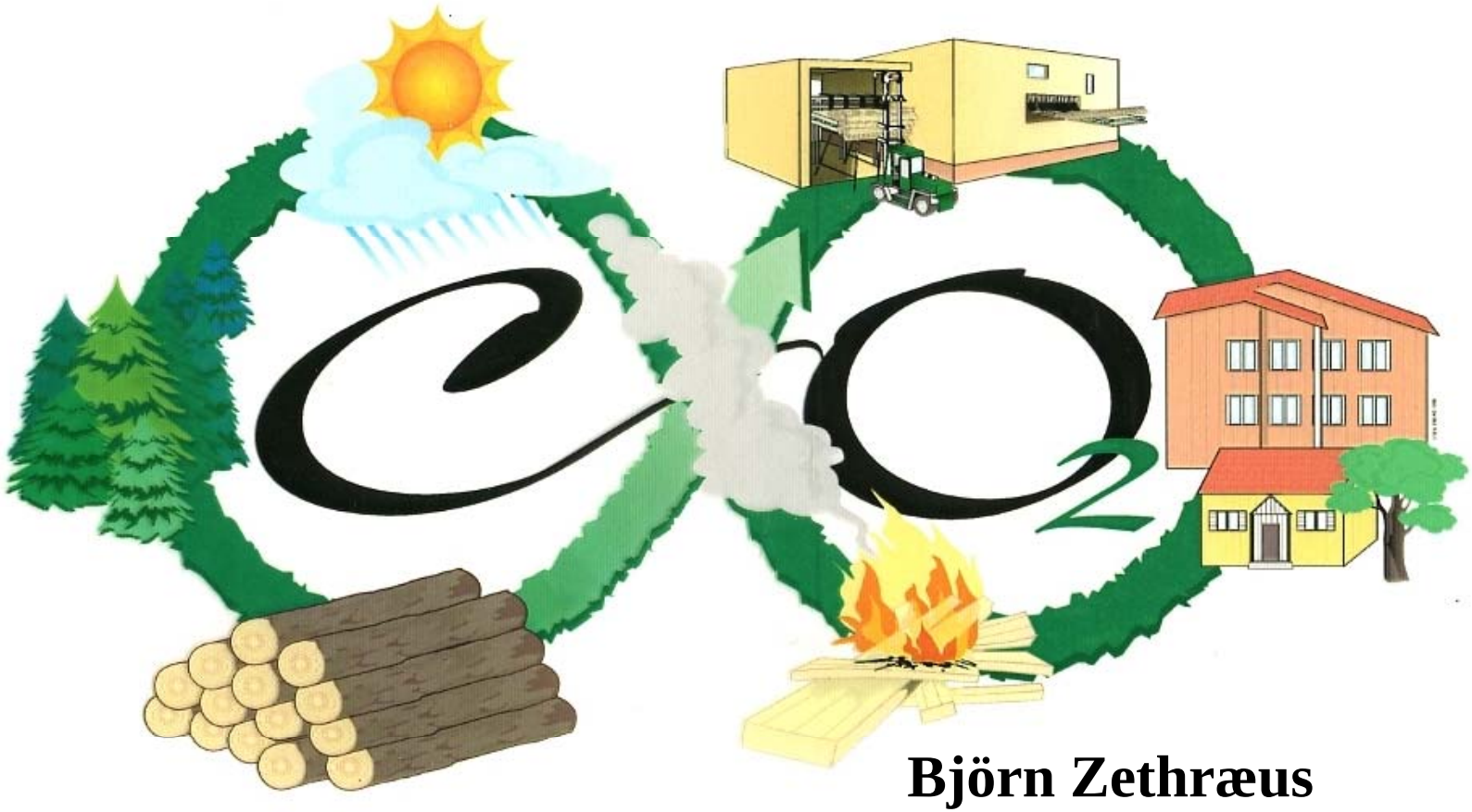
How can a minor community come to play a major role?



Björn Zethræus
Professor Bioenergy technology

Everybody knows that we have to do something about global warming

So Växjö decided to go for “Fossil-fuel-free Växjö” –96

Important:

FOSSIL FUEL FREE VÄXJÖ

Part of Environmental Programme for the City of Växjö

Everybody knows that we have to do something about global warming

The political decision was unanimous

Important:

- All political parties must agree

Everybody knows that we have to do something about global warming

The fossil fuel resources are limited

Important:

- All political parties must agree
- The underlying facts must be undisputable

Everybody knows that we have to do something about global warming

The global warming is a long-term problem

Important:

- All political parties must agree
- The underlying facts must be undisputable
- It must be in line with current and long-term trends

Everybody knows that we have to do something about global warming

"Fossil-fuel-free" is a simple phrase to use

Important:

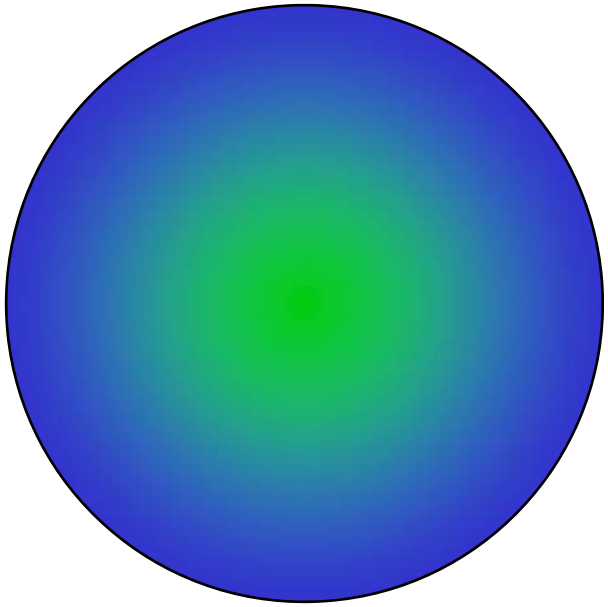
- All political parties must agree
- The underlying facts must be undisputable
- It must be in line with current and long-term trends
- It must be simple to communicate

Växjö University

Example: Go for “sustainable footprint”

These facts are undisputable...

Assume – for simplicity that this world is a little sphere.



We all remember from school that it’s 40 000 km around.

So – with 40 000 = 2·π·*r* – we readily estimate the radius $r = \frac{40\,000}{2 \cdot \pi} \approx \frac{40\,000}{6} = \frac{2}{3} \cdot 10\,000 = 6\,667$

This is overestimated, since π is a bit bigger than 3, so let’s say 6 500 km for an estimate...

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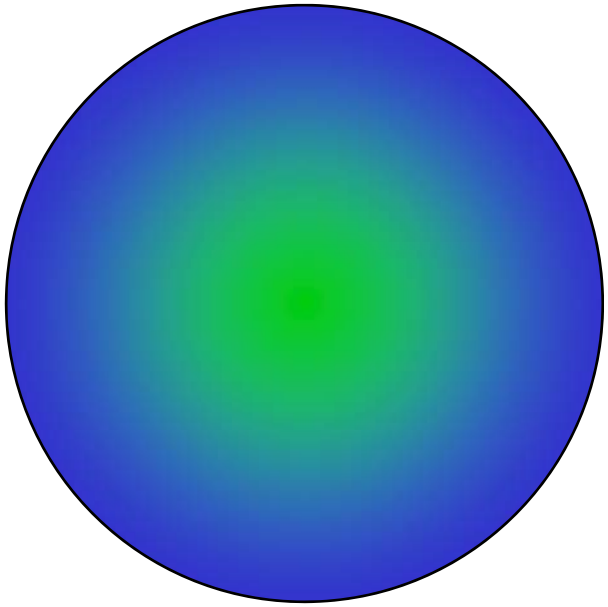
Example: Go for "sustainable footprint"

These facts are undisputable...

So – what's the area of that little sphere?



We all remember from school the equation $A = 4 \cdot \pi \cdot r^2$

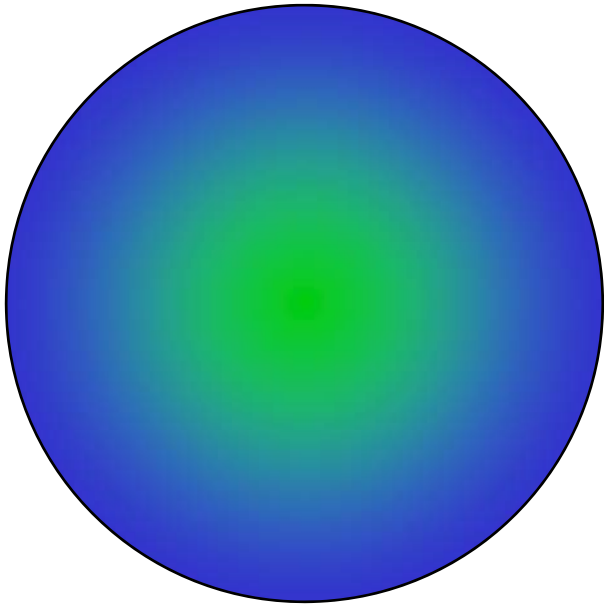
So – with *r* = 6 500 km – we estimate the area as $A = 4 \cdot \pi \cdot 6\,500^2 \approx 12 \cdot (6.5)^2 \cdot 1000^2$

6.5^2 has to be in between 36 and 47 – so let' say 42...

Thus 12·42·1 000 000 ≈ 500·1 000 000 = 500 million km^2.

Example: Go for "sustainable footprint"
These facts are undisputable...

How much land is on that little sphere?



We all remember from school that it's about 70 % sea on this planet – so land is 30 %

Thus the total land area is about 30 % of 500 Mkm^2.

That is 150 Mkm^2....

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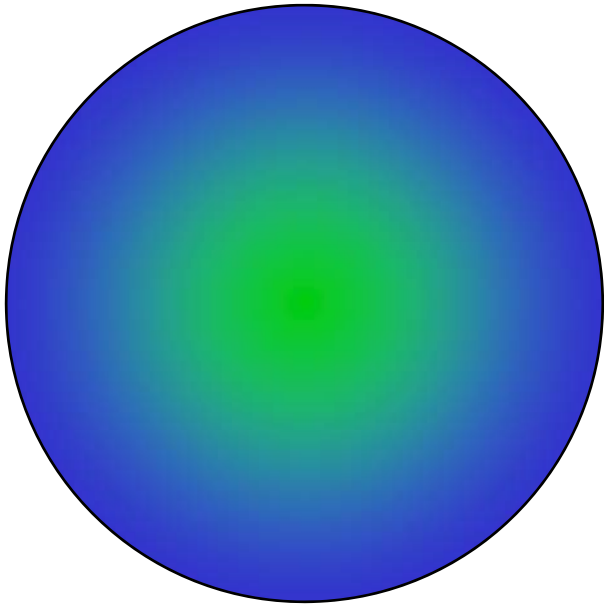
Example: Go for "sustainable footprint"

These facts are undisputable...

How many will share the land on that little sphere?



Let's us use six billion people for the estimate – just to make it simple...

Thus the total land area is 150 million km^2; or 0.15 billion km^2.

And we are 6 billion people. So that's $\frac{0.15 \text{ billion km}^2}{6 \text{ billion people}}$

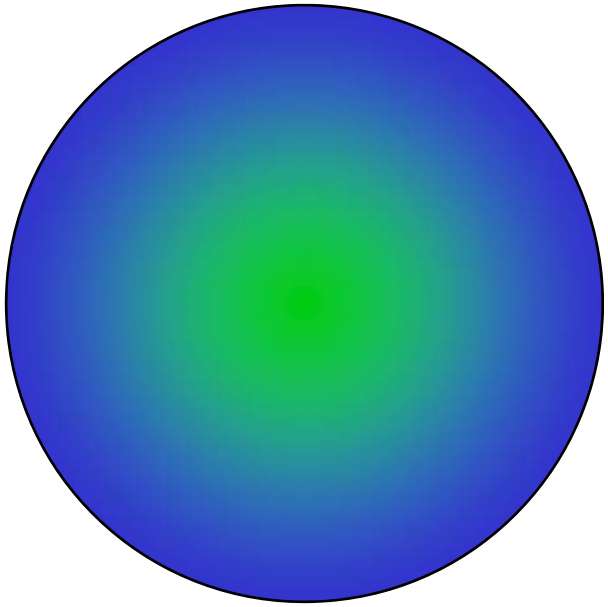
Växjö University

Example: Go for "sustainable footprint"

These facts are undisputable...

So what's the final result for that little sphere?

We had that $\dfrac{0.15 \text{ billion km}^2}{6 \text{ billion people}}$



0.15 km² = 150 000 m² per 6 persons – that's 25 000 m² each...

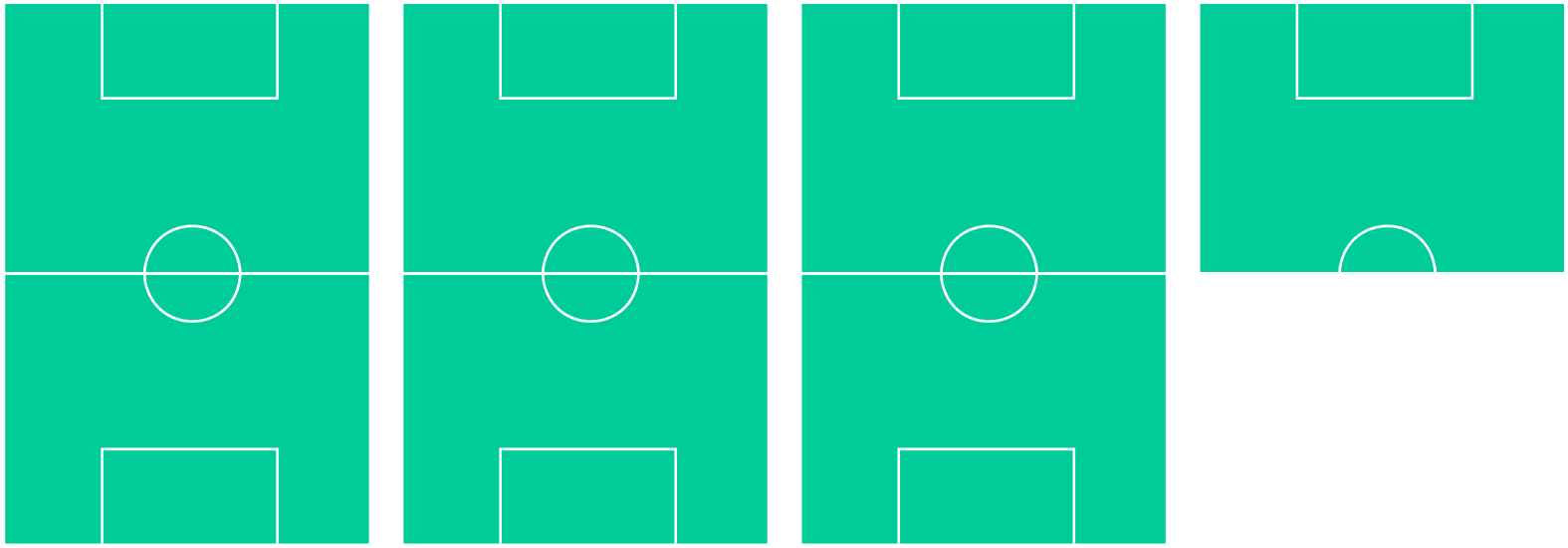
Thus the land area per six persons is 0.15 km² which finally yields about 25 000 m² per person...

Växjö University

Example: Go for “sustainable footprint”

These facts are undisputable...

Splitting the world land area equal between us all, yields about three-and-a-half football fields per person:



A football field is about 100·70 m^2 or 7 000 m^2, so 25 000 m^2 is about three-and-a-half football field...

Växjö University

Example: Go for “sustainable footprint”

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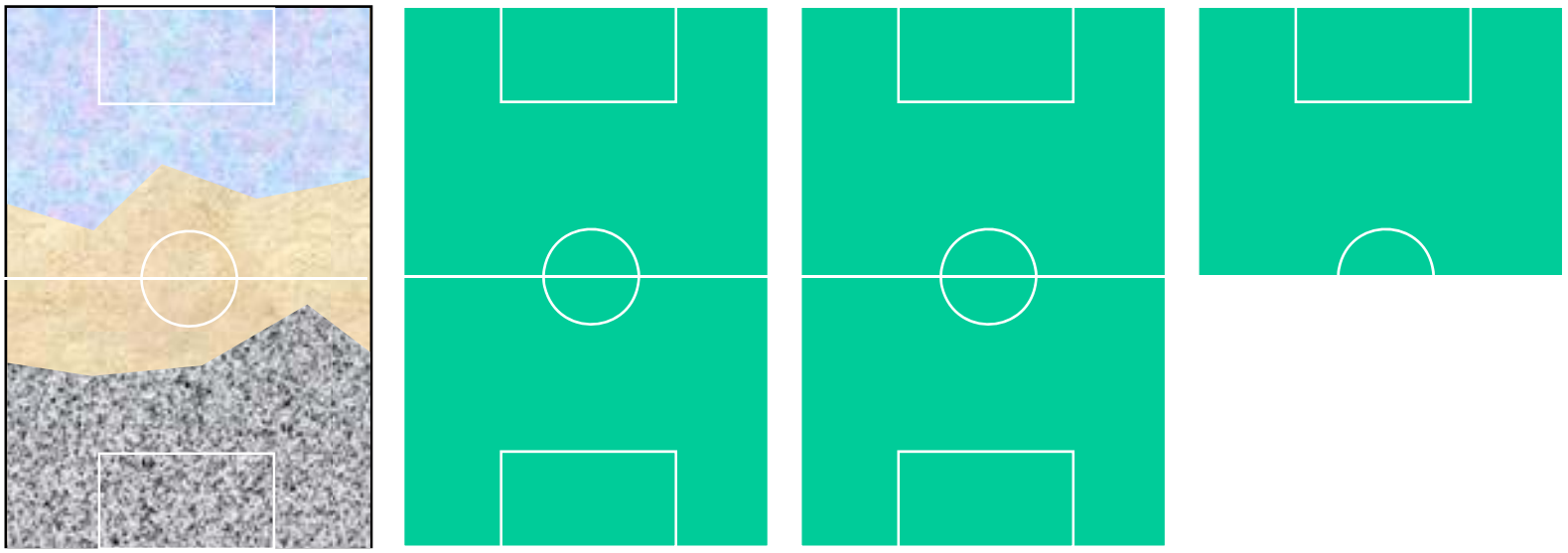

One is covered with deserts, ice or is high-alpine – so this is useless for any type of organic production...

Example: Go for “sustainable footprint”

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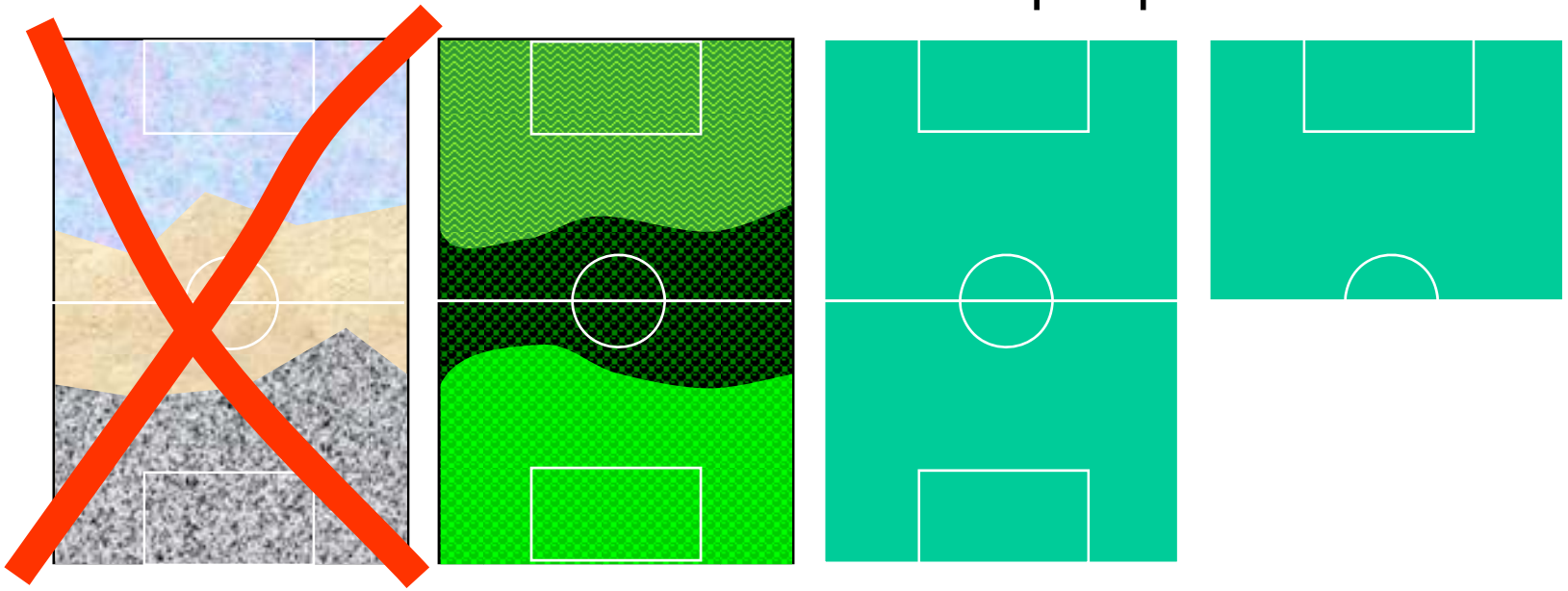
Splitting the world land area equal between us all, yields about three-and-a-half football fields per person:

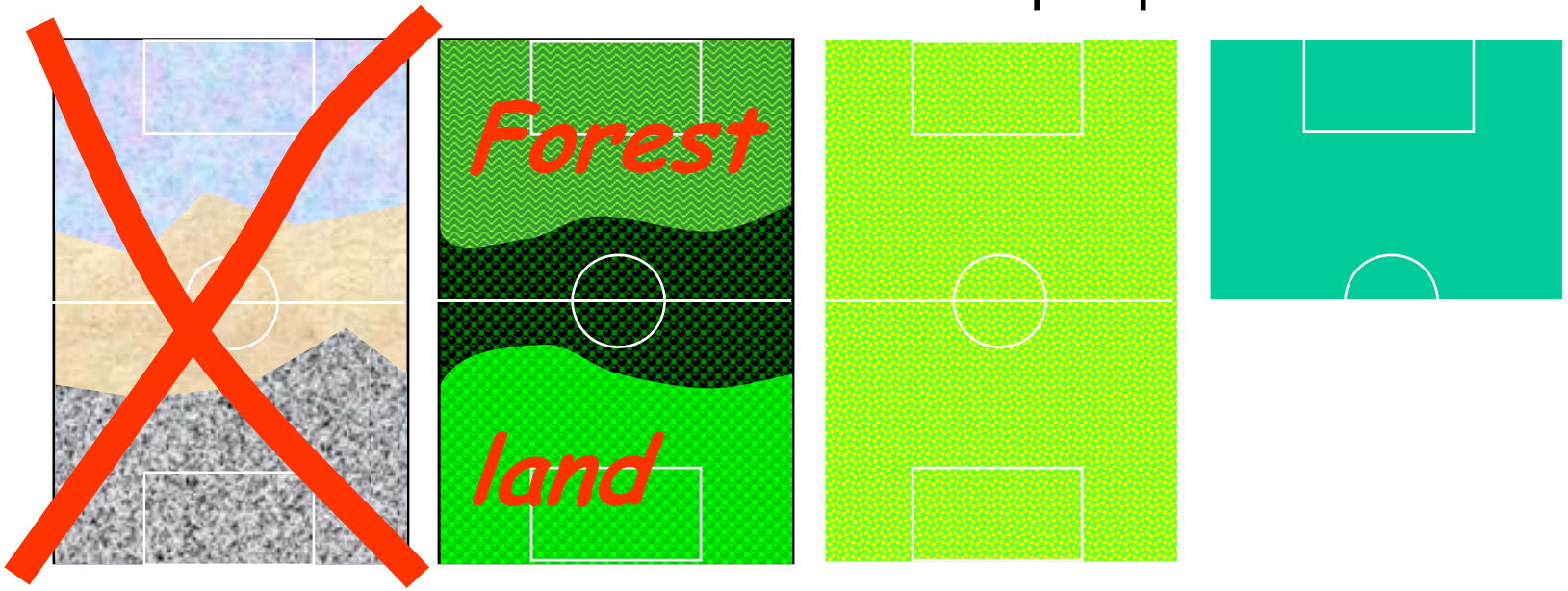


The second is forested with boreal softwood, temperate hardwood and tropical forests...

Example: Go for “sustainable footprint”

These facts are undisputable...

Splitting the world land area equal between us all, yields about three-and-a-half football fields per person:



The third one is covered with poor grass – this is the dry steppes and savannahs of inner Asia, Africa etc...

Example: Go for “sustainable footprint”

These facts are undisputable...

Splitting the world land area equal between us all, yields about three-and-a-half football fields per person:

The half one is mainly covered with good grass – this is the mid-west, the Pampas and those areas...

Växjö University

Example: Go for “sustainable footprint”

These facts are undisputable...

Splitting the world land area equal between us all, yields about three-and-a-half football fields per person:

... and a bit more than the penalty area is good enough to provide all our food and all our fibre without irrigation...

Växjö University

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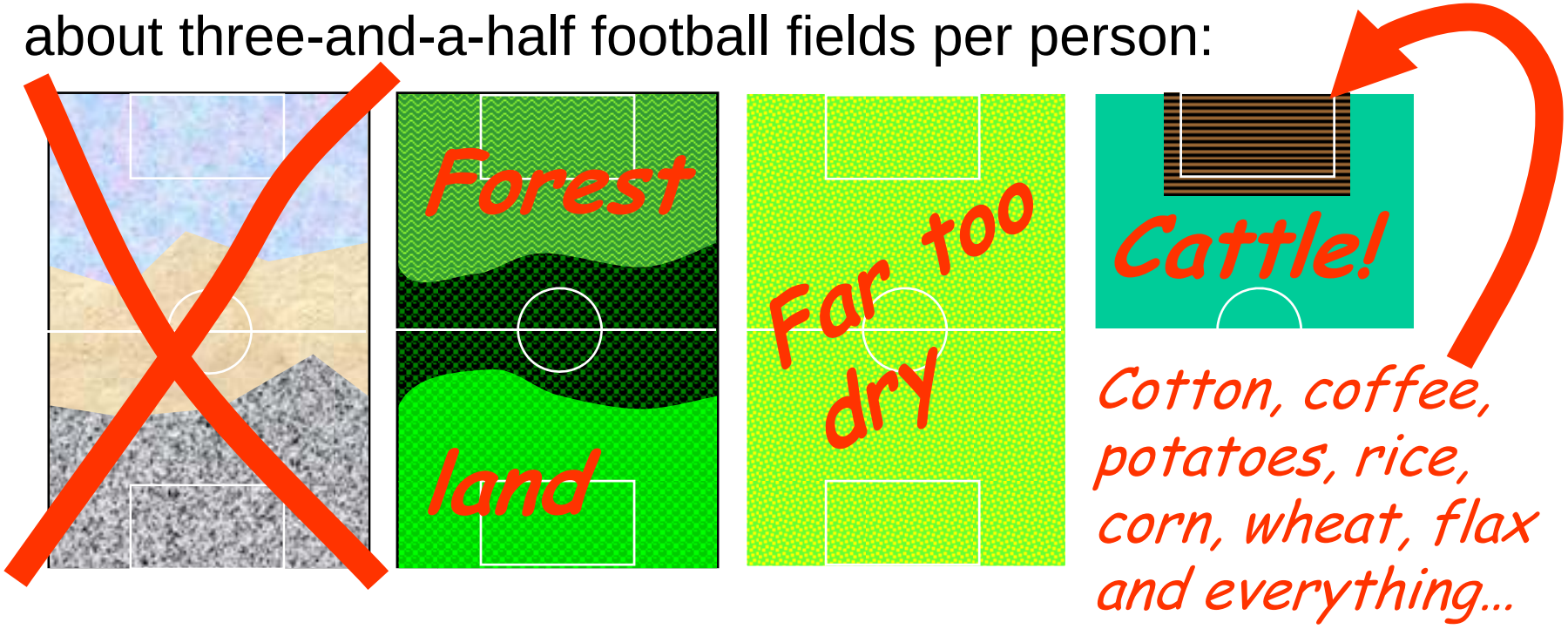

So – this conclusion cannot be disputed!!

Environmental action requires environmental expertise – and this is usually not at hand

So Växjö decided to engage the Swedish Association for Nature Conservation, started -97

Important:

Environmental action requires environmental expertise – and this is usually not at hand

A special advisory office was inaugurated to provide input to the political planning process

Important:

- The experts must be allowed to work independently

Environmental action requires environmental expertise – and this is usually not at hand

The community supported a research centre at the University and an EU Energy Agency

Important:

- The experts must be allowed to work independently
- First-class expertise is needed on a local basis

Environmental action requires environmental expertise – and this is usually not at hand

The budgeting process includes also ecological factors in the bookkeeping since 2003

Important:

- The experts must be allowed to work independently
- First-class expertise is needed on a local basis
- The administration must follow-up the progress

The goals must be possible to quantify:

- Reduce the fossil CO_2 emissions by 50% per capita until 2010 and 70% per capita until 2025 compared to 1993
- Reduce the use of electricity by 20% per capita until 2015 compared to 1993
- Stop using oil in the city administration by 2010.

Important:

- The goals must comply with the bookkeeping system

Living LIFE
Part of Environmental Programme for the City of Växjö

CO2 FOSSIL FUEL FREE VÄXJÖ
Part of Environmental Programme for the City of Växjö

OUR NATURE
Part of Environmental Programme for the City of Växjö

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Current Växjö goals

Important:

- The goals must comply with the bookkeeping system
- The statistics office must be able to collect data

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Current Växjö goals

Important:

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- The goals must be simple to communicate

3: Concretize your goals

The goals must be possible to quantify:

- Reduce the fossil CO_2 emissions by 50% per capita until 2010 and 70% per capita until 2025 compared to 1993.
- Reduce the use of electricity by 20% per capita until 2015 compare to 1990.
- Stop using oil in the city administration by 2010.

Current Växjö goals

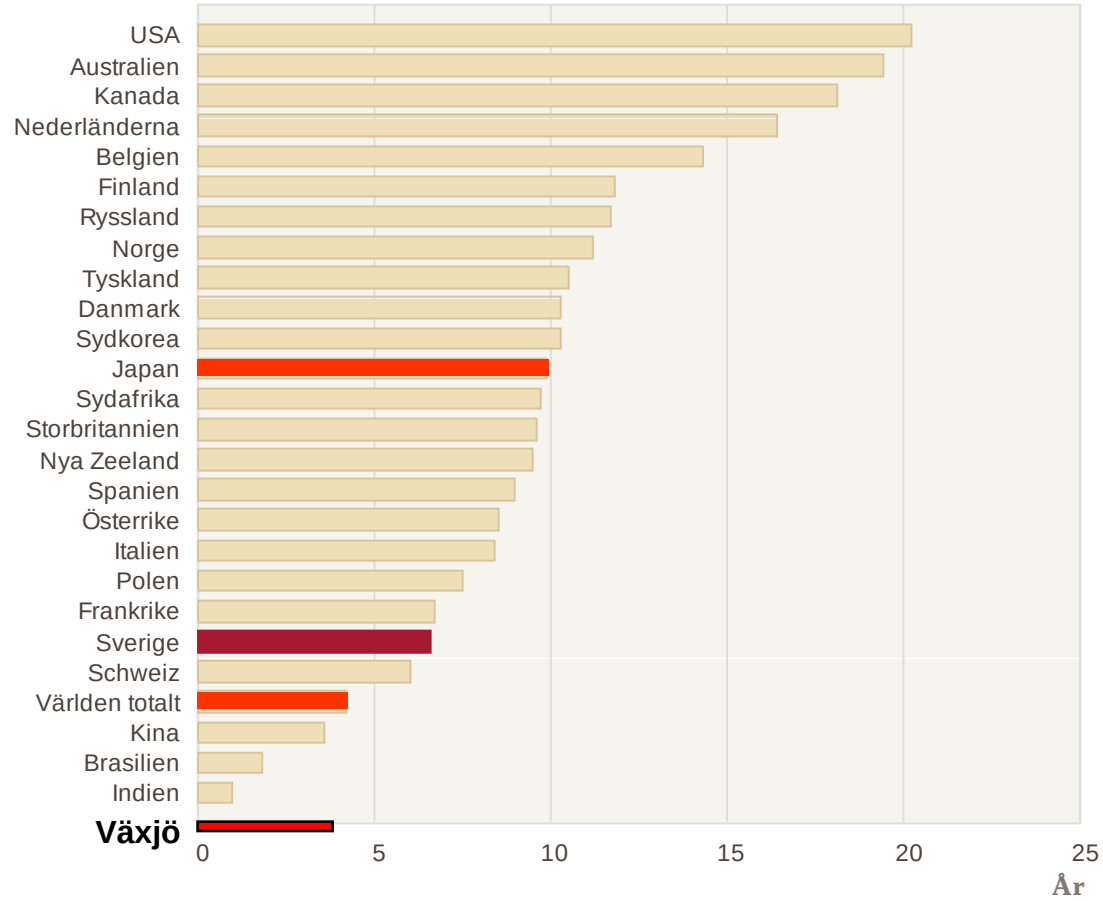
Important:

- The goals must comply with the bookkeeping system
- The statistics office must be able to collect data
- The goals must be simple to communicate
- Individuals must be engaged – local contests

Ecological footprints can be calculated for:

- Textile supplies
- Food supplies
- Energy supplies
- Sea-based resources
- ...

Total CO_2- equivalents, ton/capita -04



Källa: EIA, International Energy Annual 2004

Hämtat: 2007-06-29

ekonomifakta

So far, the reduction has been more than 30 % and Växjö is now below the world average - decreasing

Växjö achieved its world-wide reputation by:

- Adopting a goal that could not be disputed

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- Following the development actively

And this has lead to:

- Technical visits
- International co-operations
- Awards

The end...