

The view:



Future agricultural challenges:

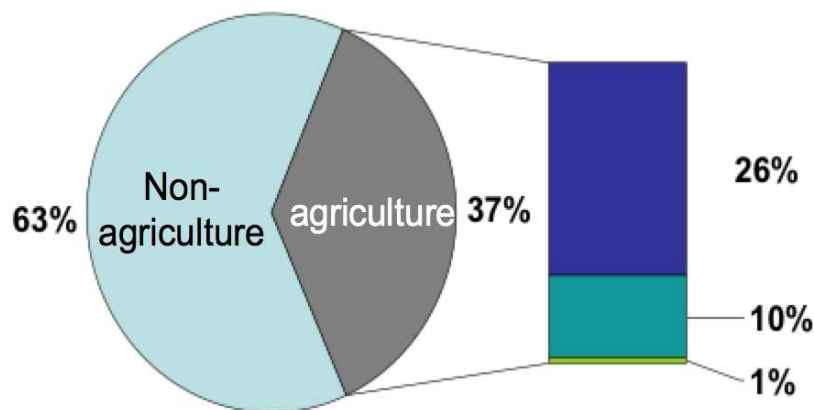
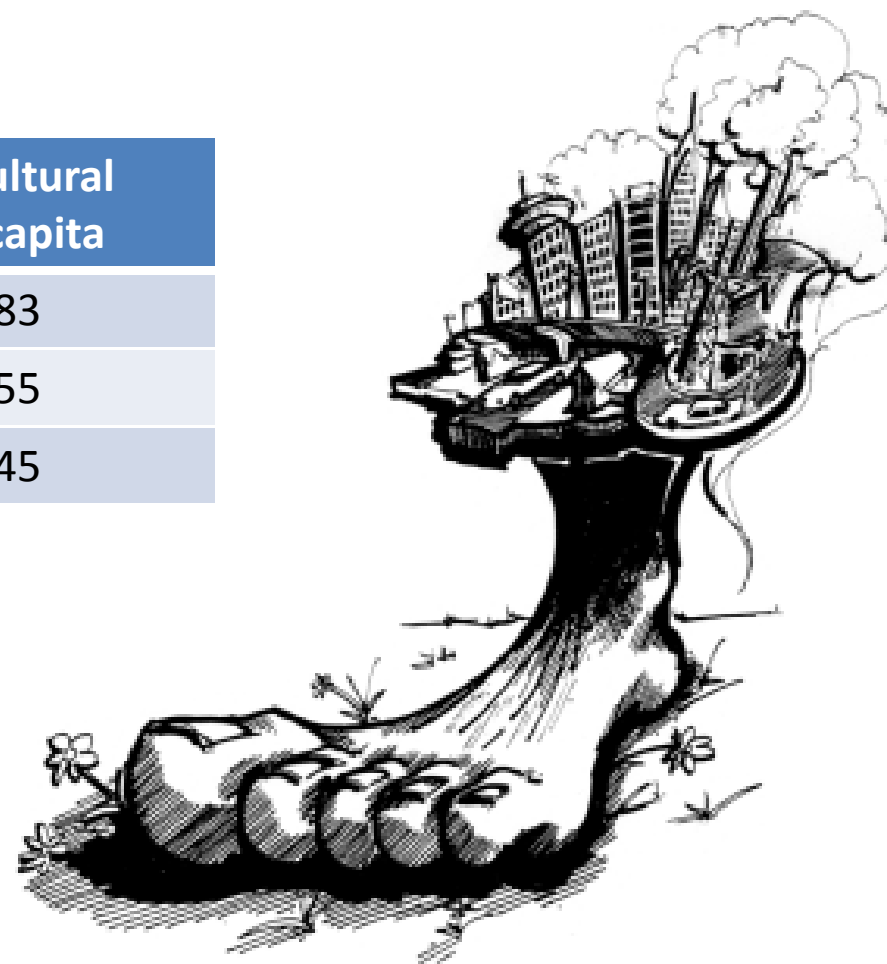


- Enough, good and affordable food
- Fossil resources ends: energy, phosphate, etc.
- Climate will change
- Avoid pollution: soil, air, water
- Changing ethics and food habits
- Economics and globalisation

Recently we use our world 1.5-times

Land becomes scarce

Year	billion people	Total available ha / capita	Agricultural ha / capita
2000	6	1,7	0.83
2050	9	1,2	0.55
2100	11	1,0	0.45



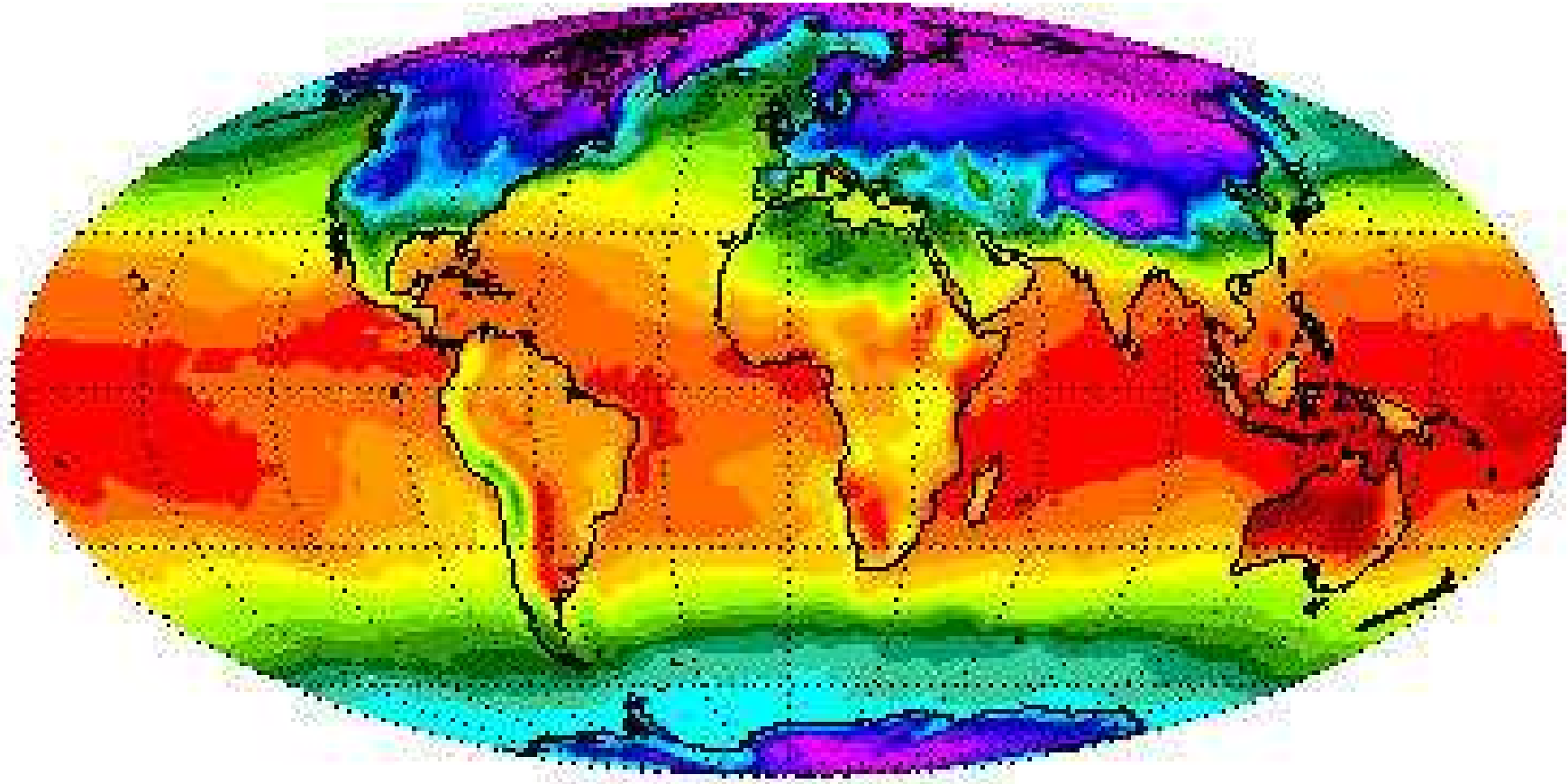
■ non-agricultural
 ■ pasture
 ■ arable land
 ■ permanent crops

Total usable land: 11 billion ha
 Total agricultural land: 5 billion ha

Degradation, pollution, sealing and droughts

(globally, every year are 2.5% arable land food production lost for production)

Climate will change



+2 or +4 °C doesn't matter: the changes will be severe, particularly for poor countries.



0.8 billion people
suffer hunger

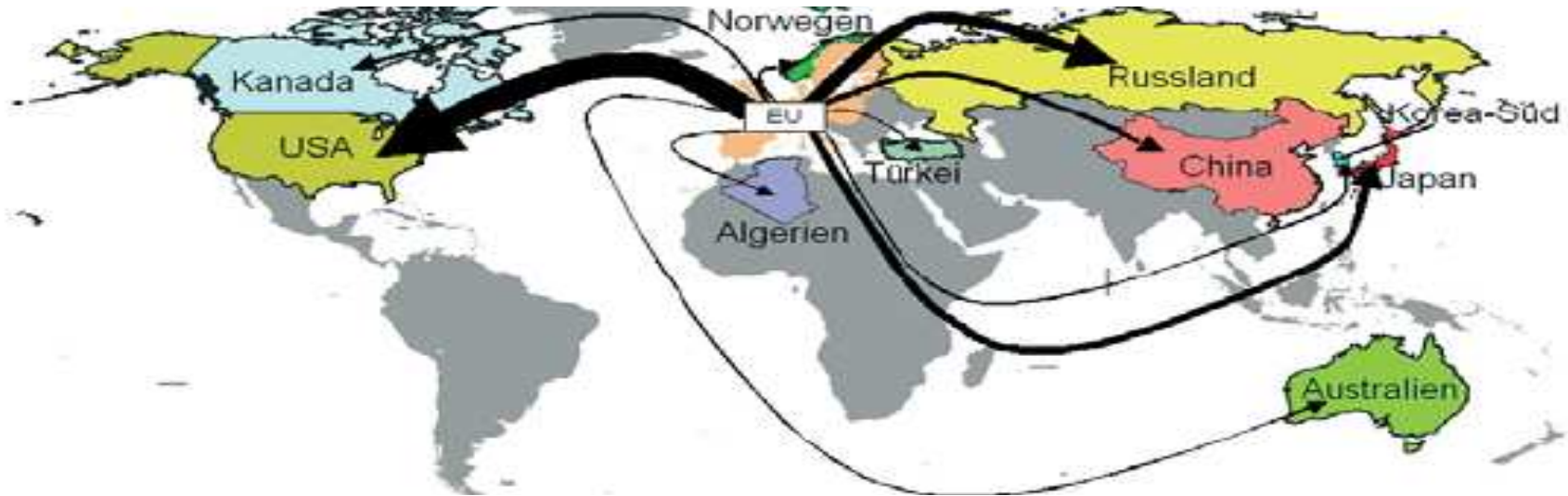


1.2 billion people
eat too much

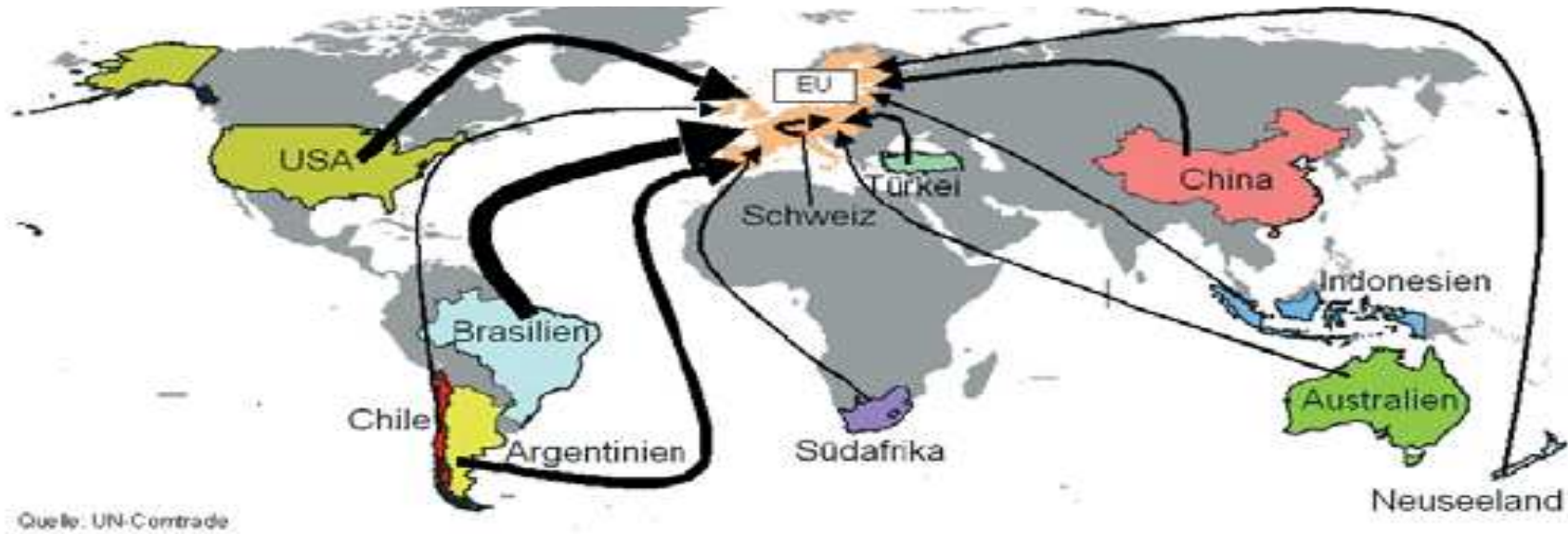
30 % of food becomes waste



European Food Export



European Food Import



Food is a global commodity



Food for Humans and/or for Livestock

Globally, on about 1.2 billion hectare arable land are about 2.4 billion tons (DM) of monogastric food/feed produced annually. 30% is used as feed (FAO 2013).

1.6 billion tons (DM) food for human nutrition

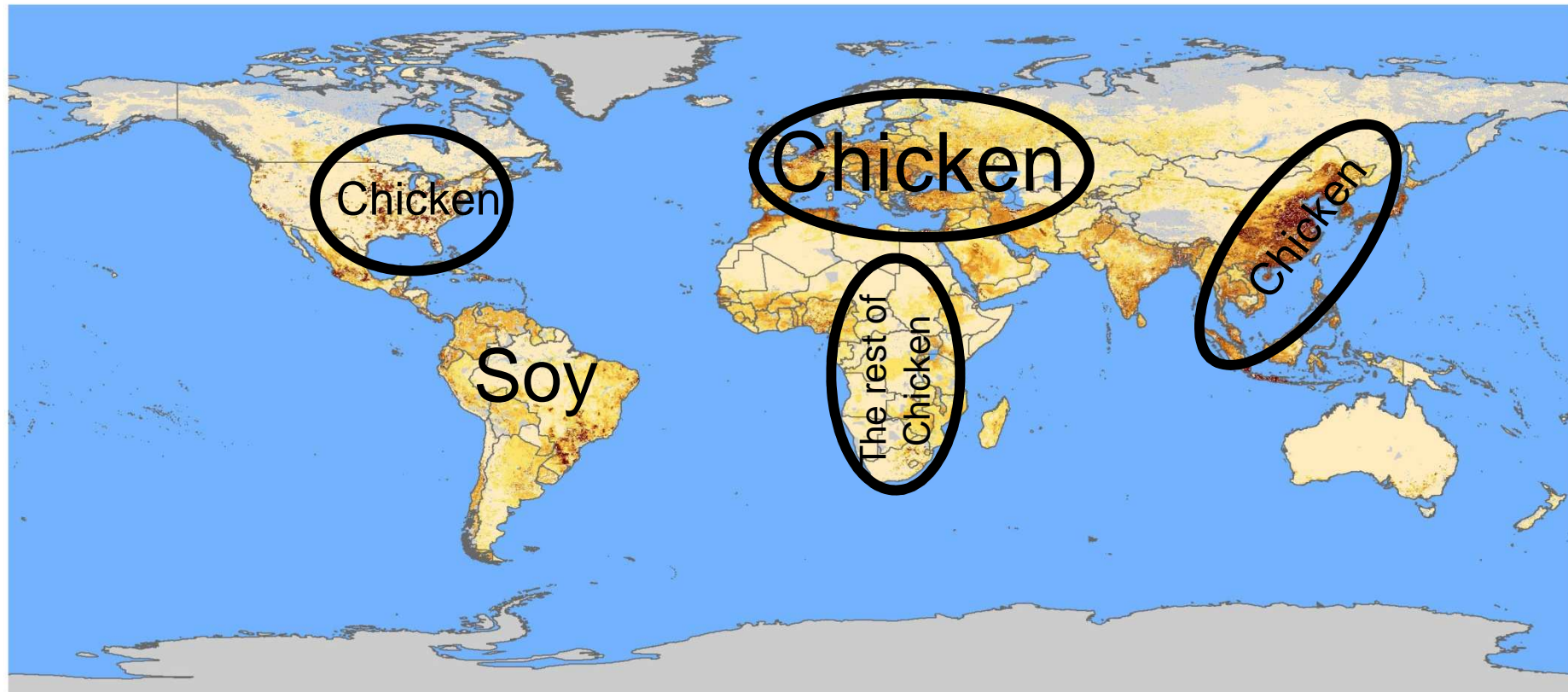


0.8 billion tons concentrates for livestock nutrition





Soy bean harvesting in Brazil for EU livestock (30 mio ha former rain forest)



With the feed for 50 billion broiler chicken a⁻¹
1.500 Mio people could survive one year

Low input/Low output production is not a solution: 50% of recent land use has to increase productivity

Hungry and
hard working
man

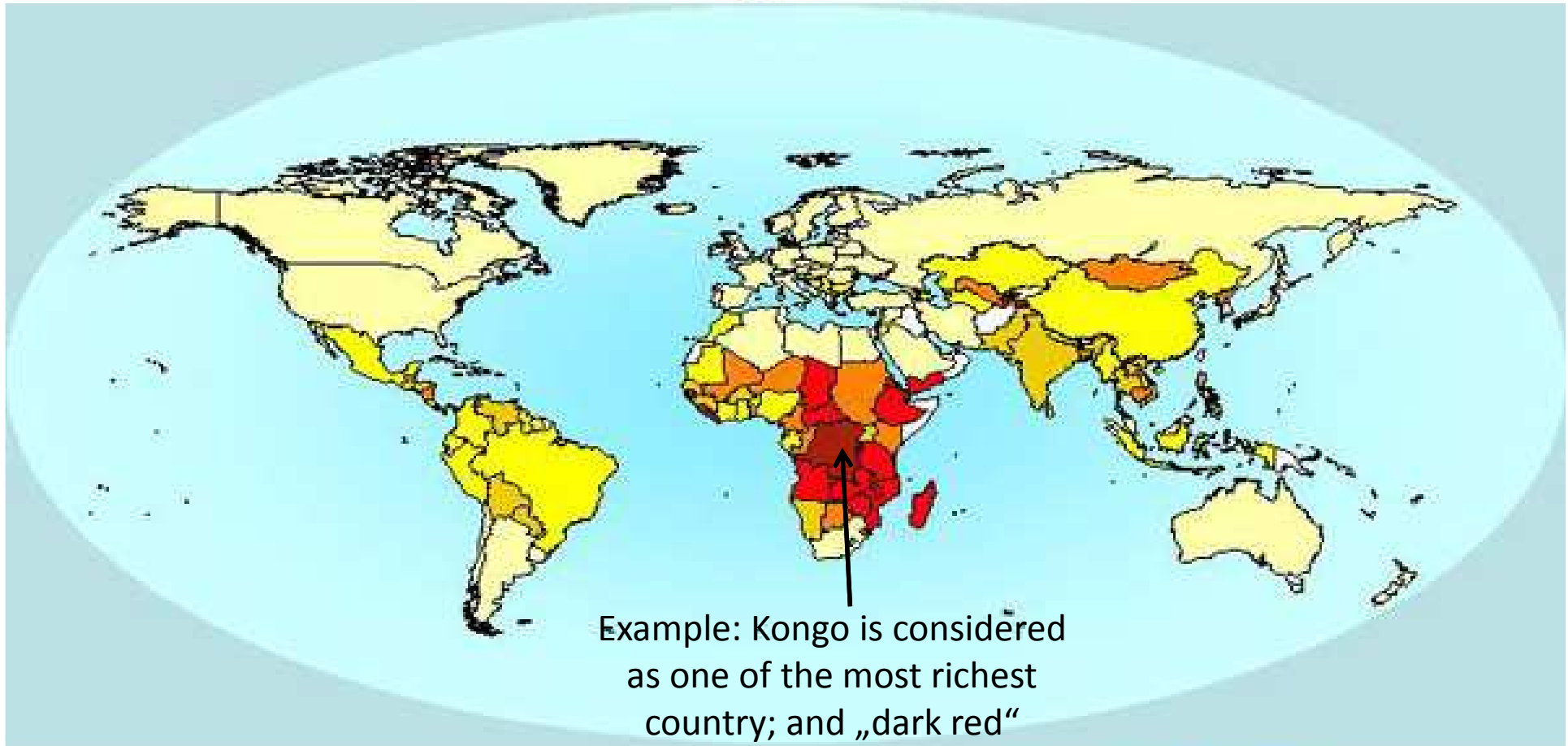
Hungry and
hard working
livestock

Hungry and hard working soils





Hunger map



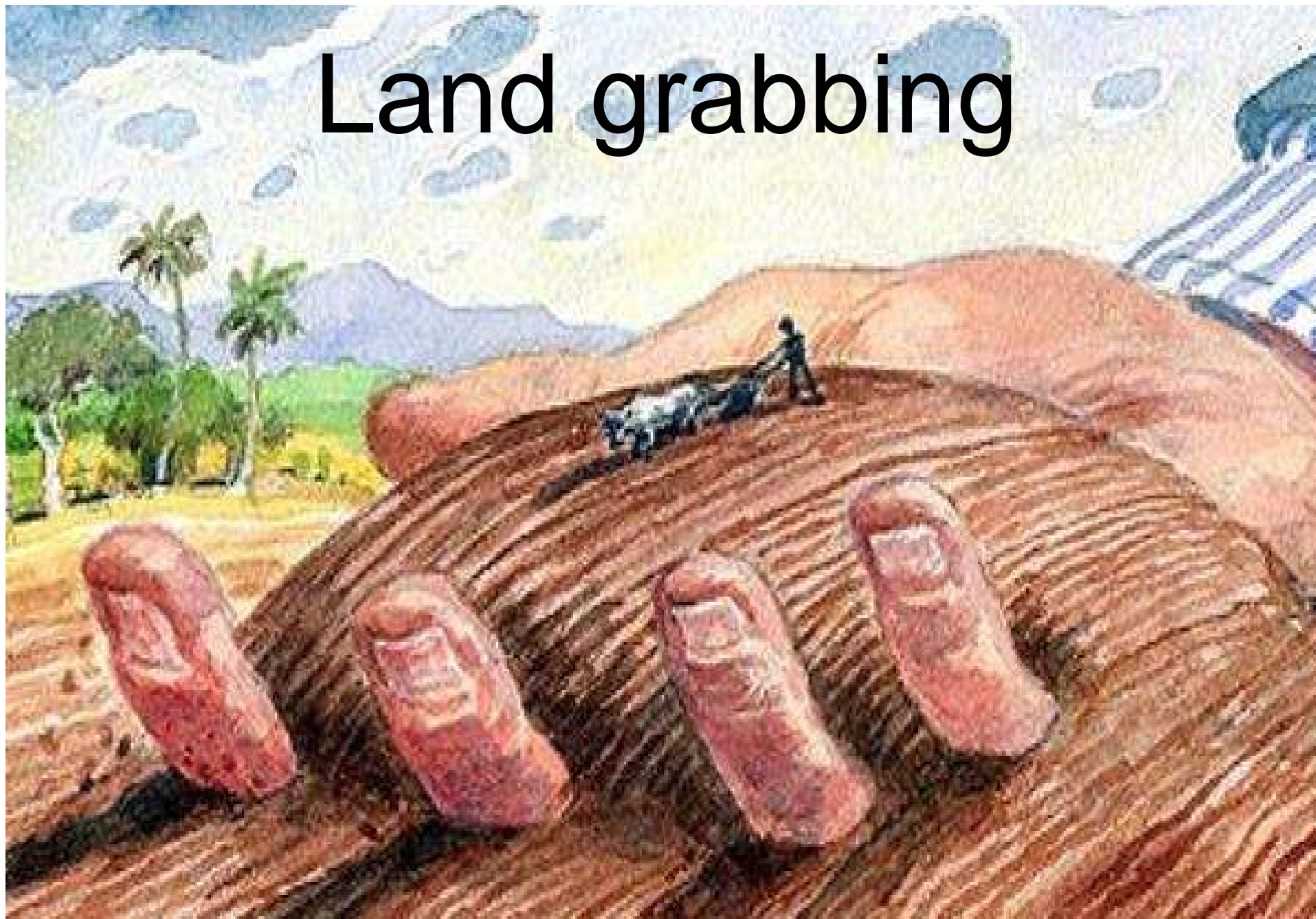
Rome, Italy,
 20.-21. January 2016,

Prof. Dr. habil. Gerold Rahmann
 President of ISOFAR



International Society of Organic Agriculture Research

Land grabbing



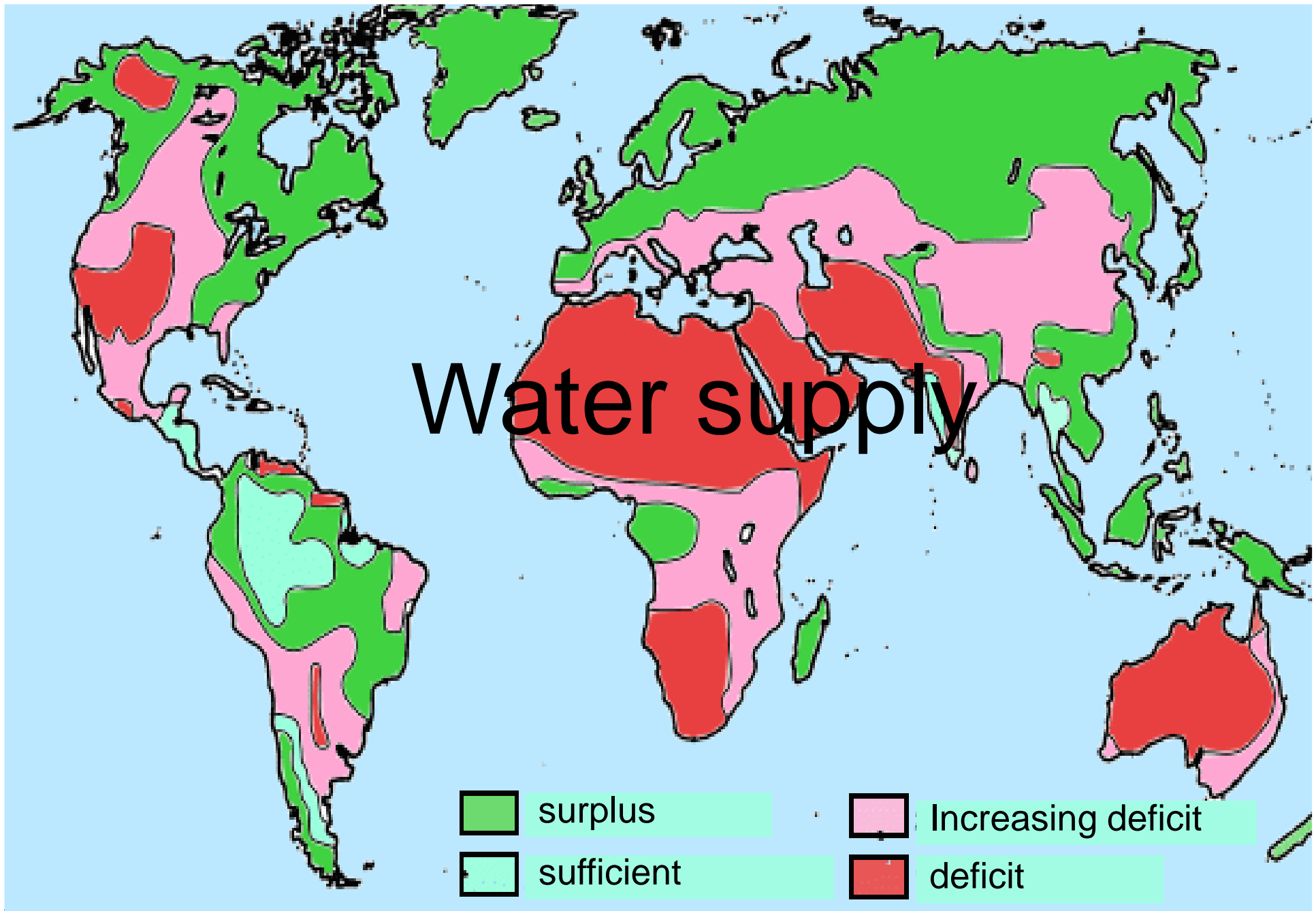
Renewable palm oil trees in Indonesia for EU fuel



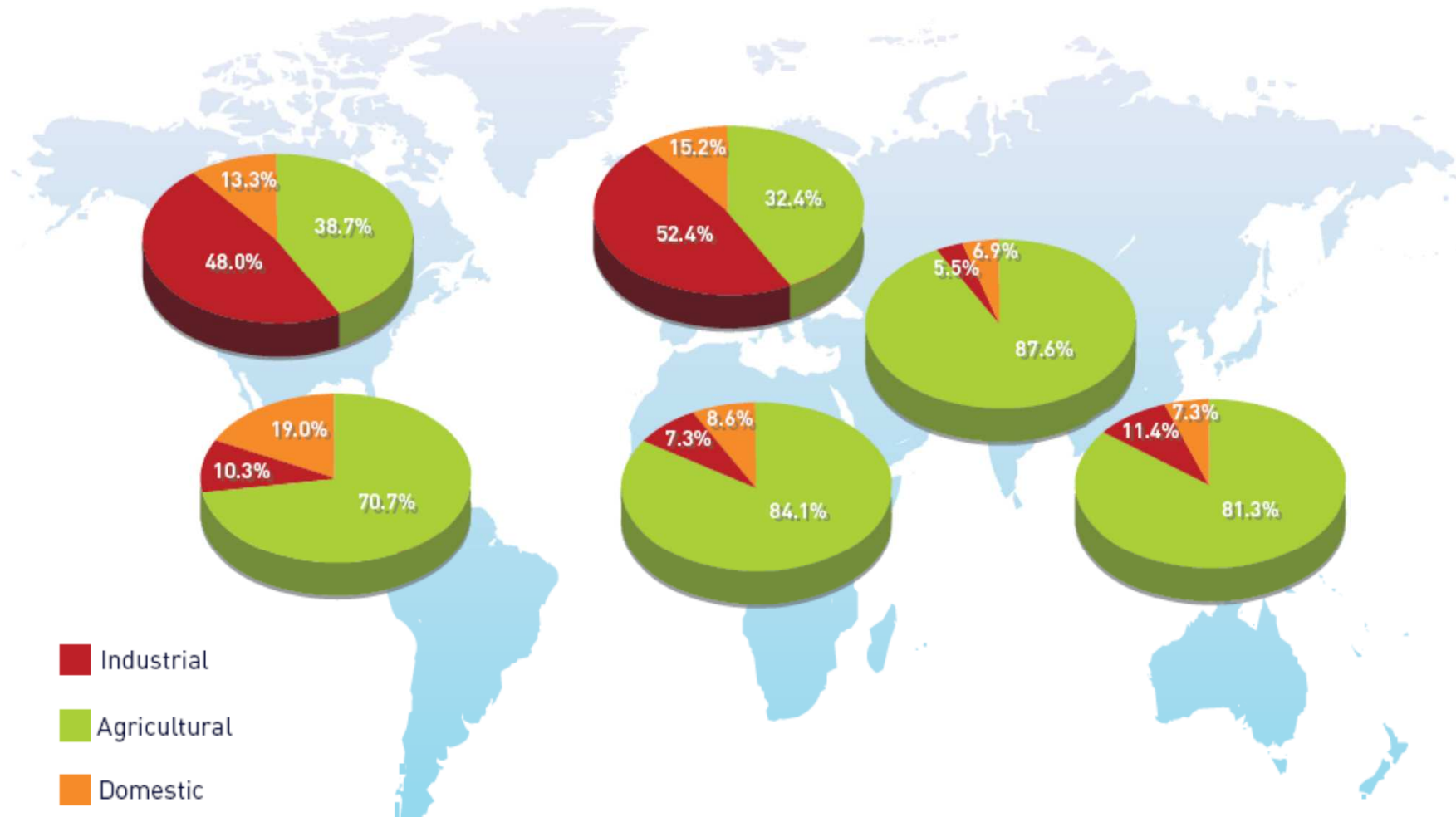
Extreme loss of agricultural biodiversity



Only three crops (maize, rice, wheat) deliver 60% of our food, 12 deliver 80%. 3500 edable crops are available. Global hybrids exchange local self-reproducible varieties.



Water utilisation



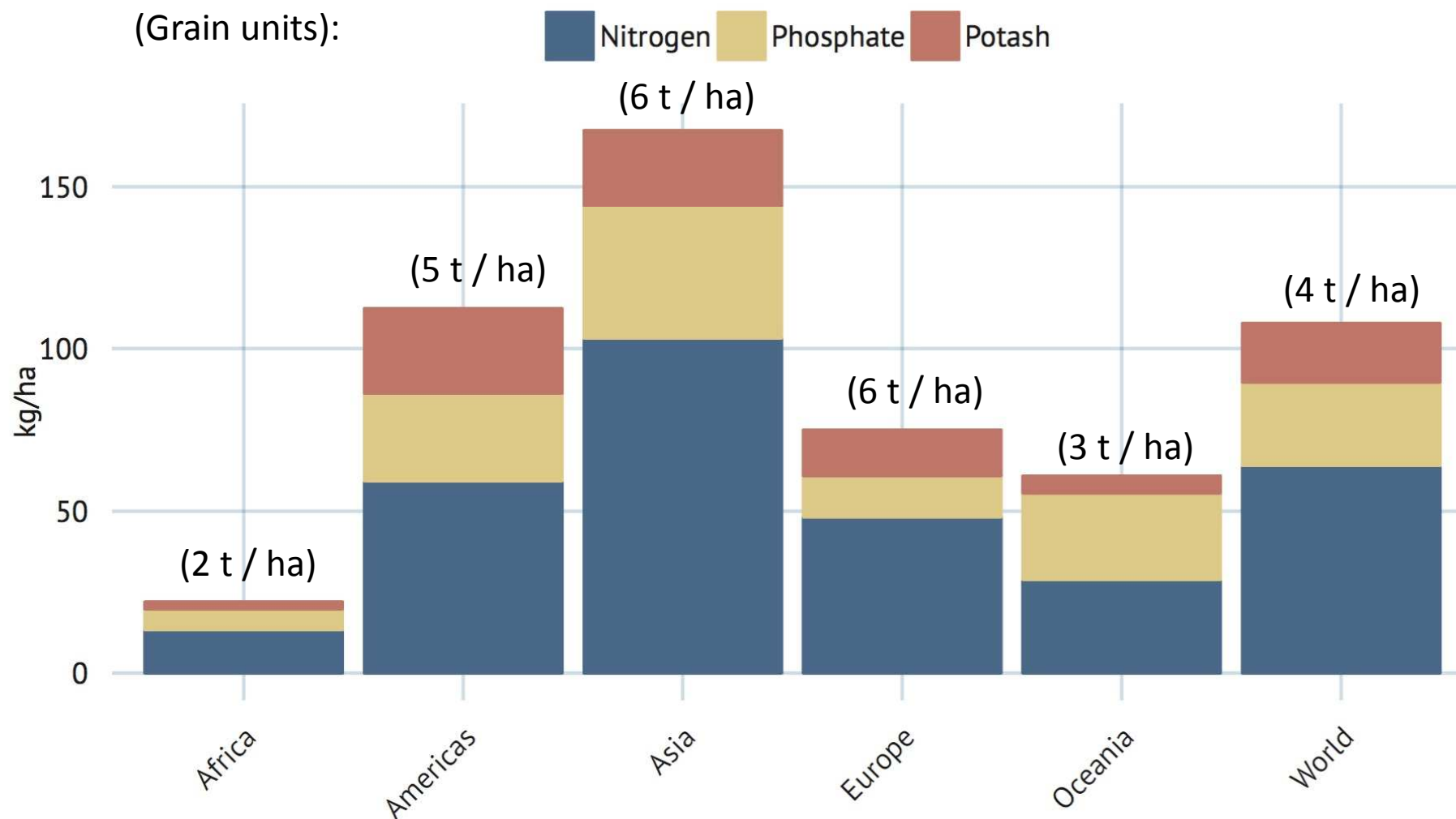




Nestle is not the
solution

Fertilizer Consumption in nutrients per ha of arable land (2012)

Average yields
(Grain units):



My concern: 1 billion tons of nutrients are applied per year (trend: increasing)

- Ground water contamination
- Waste water with residues
- High energy demand and costs
- Fossil nutrients end



My concern: 5 mio tons of pesticides are used per year (trend: increasing)

- 1-10 kg/ha farm land and year
- 0.7 kg per human and year
- product contamination: human health
- environment pollution and losses of biodiversity
- 20% is only Roundup-Ready® for GMO etc.

My concern: 100.000 tons of antibiotics are used in animal husbandry per year (trend: increasing)

- Multi-resistant germs
- Contaminated environment
- Contaminated food
- Sick and non-treatable humans

Organic can
be a solution

Health

Quality
of
life

Ecology

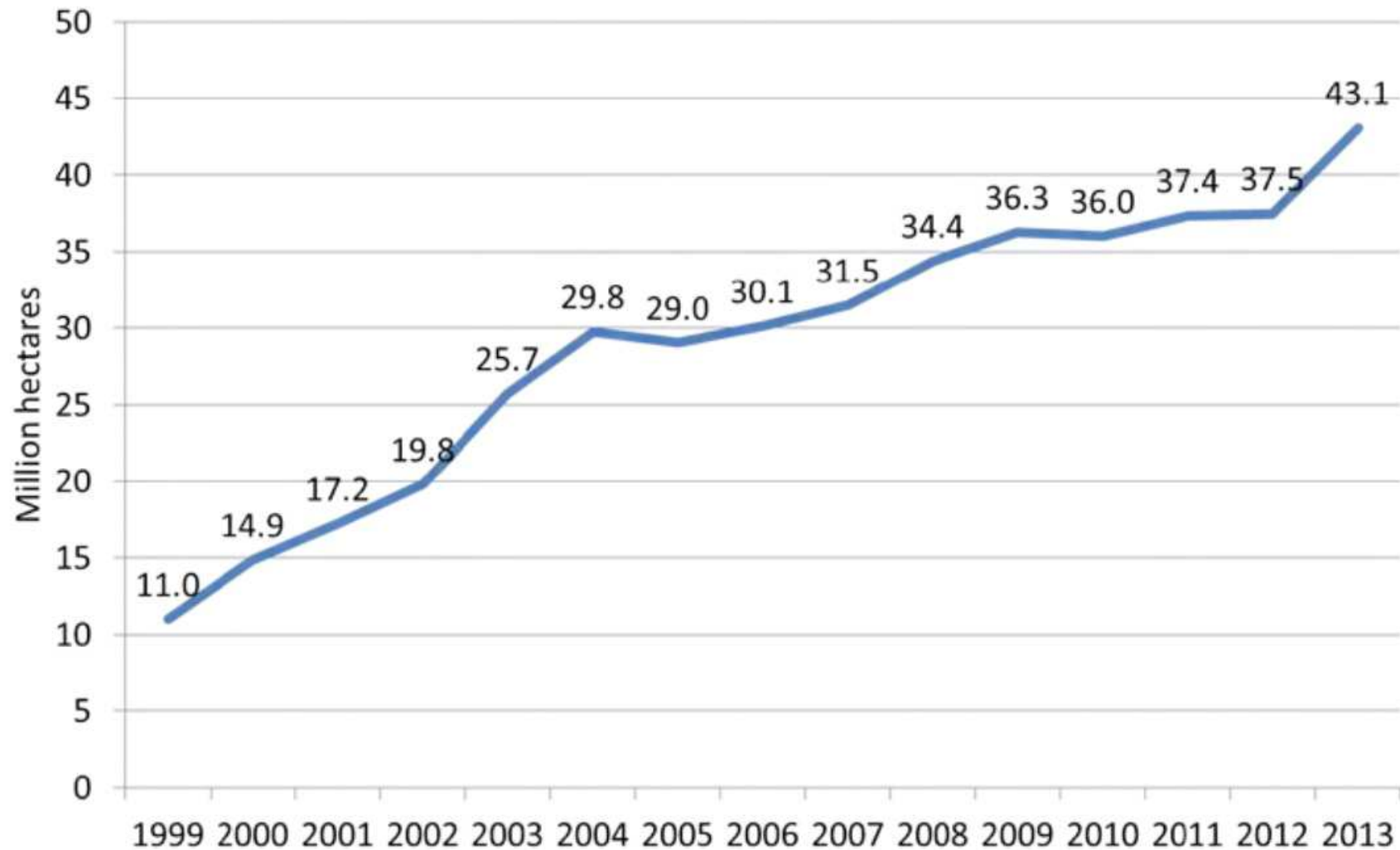
Fairness

Care

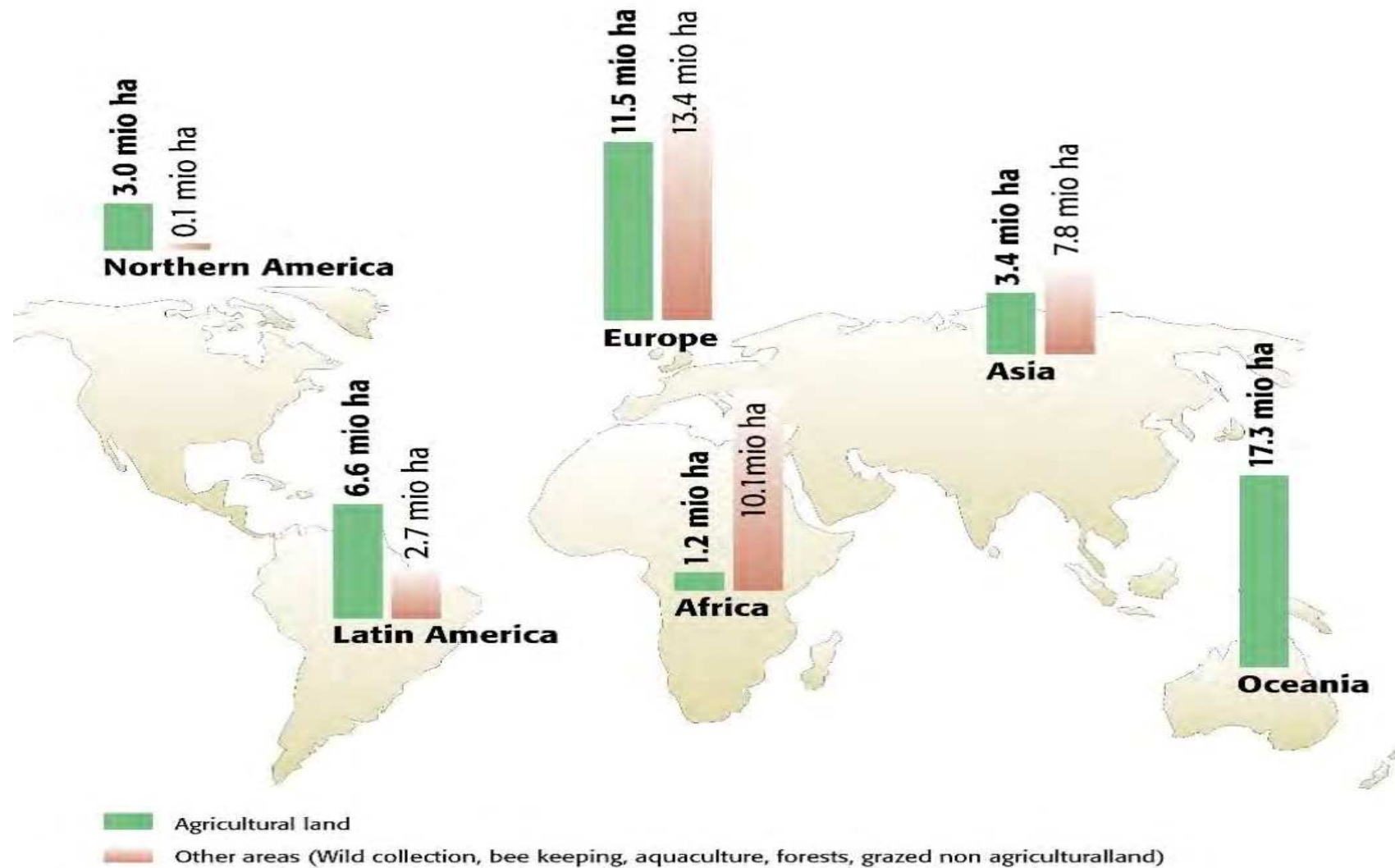
The world of Organic Farming 1999 - 2013

Growth of the organic agricultural land 1999-2013

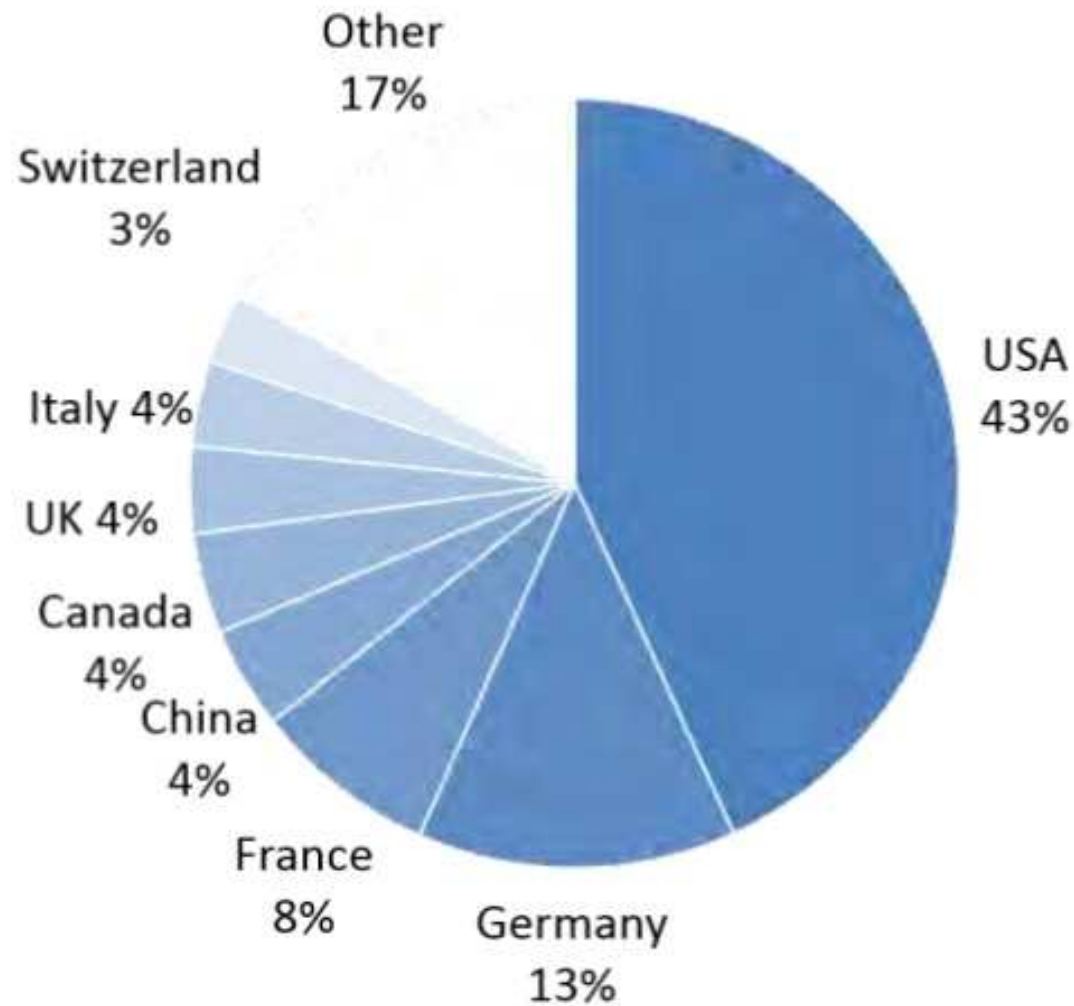
Source: FiBL-IFOAM-SOEL-Surveys 1999-2015



The world of Organic Farming 2015



Organic world market: 80 billion US-\$ (2014)



(IFOAM 2015)

Why Organic Agriculture Research?

- Organic is sustainable food production
- Organic can help to solve future challenges
- Organic is still a niche
- Organic needs support to grow



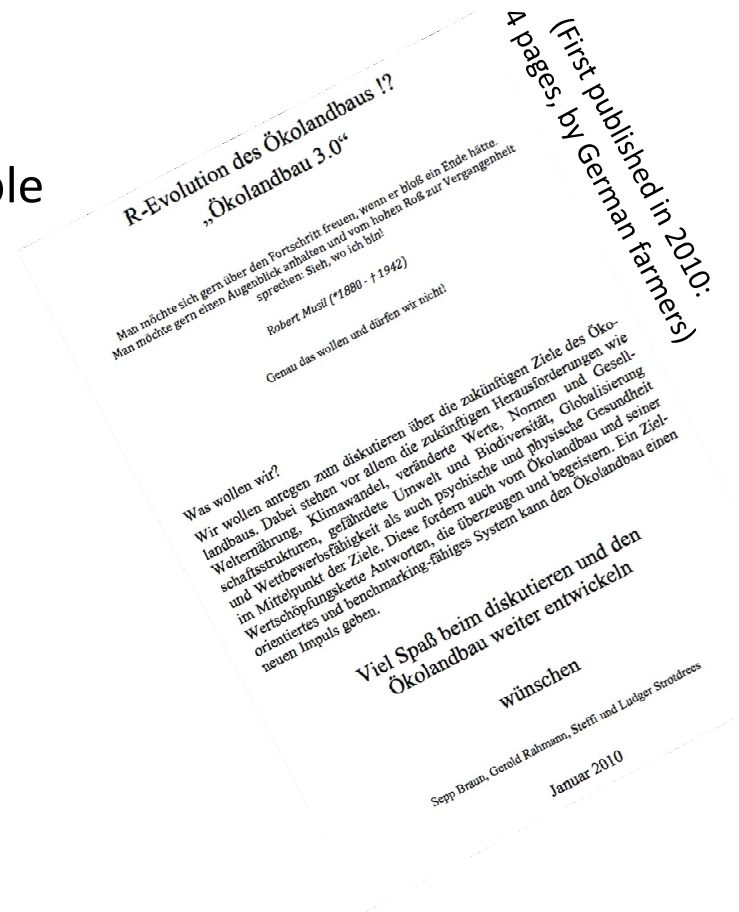
- Research can help to make organic even more productive, efficient and sustainable
- Organic Agriculture is „knowledge farming“
- Organic sector is part of the science based development: improved sustainable food and value chains

What is going on in the global world of Organic Research?

- Strategy papers „Organic 3.0: release the potential of Organic Agriculture with research“
- Design new methodologies for „farming system research and development“ with scientific AND real impacts
- Professionalism of research \leftrightarrow practice interactions: participation and innovation
- Going in a positive competition with conventional agriculture: learning from each other

Organic 3.0: what is that?

- Defined by German organic farmers in 2010
 - Organic 1.0: yesterday - the pioneers
 - Organic 2.0: today - business and regulations
 - Organic 3.0: future - feed the world sustainable
- First official distribution and publication 2011 OWC in Korea
- Idea taken over by (with concepts):
BioFach, IFOAM, German speaking organic associations (Bioland, BioAustria, BioSwiss), German Agricultural Research Association (DAFA), ISOFAR, others
- Many publications are available ...
- Further actions and implementations are planned ...



German speaking organic associations:

**Mit Bio zu einer modernen nachhaltigen
Landwirtschaft**

Ein Diskussionsbeitrag zum Öko- oder Biolandbau 3.0



Bioland, BioAustria, BioSwiss

BIOFACH's Organic 3.0: main topic 2014, 2015, 2016



BIOFACH2016

into organic

10 - 13 February 2016 // Nuremberg, Germany

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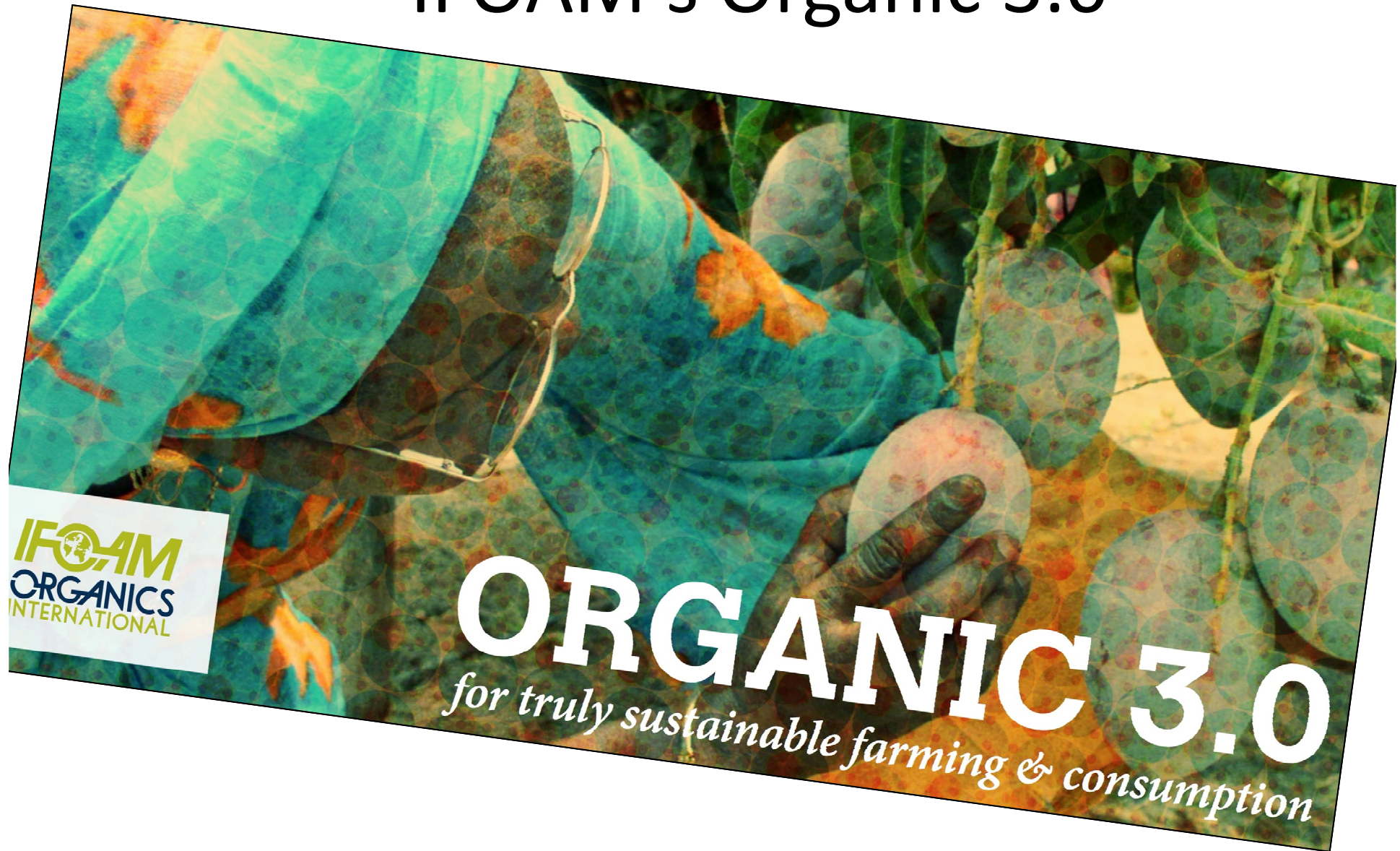
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International Society of Organic Agriculture Research

IFOAM's Organic 3.0



IFOAMs Organic 3.0

Goal: Shift of conventional agriculture in the direction of organic agriculture and an increased market share of sustainably produced goods.

Principles: Health, Ecology, Fairness, Care (and Quality).

From 2.0 to 3.0:

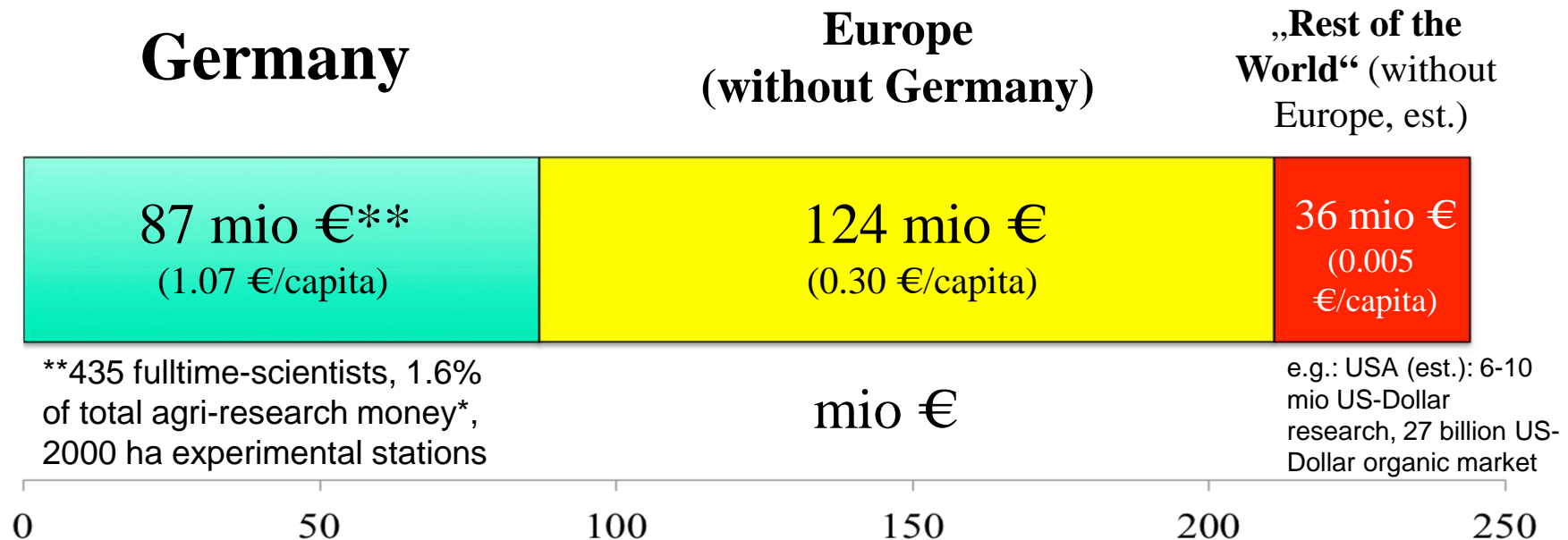
- From an orientation towards minimum requirements to an orientation to continuous improvement
- From exclusivity of certification towards multiple options to achieve credibility
- From organic agriculture as the goal in itself towards organic as an instrument to achieve true sustainability
- From exclusion due to non-compliance to inclusion of parties that we see potential in organic
- From pioneering technologies towards the relevance of systems From a respectable niche philosophy to mainstreaming policies
- Usage of real cost accounting through the consideration of positive and negative externalities in agricultural production

Example: Germany's Organic 3.0 Research strategy

- Network of the German Food and Agricultural Research Institutions (DAFA: 32 members; 3.000 scientists)
- Build up innovation cluster with practice: with relevant resources and motivation
- Design of the „Future research strategy for „Organic Agriculture towards 2050“ (finalized with the organic movement: Biofach 2016).
 - One Target: more than 20% organic farm land in 2030 (today 7%)
 - Become more attractive to conventional farmers
 - increasing productivity, efficiency, sustainability
 - staying accepted by public and consumers



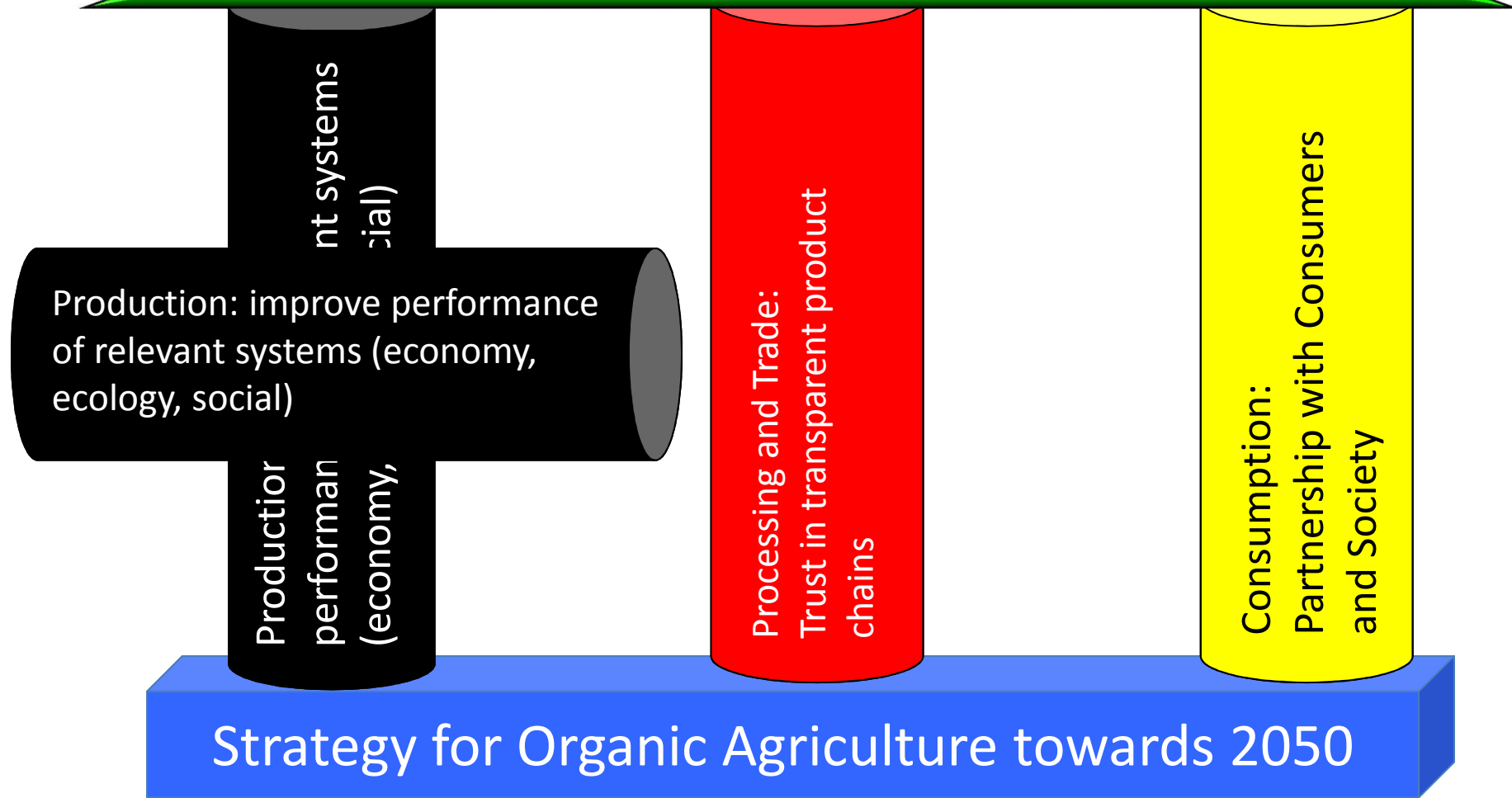
Organic Farming Research Budgets* (public) in Germany, EU and the Rest of the world in 2012



*Conventional agricultural research money:

- Germany: 4 billion €, 50 €/capita/y
- Global: 40 billion €, 6 €/capita/y

Future of the system of Organic Agriculture in Germany



Future of the system of Organic Agriculture in Germany

Production: improve
performance of relevant systems
(economy, ecology, social)

Product

Processing and Trade:
Trust in transparent product
chains

Processing
Trust in tra
chains

Consumption: Partnership
with Consumers and
Society

Strategy for Organic Agriculture towards 2050

Future of the system of Organic Agriculture in Germany

Production: improve
performance of relevant systems
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Processing and Trade:
Trust in transparent product
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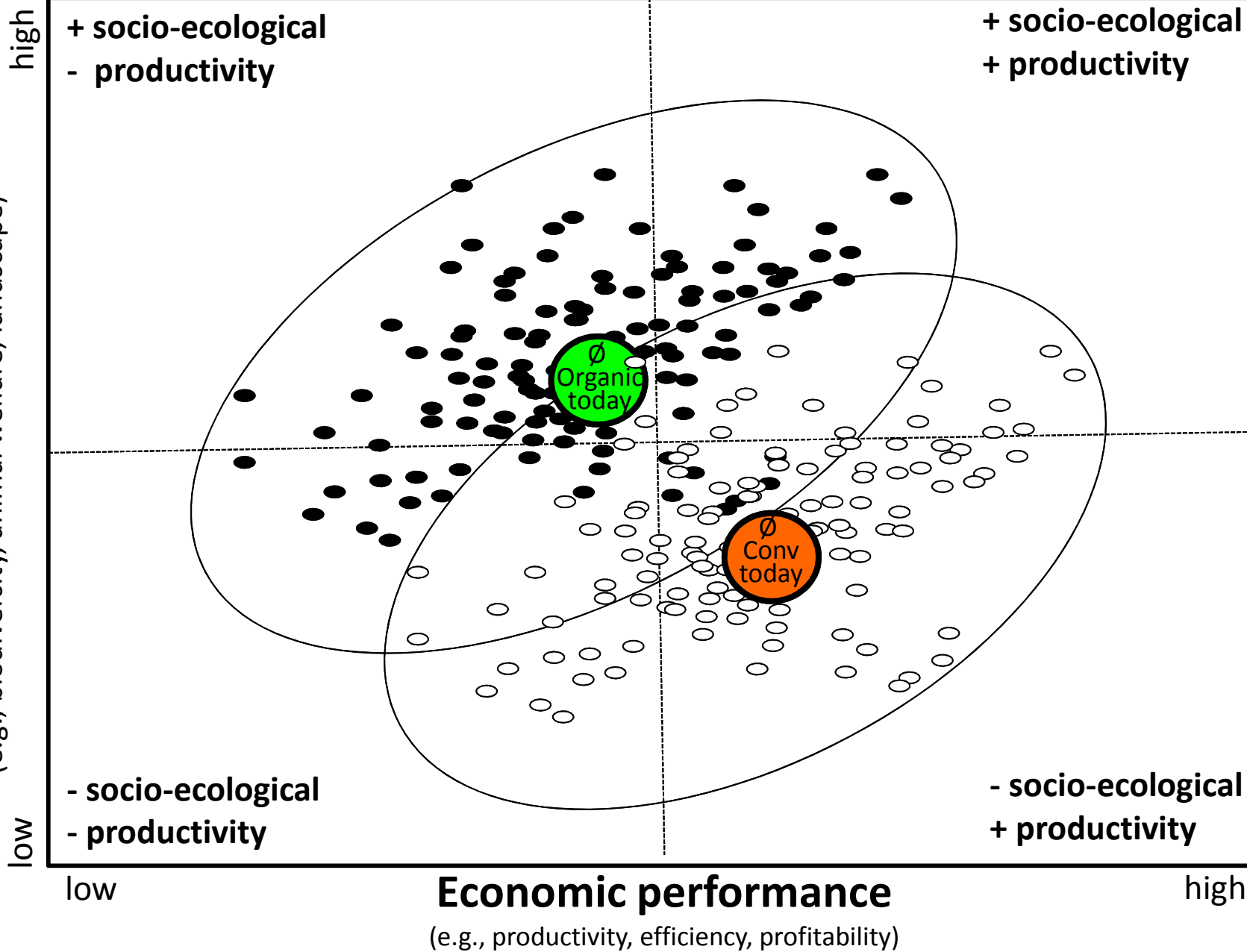
Consumption: Partnership
with Consumers and
Society

Partnership
Consumption
with Consumers
and Society

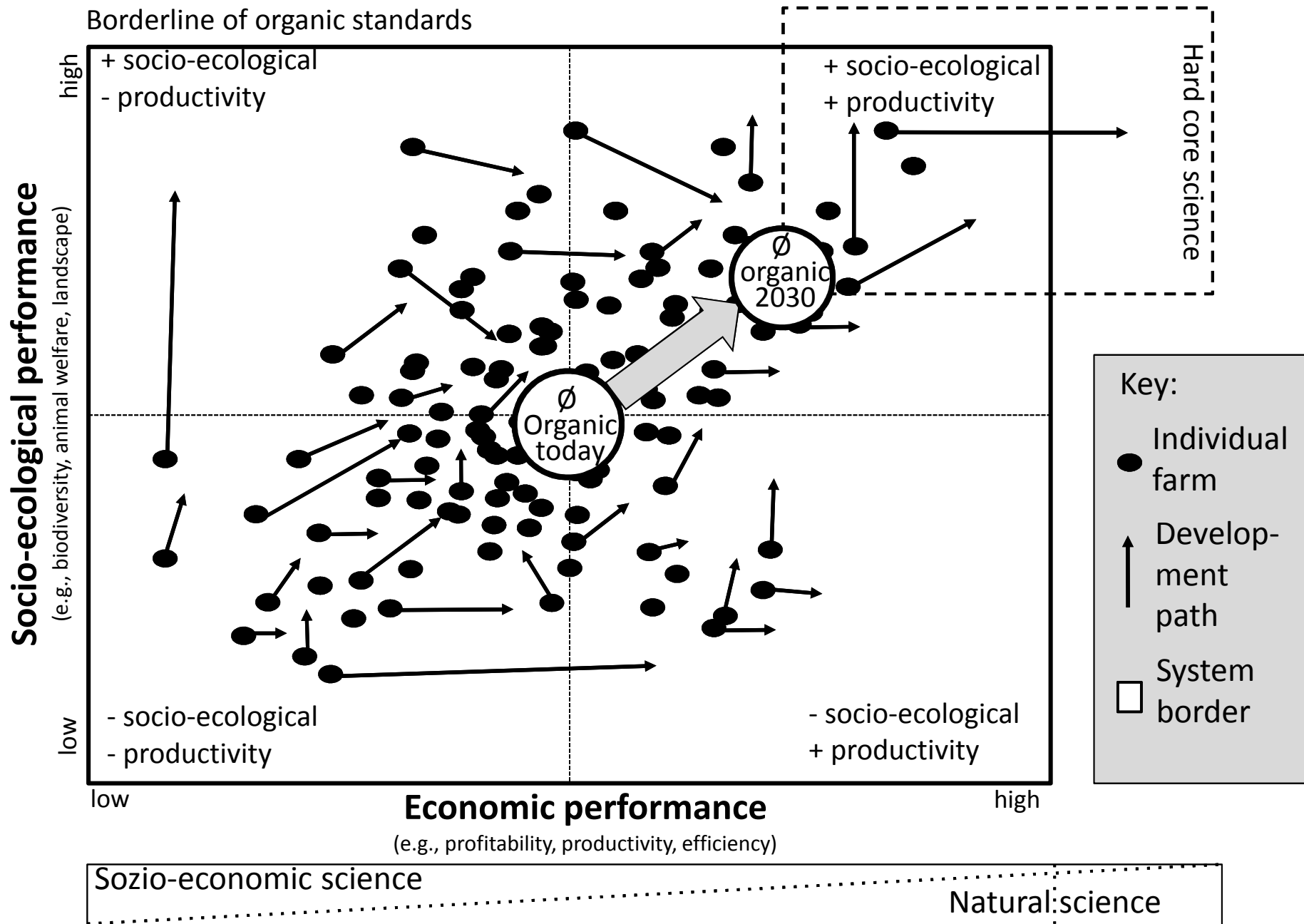
Strategy for Organic Agriculture towards 2050

Socio-ecological performance

(e.g., biodiversity, animal welfare, landscape)



Borderline Good Farming Practice



My five visions about the need of Organic farming development till 2050

Conventional can learn from Organic

For example:



Close nutrient cycles



Mix crops and legumes

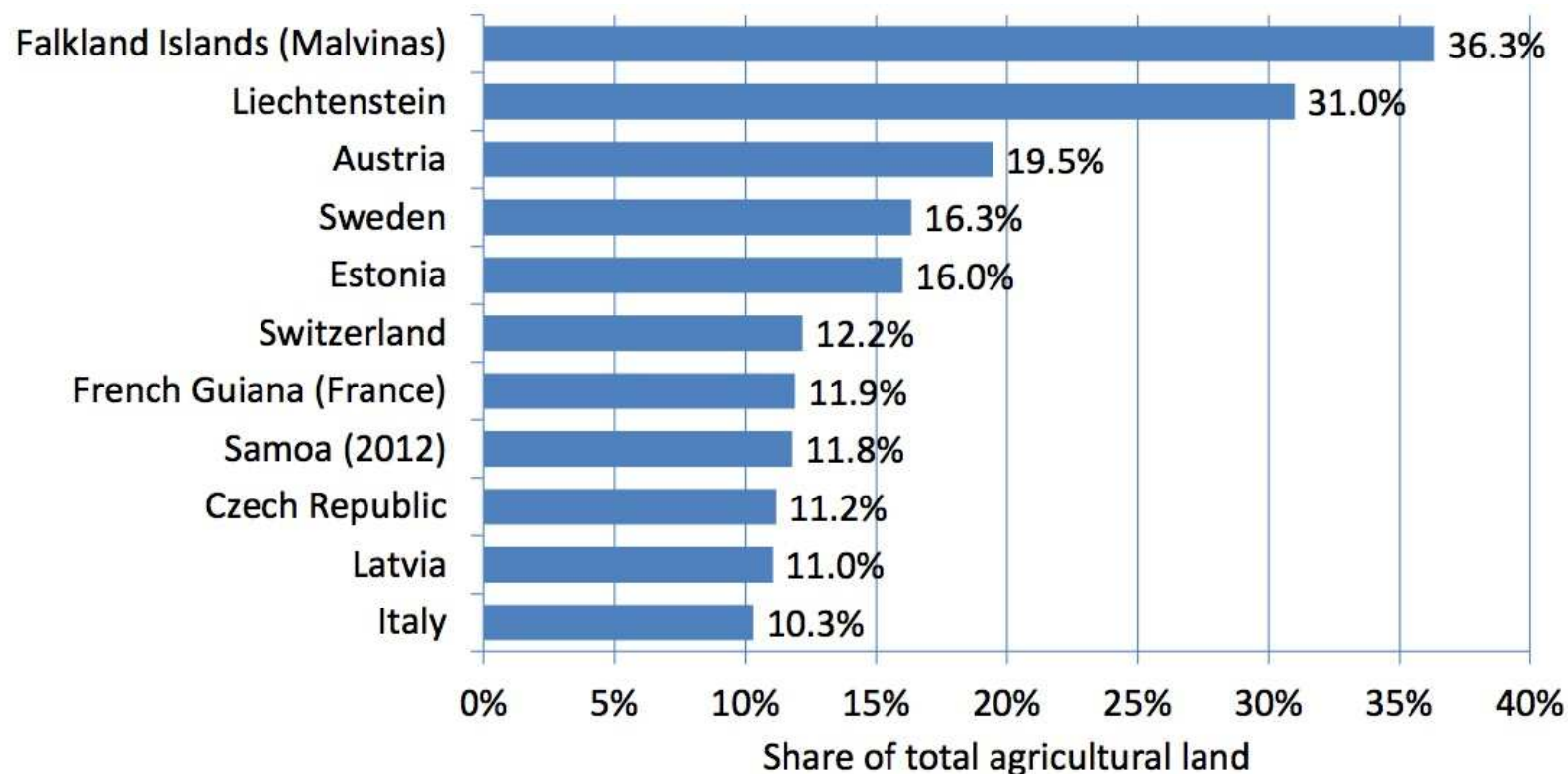


Improve animal welfare



Avoiding pesticides with machines and knowledge

Scale-up Good Organic Farming Practice



Global share of Organic farm land (2013): <1.00 %
... (2050): >10.0 %

IFOAM 2015

Food production meets Food consumption



Farming has to change from „commodity related“ towards „food needs related“ production



What needs to be initiated today to tackle with the challenges after 2050?

TABLE 1. POPULATION OF THE WORLD AND MAJOR AREAS, 2015, 2030, 2050 AND 2100, ACCORDING TO THE MEDIUM-VARIANT PROJECTION

<i>Major area</i>	<i>Population (millions)</i>			
	<i>2015</i>	<i>2030</i>	<i>2050</i>	<i>2100</i>
World	7 349	8 501	9 725	11 213
Africa	1 186	1 679	2 478	4 387
Asia	4 393	4 923	5 267	4 889
Europe	738	734	707	646
Latin America and the Caribbean	634	721	784	721
Northern America	358	396	433	500
Oceania	39	47	57	71

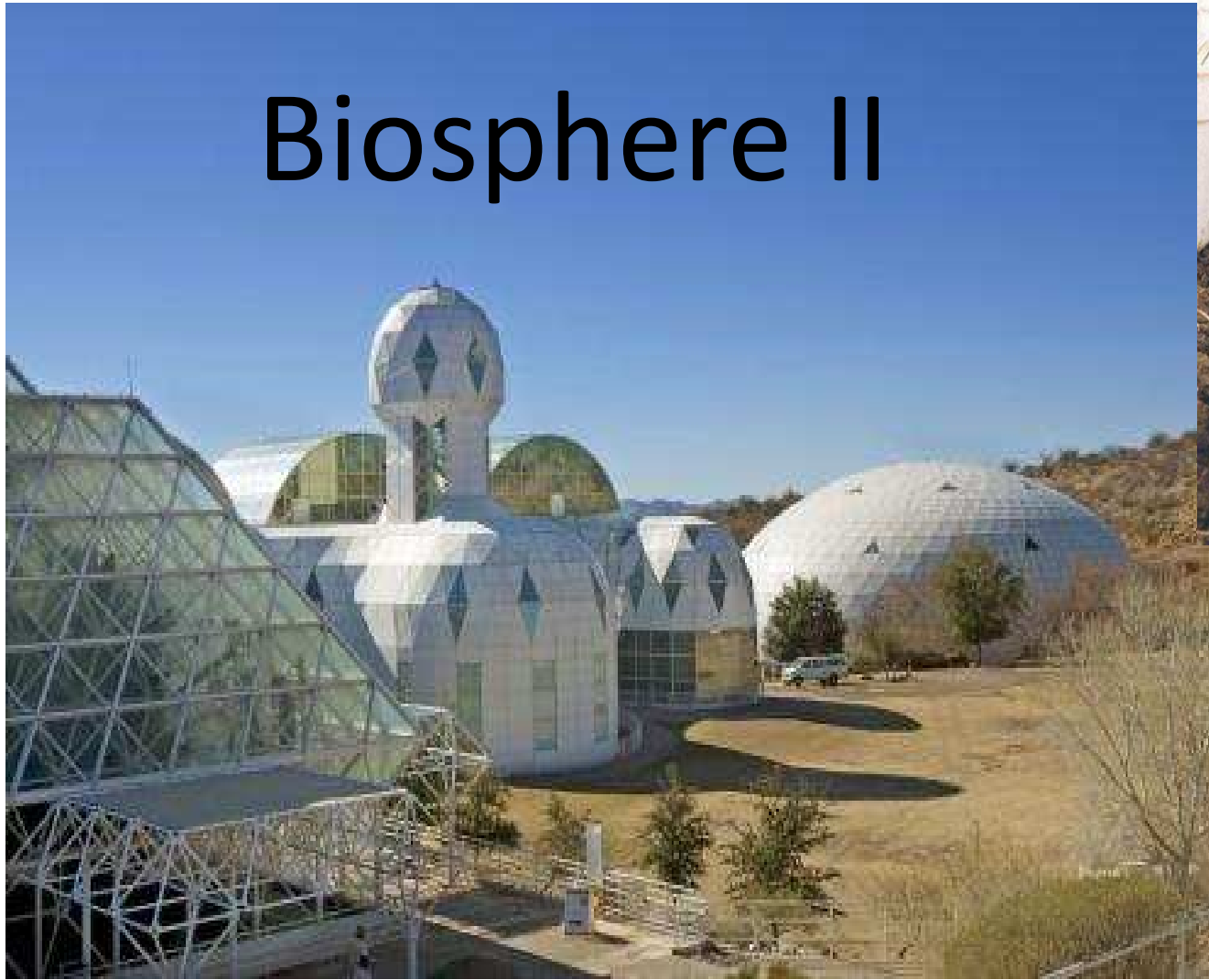
Source: United Nations, Department of Economic and Social Affairs, Population Division (2015). *World Population Prospects: The 2015 Revision*. New York: United Nations.

Less or no livestock



Local versus global food chains

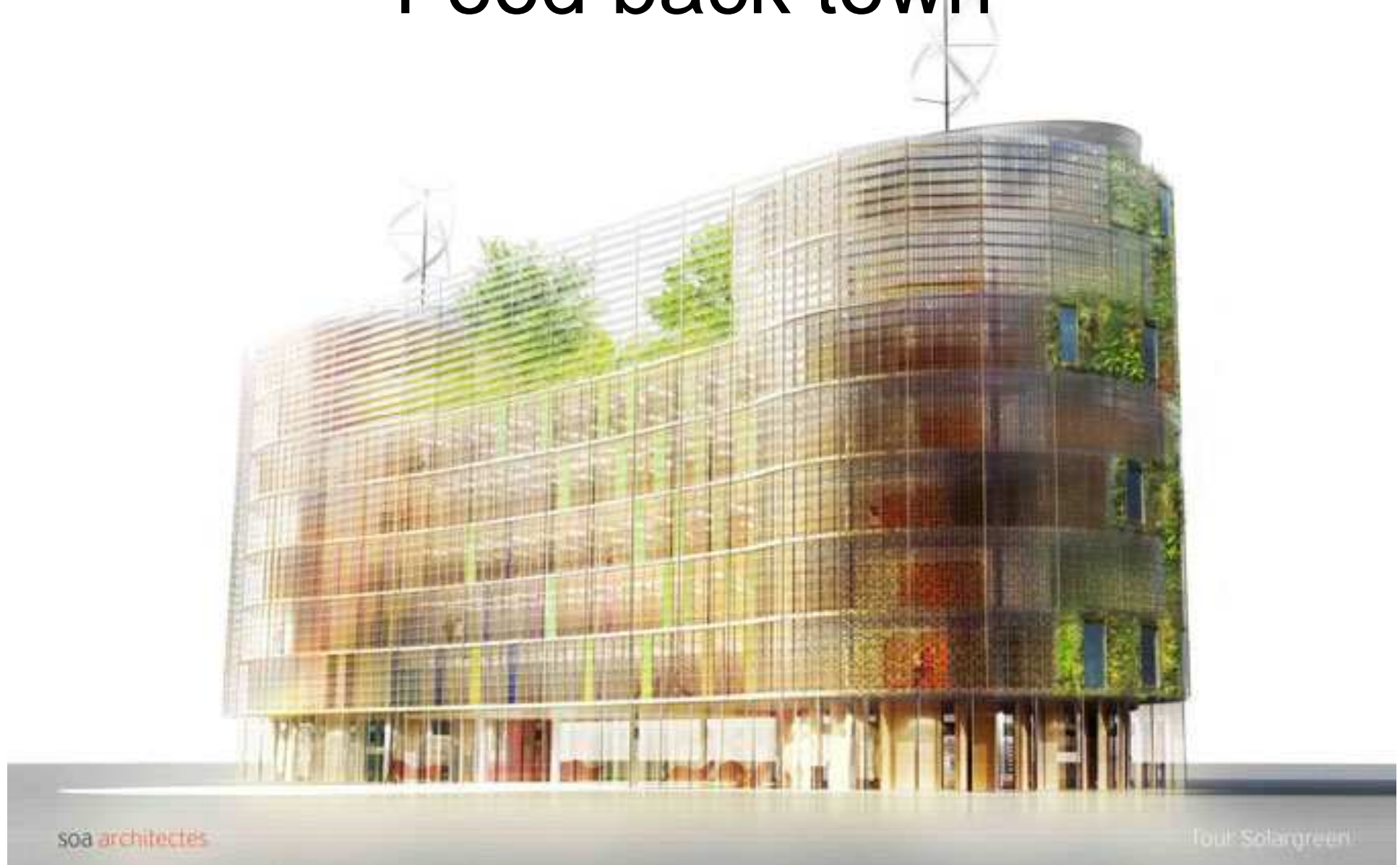
Biosphere II



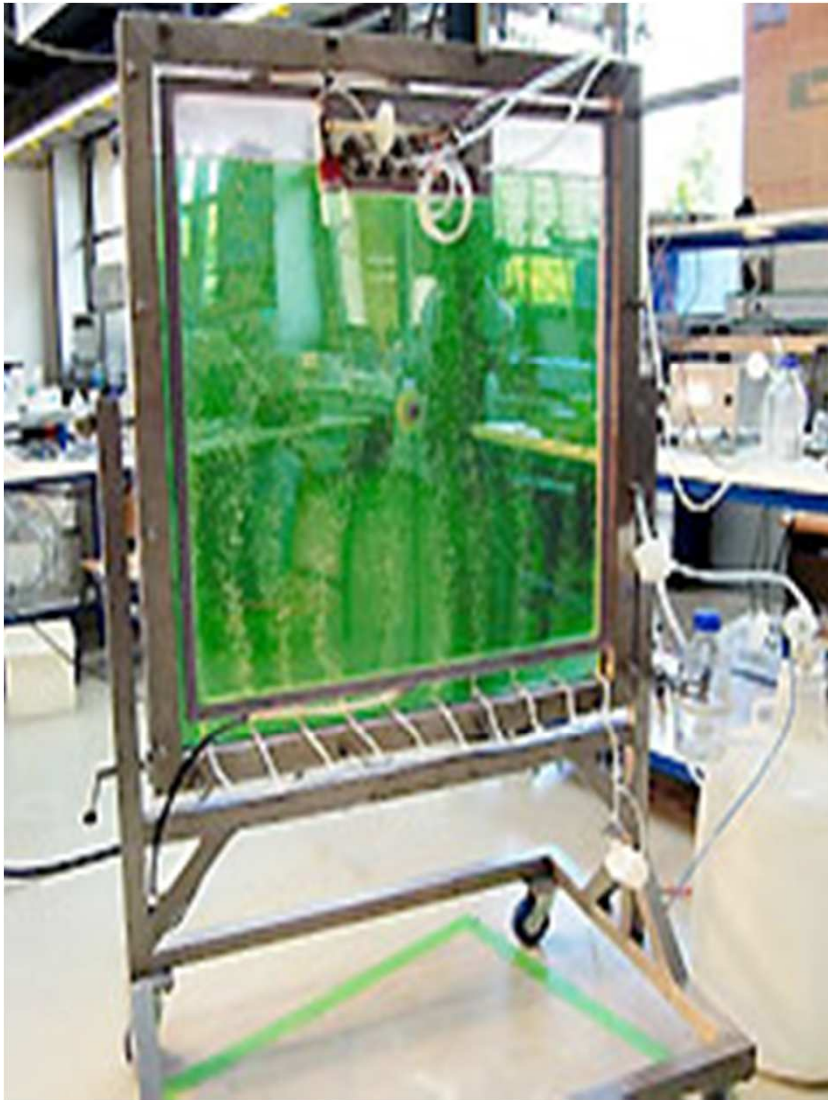
Food back home



Food back town



Sustainable artificial food components



Artificial food components: why not Glucose from reactors?

Sugar farm land:
31 mio ha
(3 % of total;
FAO 2013)

Artificial sugar
would probably
need 100 ha
for reactor space



Organic World Congress 2017: New Dehli, India from 9-11 November

(5 Tracks: Main, Farmers, Science, Marketing and Quality, Workshops)

Scientific Track: “Innovative research for Organic 3.0”

(managed by NSOF, ISOFAR, TIPI)

1. Feeding the world (productivity, efficiency)
 2. Minimize food chain induced global changes (ecology)
 3. Respect ethical and cultural issues (ethics)
 4. Improve quality and health of food (quality)
 5. Make organic prospering and profitable (economics)
 6. Better global research communities cooperation (networking)
- 2-hours visionary plenary sessions with keynote speakers
 - 20 sessions in two parallel sessions (2x10) classic topics: soil – consumers
 - 3 oral papers (total 60 oral papers) and 3 poster (60 poster papers)
 - Deadline submission via eprints.org: 30. September 2016



We have to safe
our future: the
soils !

What is ISOFAR ?

- International Society of Organic Farming Research
- Founded in 2003 in Berlin
- Members and affiliates:
1,320 persons

Support ISOFAR - become member:

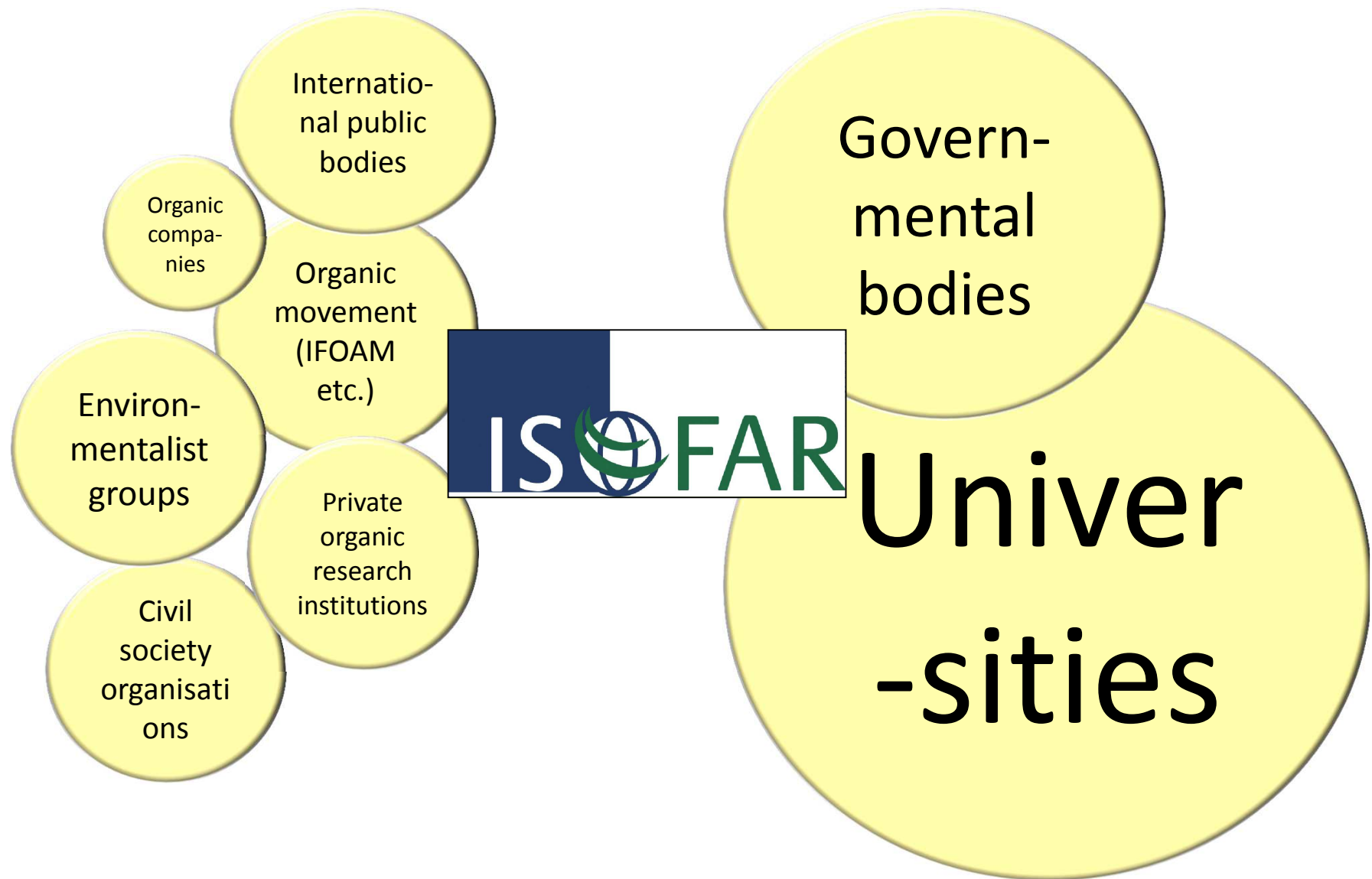
(Italians: 60 Euro / year (students 50%);
free reviewed access Journal ORGA)



Goals:

- Networking the global organic scientists
- Communicate organic research results
- Creating capacities for research activities

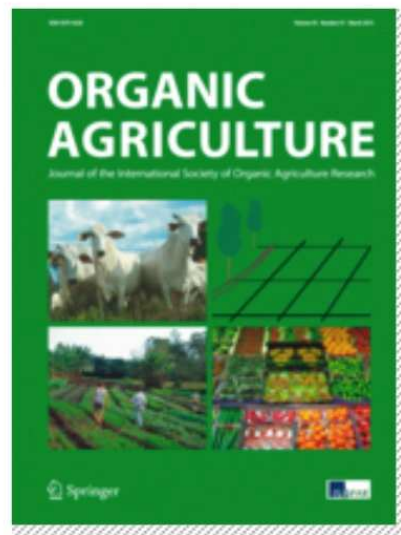
Link between movement and public research



e.g., Journal of Organic Agriculture

Agriculture Home > Life Sciences > Agriculture

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e.g. events: Science meets the public



ISO FAR - International Organic Expo 2015 in Goesan
1.1 Million Visitors from 18. Sep to 10th October 2015