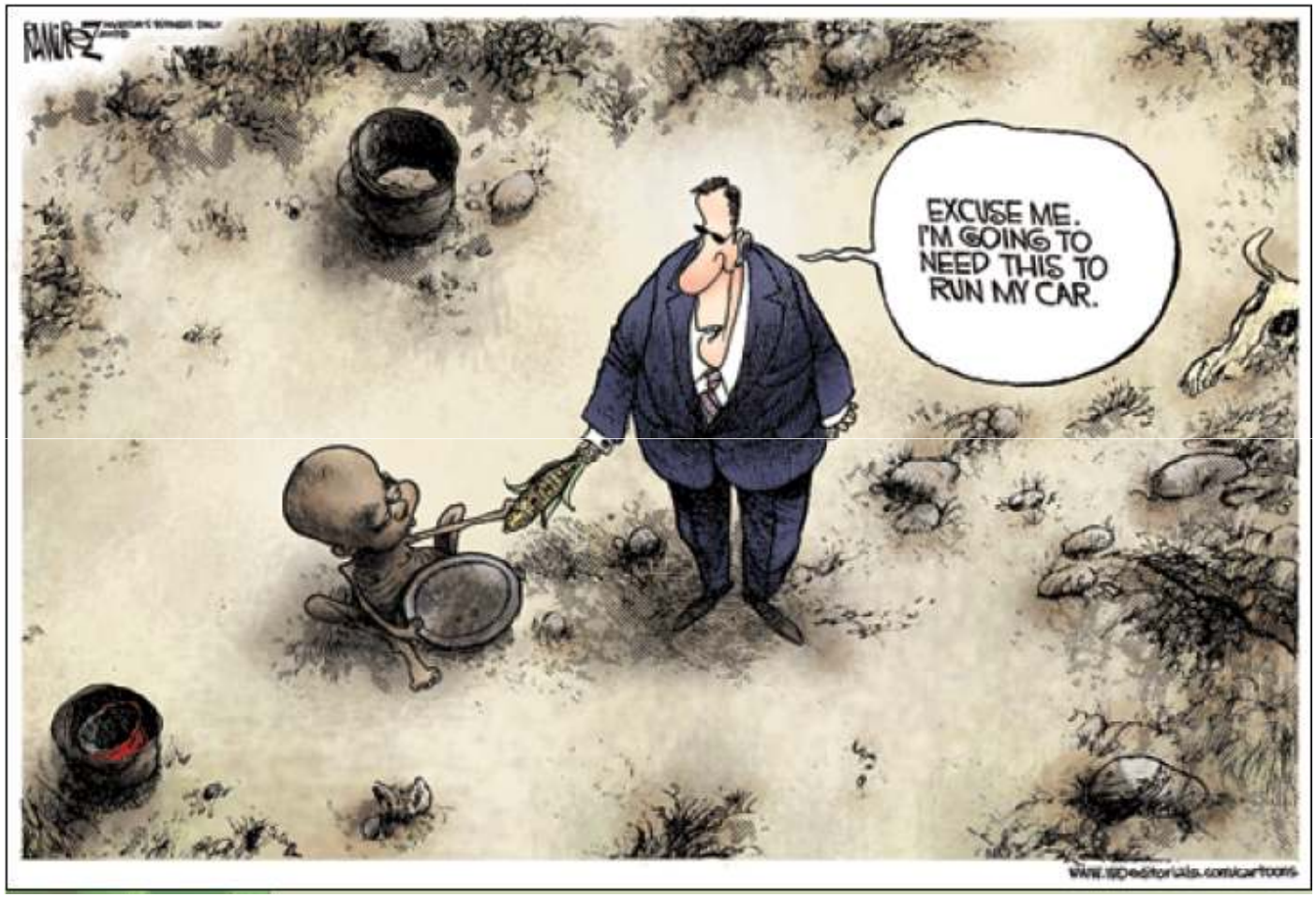
Biofuel feedstock: facts and figures

Willy De Greef

A nasty perception...



But does it fit the facts?

The big picture

- Biofuels are part of the bio-based economy
  - Bio-based economy is one of the top strategic goals of the knowledge society
- Bio-based economy is not new
  - For most of recorded history we were a biobased economy
  - The 20th century may turn out to be just an interlude
- How big is the biobased economy anyway?
- Generation conflict: does it matter if something is first or second generation?

Nothing new under the sun

We are using biobased industrial raw materials all the time

- Non-food crops and farming systems
- Use of food crops for non-food purposes

The bio-based economy is as much
part of our past as of our future

Biofuel crops:

- Sugarcane for ethanol: ~ 4 million hectares
- Maize for ethanol ~ 10 million hectares
- Oil crops for biodiesel: ~ 2 million hectares

With minor crops included the total is likely to be below 20 M Ha.




Food crops for non-food uses

- Using food crops as raw material for non-food uses is already an important sector:
  - Vegetable oils for soaps and detergents: ~50 million tons/year
  - Potato and maize starch for glues and bio-plastics

Non-food crops and farming systems

Rubber tree

- grown on 8.2 million hectares in the tropics
- employs >10million labourers
- irreplaceable source of industrial raw material

Cotton fibre

- grown on 35 million hectares
- principal cash crop for >50 million farmers
- clothes more than half the world population

coffee



- grown on 10.5 million hectares
- employs >10million farmers and labourers
- >20billion $ of trade revenue for developing countries

Non-food crops and farming systems

- The farming community uses significant acreage for non-food crops:
  - Rubber tree: >8 million hectares
  - Coffee: >10 million hectares
  - Cotton: >35 million hectares
  - Many others: tea, cocoa, sisal, hemp, medicinal and ornamental plants, ...
  - Tobacco: >3.8 million hectares
- More than 90% of these crops are grown in developing countries
- They use a lot of agricultural land and labour,
- **They are essential contributors to the rural economies**

Altogether:

- The world uses **~ 1250 million hectares** for crop production
- Of this total, **~ 100million hectares** is for non-food/feed, including all current production of biofuel feedstock crops
- Of this, **~20 million hectares** are grown for fuel
- In context: **~ 675 million hectares** is grown with cereals

Food crops for non-food uses

The elephant in the room: food crops for animal feed

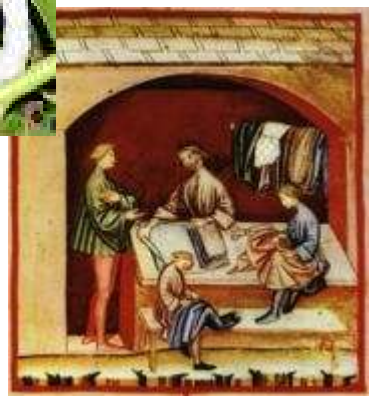
>50% of maize production

>90% of soybean production

Not all animals are grown for food...

What do these animals have in common?

silkworm



sheep

Both are bio-fermenters producing fibre

This is not a horse...

... It’s an engine running on biofuel

We use a lot of biofuel engines especially in developing countries

The big question:

can we supply all these processes with feedstock?

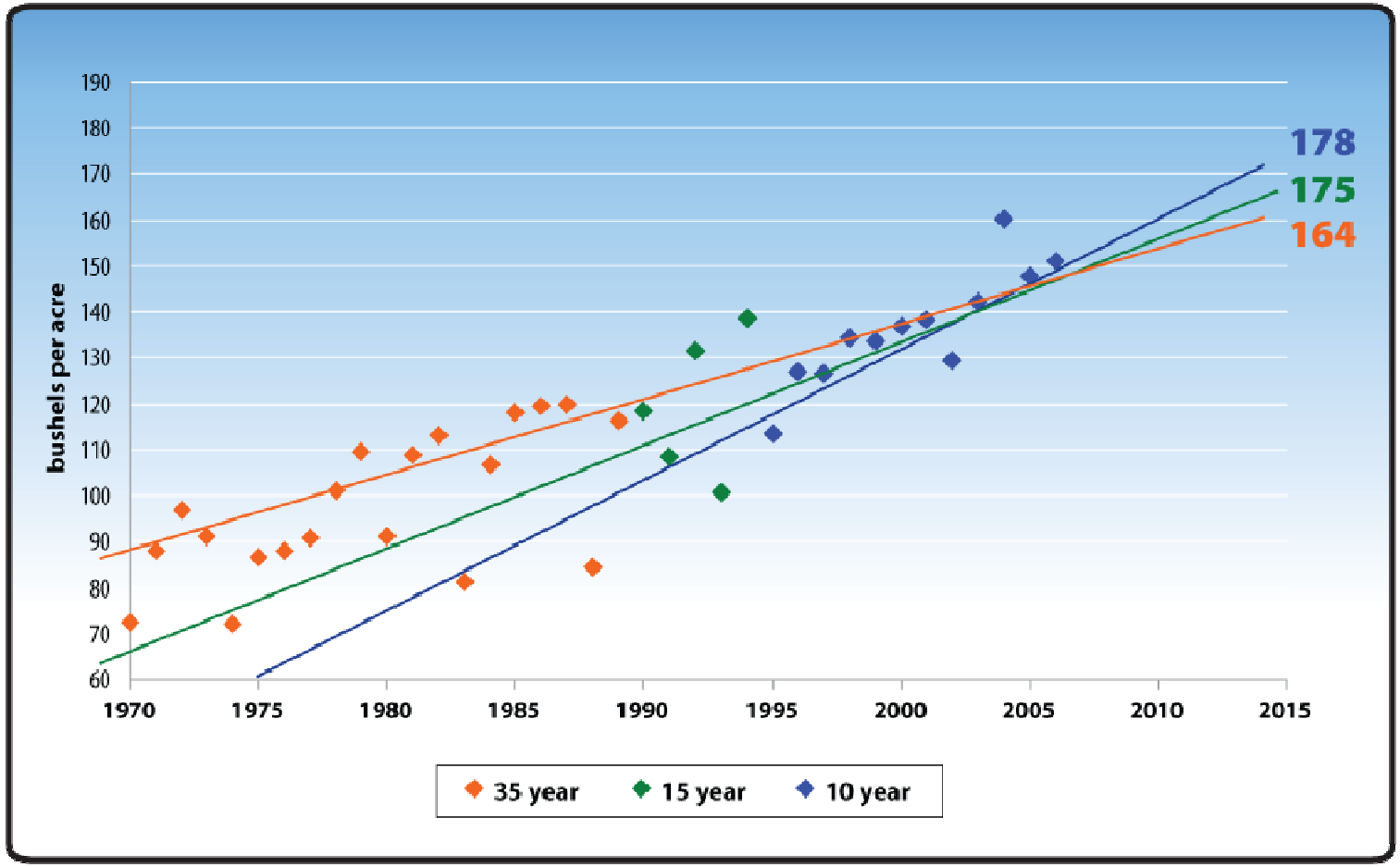
Ways to increase raw materials in agriculture

- There are only 2 ways to increase the availability of agricultural raw materials:
  - Increase the amount of land cultivated
  - Increase productivity of existing land

The second way is a lot more sustainable!

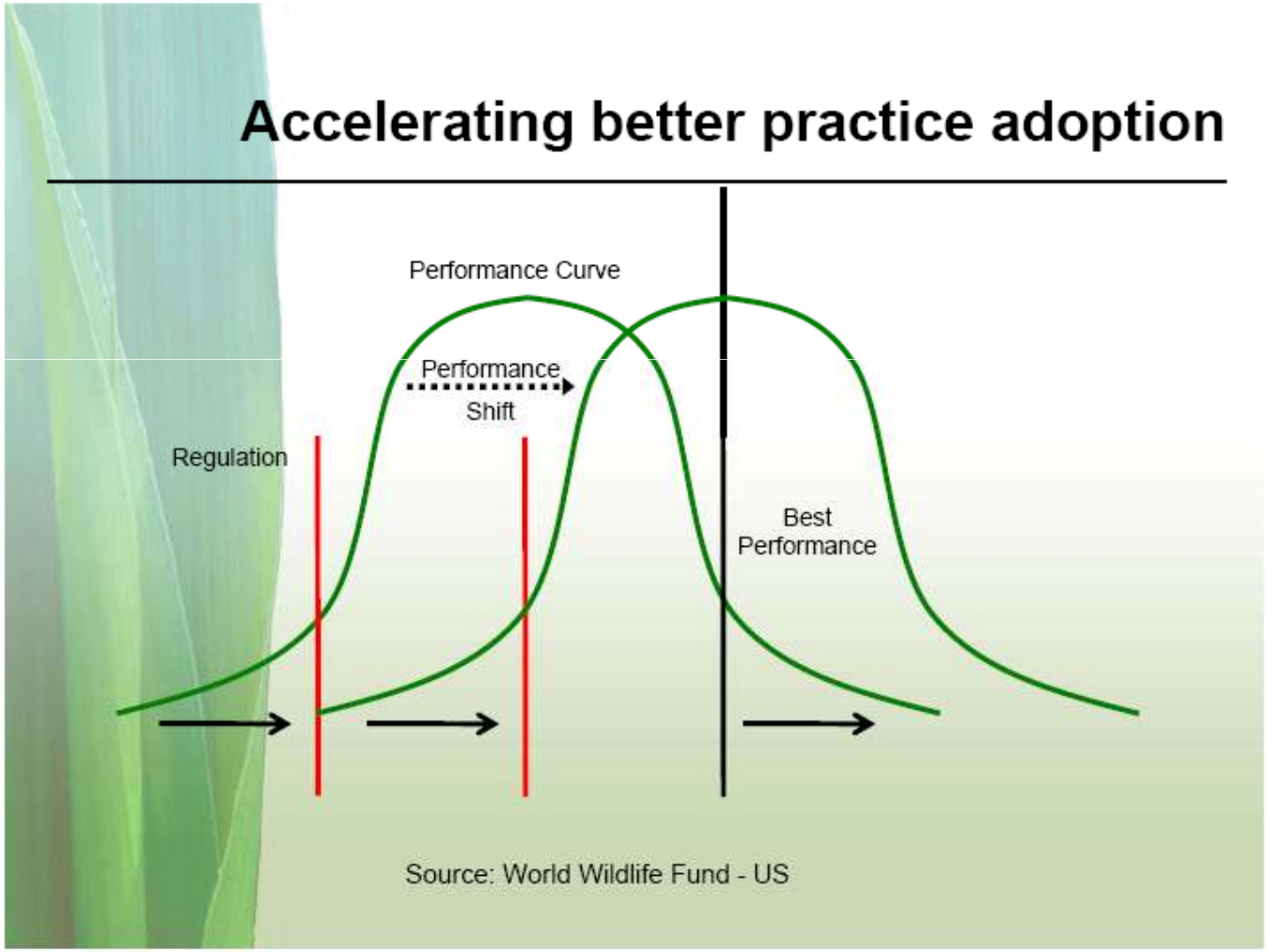
- Productivity increase is the result of:
  - sound farming policy and
  - improved technology dissemination to the farm

There is HUGE productivity opportunity



Develop new technology

Disseminate best technology and practices



Components of cereal production in Asia and Africa

	1970	2005	% increase
POPULATION (millions)			
Asia	**2338**	**3905**	**+67%**
Africa	**364**	**905**	**+149 %**
PRODUCTION (MT)			
Asia	**649**	**1084**	**+67%**
Africa	**60**	**141**	**+135%**
AREA CULTIVATED (MHa)			
Asia	**408**	**321**	**-21%**
Africa	**66**	**100**	**+51%**
YIELD (Kg/Ha)			
Asia	**1588**	**3371**	**+112%**
Africa	**907**	**1407**	**+55%**

sustainable

unsustainable

Source: FAOSTAT

What would happen if we got our act together on technology transfer?

Scenario for maize production

	maize area (million Ha)	Yield (Kg/Ha)	Production (million tons)
Africa	26	1770	**46.2**
EU 27	8.5	6510	55.8
Asia	47	4286	203
If Africa gets 50% of EU yields...			**84.6**
If Africa gets Asian yield...			**111.4**

(all data for 2006, source FAOSTAT)

Ways to increase raw material supply in agriculture

- S&T is essential part of sustainability drive by:
  - Increasing the **yield potential** of existing crops (plant breeding)
  - Decreasing **input requirements** (e.g. Fertilizers, pesticides)
  - Diversifying the **biological resources** available to the bio-based economy (new crops and new varieties of existing crops)

We need a fundamental rethink of the role of science and technology in agricultural development strategies

conclusions

- Using land, water and labour for non-food economy is part of agricultural economy through the ages
- Which crops (food ←→ non-food)matters much less than the added value for the farmer
- Building the bio-based economy of the 21st century requires productivity increase to avoid expanding farmland
- There is enormous scope for this, by speeding up development of S&T and technology transfer


Thank you!