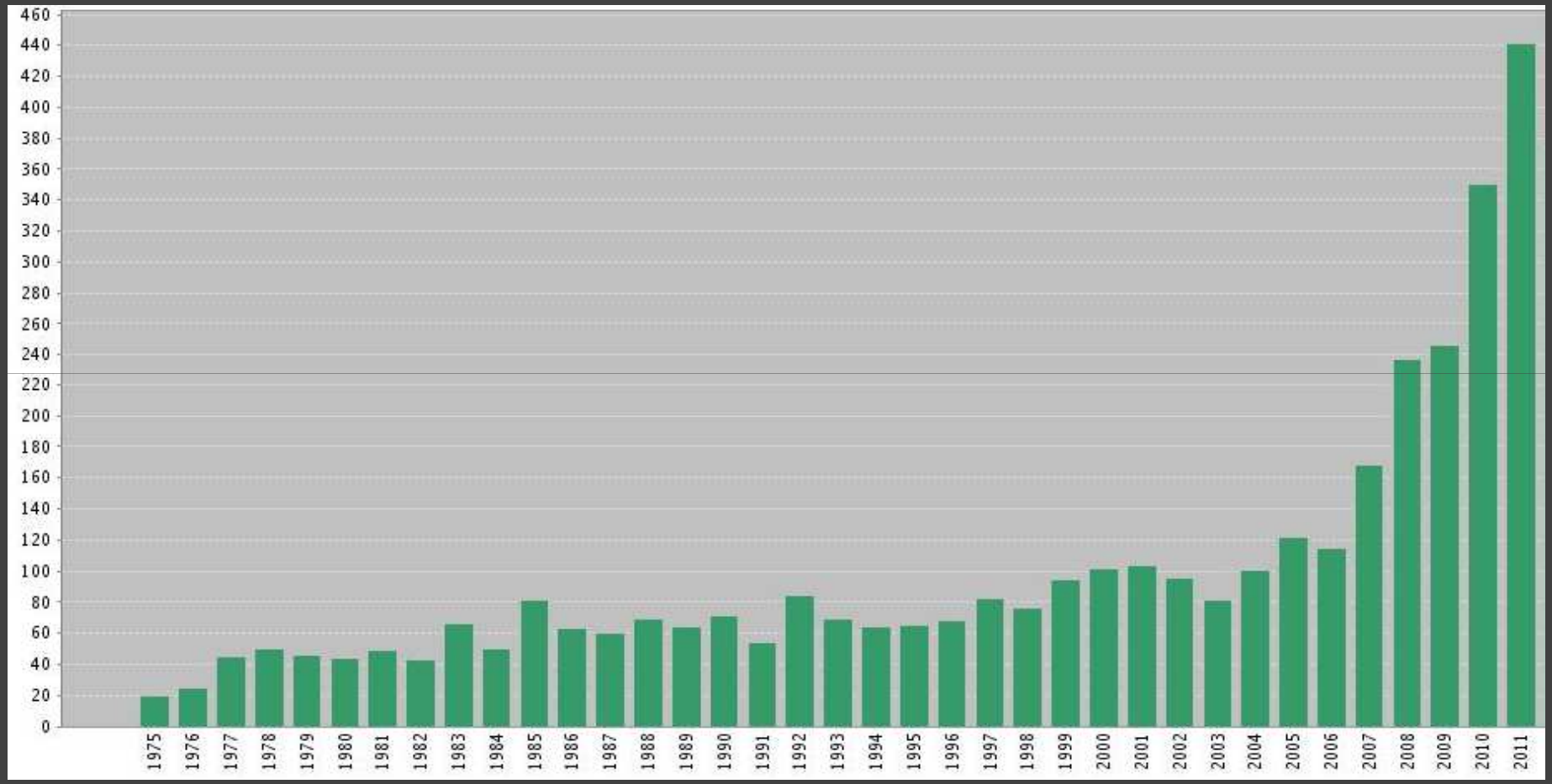
An original model for social studies



- ✓ Which prerequisites for efficient poverty alleviation?
  - Where, when, how and how much ?
- ✓ Which model?
  - Nucleus/Estate
  - Agroindustrial
  - Outgrowers

- ✓ Which role for multi-stakeholders initiatives ?
- ✓ A role for Governments?
- ✓ Which standards : RSPO, MSPO, ISPO …
- ✓ Social impacts on the long term (FELDA, Malaysia)

The oil palm literature boom



Published peer-reviewed articles on *oil palm* . *Source Web of Science*

Publish or Perish!

PNAS

Spatially explicit scenario analysis for reconciling agricultural expansion, forest protection, and carbon conservation in Indonesia

Lian Pin Koh[1] and Jaboury Ghazoul

Institute of Terrestrial Ecosystems, Eidgenössische Technische Hochschule (ETH) Zürich, 8092 Zürich, Switzerland

Edited by Stephen Polasky, University of Minnesota, St. Paul, MN, and accepted by the Editorial Board May 3, 2010 (received for review January 14, 2010)

Palm oil is the world's most important vegetable oil in terms of production quantity. Indonesia, the world's largest palm-oil producer, plans to double its production by 2020, with unclear impli-

preservation scenario whereby expansion proceeded in sequence from degraded lands, through agricultural lands and secondary forests, to primary forests; (*iv*) a carbon conservation scenario

Biodivers Conserv (2010) 19:999–1007
DOI 10.1007/s10531-009-9760-x

ORIGINAL PAPER

Addressing the threats to biodiversity from oil-palm agriculture

David S. Wilcove · Lian Pin Koh

Meta-analysis of prospective cohort studies evaluating the association of saturated fat with cardiovascular disease[1–5]

Patty W Siri-Tarino, Qi Sun, Frank B Hu, and Ronald M Krauss

Regulatory Mechanisms Underlying Oil Palm Fruit Mesocarp Maturation, Ripening, and Functional Specialization in Lipid and Carotenoid Metabolism[1[W][OA]]

Timothy J. Tranbarger[2]*, Stéphane Dussert[2], Thierry Joët, Xavier Argout, Marilyne Summo, Antony Champion, David Cros, Alphonse Omore, Bruno Nouy, and Fabienne Morcillo

ELSEVIER

Contents lists available at SciVerse ScienceDirect

Global Food Security

journal homepage: www.elsevier.com/locate/gfs

Oil palm expansion transforms tropical landscapes and livelihoods

Jeffrey Sayer[a,*], Jaboury Ghazoul[b], Paul Nelson[a], Agni Klintuni Boedhihartono[a]

Collaborative Research

Biodiversity Ecosystem and Function in Tropical Agriculture

UNIVERSITY OF CAMBRIDGE

smart agribusiness and food
smart research institute

- Quantify the effect of habitat complexity in maintaining biodiversity, ecosystem function and ecosystem services within oil palm

- Develop novel experimental approaches for partitioning the effects of habitat structural complexity and aspects of biodiversity on ecosystem functioning

- Predict and model optimal cover of understory and epiphyte vegetation in oil palm plantations so as to maximise biodiversity and economic profitability through ecosystem services.

Collaborative Research

Stability of Altered Forest Ecosystems (SAFE) Project (2010-2020)

SAFE is slated to be the world's largest ecological experiment both in terms of size and breadth of ecological processes.

A major contribution to sustainable palm oil management and the conservation of biodiversity,

A major contribution to sustainable plantation management, the implementation of the Roundtable on Sustainable Palm Oil (RSPO) guidelines and the conservation of biodiversity in agricultural landscapes

Collaborative Research

The **Socially** and **Environmentally Sustainable Oil** palm **Research** (SEnSOR)

An integrated multi-disciplinary research programme designed to fill key knowledge gaps in testing and developing the RSPO's Principles and Criteria for sustainability in oil palm agriculture.

1. Soil and Water
2. Greenhouse Gases and Air Quality
3. Biodiversity
4. Participatory Processes and Rights
5. Livelihood

SPOP : Sustainable development of Palm Oil Production

Designing strategies from improved knowledge on oil palm cropping systems

- To generate knowledge and toolkits aimed at assessing economical, environmental and human impacts of various different oil palm farming systems
- To assess the sustainabilty of present farming systems and to propose improved systems
- To involve farmers and stakeholders into the research protocol, through the implementation of participative methods
- To implement multi-agents modelling

Research Networks

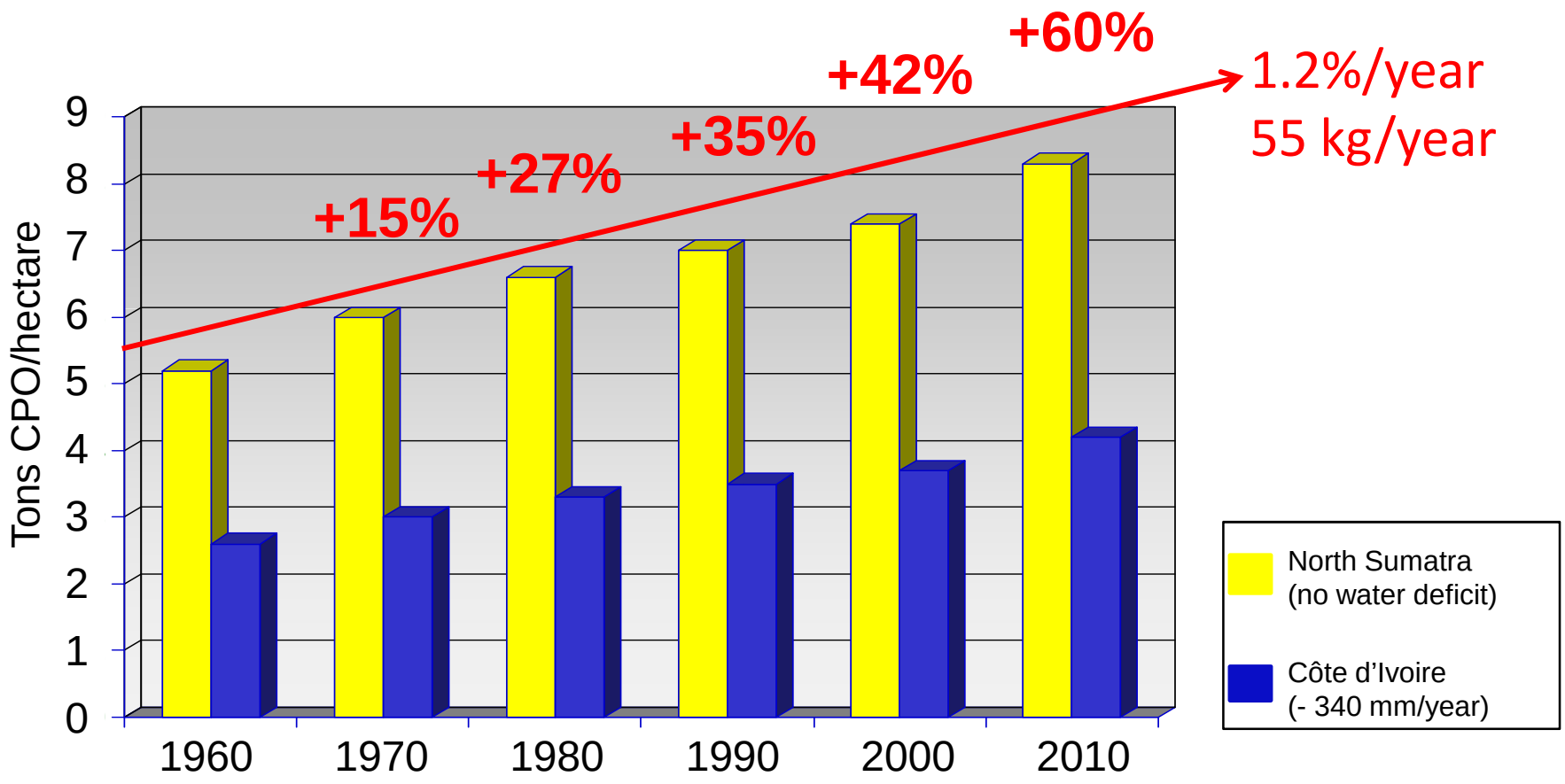
Sharing indicators for sustainable palm oil production

The PALMINET web platform was launched in 2011 by the international network on sustainable palm oil indicators coordinated by Cirad.

- to inform stakeholders,
- to pool research and share experience
- to foster the creation of indicators and tools for sustainable development.
- to encourage new partnerships

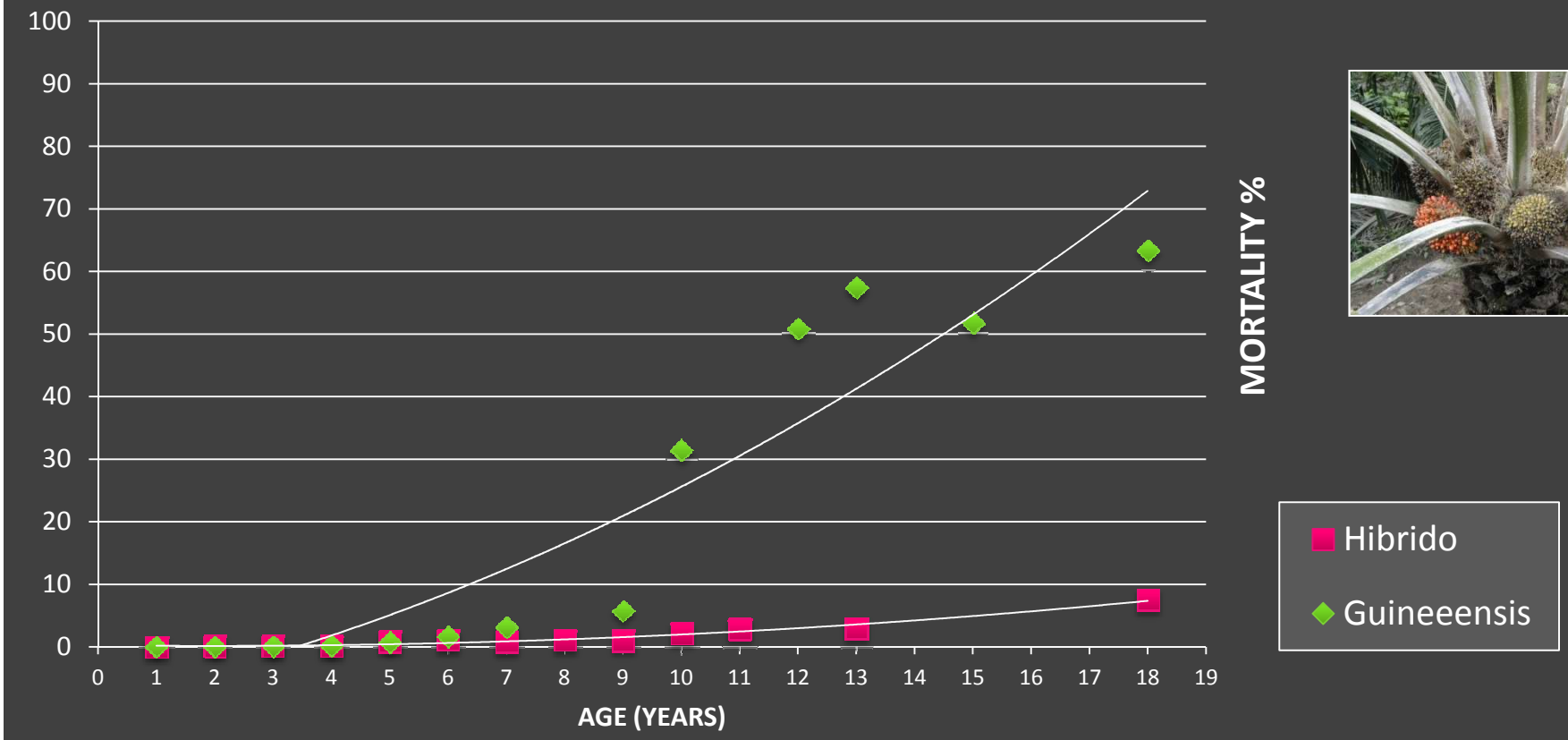
Having an impact (1)

An appropriate combination of breeding and BAP strategies



Having an impact (2)

An appropriate breeding strategy



In Latin America, Bud Rot (PC) is controlled by developing interspecific *E. oleifera x E. guineensis* hybrids.

Having an impact (3)

Adapting oil palm quality to markets

Fatty Acid		High Oleic Palm Oil	Palm Oil	Olive Oil	Soybean Oil
Lauric	C12:0	0,13	0,35		
Miristic	C14:0	0,80	1,2		
Palmitic	C16:0	27,7	42	13	11
Stearic	C18:0	2,8	5,4	3	4
Oleic	C18:1	55,0	40	71	24
Linoleic	C18:2	11,4	11	10	54
Linolenic	C18:3	0,4	0,2	1	7
Saturated		31	49	16	15
Unsaturated		69	51	82	85

Results from E. guineensis X E. oleifera hybrids in Hacienda la Cabaña, Colombia

Having an impact (4)

An environmentally and economically efficient composting

Composting reduces needs for mineral fertilizers of 15%
It improves both soil fertility and structure.

ENVIRONMENTAL SERVICES

DIRECT

- ↓ FERTILISERS BILL
- ↑ ORGANIC MATTER
- ↑ C SEQUESTRATION

INDIRECT

- ↓ N LEACHING
- ↓ N_2O EMISSIONS
- ↓ CO_2 EMISIONS

Having an impact (5)

12 m^3 methane per ton FFB

15 m^3 methane per m^3 POME

Mitigating GHG emissions

Global project - 3 palm plants		2012	2020
Palm plants			
Milling (T FFB/year)		295,000	438,000
POME flow (m^3/year)		231,500	344,700
COD load (T/year)		15,400	22,900
Methanization systems			
Biodigester capacity	(m^3)	37,500	37,500
Methan captured and used	(m^3/year)	3,645,900	5,382,600
Diesel/Kerosene savings	(l/year)	2,946,600	4,059,800
GHG reduction			
CH_4 and N_2O avoided	(T CO_2 eq./year)	40,500	59,800
Diesel/Kerosene savings	(T CO_2 eq./year)	9,400	13,900
Economics			
Investment costs(5%, 9years)	k€	5,453	8,460
Savings	k€		17,564
O&M costs	k€		5,258
Net profit	k€		3,847

Farinet et al (2011) Palminet Workshop, Bali, Indonesia.

Getting into the public debate …

Huile de palme et environnement

Alain Rival

Alain Rival est biologiste, Correspondant pour la Filière Palmier au CIRAD (Centre de coopération internationale en recherche agronomique pour le développement).

La forêt primaire et la biodiversité sont-elles menacées ?

La relation entre plantations de palmier et déforestation est complexe : ni directe ni automatique. Les concessions sont accordées par les pouvoirs publics, souvent au niveau local, aux compagnies forestières qui exploitent le bois. Les forêts dégradées peuvent ensuite évoluer en friches, en savanes ou en terres cultivées sous l'action de l'homme. Les espaces déforestés ne sont que partiellement reconvertis en plantations de palmier. Ainsi, sur les 21 millions d'hectares de forêt primaire qui ont disparu en Indonésie entre 1990 et 2005, 3 millions seulement correspondent à la création de palmeraies [1]. Toutefois, cette relation directe a tendance à s'aggraver dans de nouveaux fronts pionniers, comme à Bornéo, où près de 30% des forêts primaires abattues ont été converties en palmier à huile [2], alors que les nouvelles plantations sont responsables en moyenne des 10% de la déforestation enregistrée en Indonésie et Malaisie [3].

People do not know what they should know …

Take home messages

- ✓ Improving sustainability requires multidisciplinary and collaborative research
- ✓ Public awareness has pushed new approaches and new actors into the sector
- ✓ Large scale projects based on Public/Private partnership are emerging
- ✓ Results are getting more published and recognized
- ✓ Research provides a shared basis to certification processes
- ✓ There is a need for education and capacity building on sustainability
- ✓ Scientists must jump into the arena of the public debate

Thank you four your kind attention

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