Institute of Organic Farming in Trenthorst
(Northern Germany, close to Hamburg)

- Belongs to the German Ministry of Agriculture (established in 2000)
- Goal: develop and inspire the „organic farming of the future“
- 100 employees (35 scientists)
- Annual budget: 10 Mio. €
- Modern laboratories
- 600 ha organic research station

my office 😊 in Trenthorst
Prof. Dr. habil. Gerold Rahmann
President of ISOFAR, world board member IFOAM
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President of ISOFAR, world board member IFOAM
Good News - Bad News
World of Food and Farming

Food and Farming impressions from all countries of our World
Ethiopia 2015-2017: Establishment of the German project: *One World-No Hunger*
Two farm visits last days

Friday: Ethiopia
6 persons (woman lead), 1.5 ha farm land (wheat), 5 cattle, biogas, 500 USD/y
Tuesday: Finland
6 persons (woman lead), 220 ha farm land (forage, wheat), 60 cattle, biogas, 500,000 USD/y

Two farm visits last days
Future agricultural challenges:

- Enough, good and affordable food
- Fossil resources end:
  - 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
My 1st concern: 5 mio tons of pesticides are used per year (trend: increasing) (4 kg / ha; 0.7 kg / capita and year)
My 2nd concern: 100,000 tons of antibiotics are used in animal husbandry per year (trend: increasing, incl. resistant germs.

US and China scientists found already total resistant germs in hospitals; 75% of chicken in samples of German chicken have shown resistant E.Coli)
What needs to be initiated today to tackle with the challenges till 2050 and 2100?
<table>
<thead>
<tr>
<th>Major area</th>
<th>Population (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2015</td>
</tr>
<tr>
<td>World</td>
<td>7,349</td>
</tr>
<tr>
<td>Africa</td>
<td>1,186</td>
</tr>
<tr>
<td>Asia</td>
<td>4,393</td>
</tr>
<tr>
<td>Europe</td>
<td>738</td>
</tr>
<tr>
<td>Latin America and the Caribbean</td>
<td>634</td>
</tr>
<tr>
<td>Northern America</td>
<td>358</td>
</tr>
<tr>
<td>Oceania</td>
<td>39</td>
</tr>
</tbody>
</table>

Distribution of the world’s population by age and sex, 2015

# Land becomes scarce

<table>
<thead>
<tr>
<th>Year</th>
<th>billion people</th>
<th>Total available ha / capita</th>
<th>Agricultural ha / capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>7</td>
<td>1.7</td>
<td>0.83</td>
</tr>
<tr>
<td>2050</td>
<td>9</td>
<td>1.2</td>
<td>0.55</td>
</tr>
<tr>
<td>2100</td>
<td>11</td>
<td>1.0</td>
<td>0.45</td>
</tr>
</tbody>
</table>

Total land: 11 billion ha  
Total agricultural land: 5 billion ha
Ecological footprints of selected countries and regions

[Bar chart showing ecological footprints of different countries and regions, with labels for HIC, MIC, LIC, Africa, Burkina Faso, Egypt, Asia, China, Russia, Europe, Switzerland, Germany, Latin America, Argentina, Mexico, North America, USA, and Canada. The chart includes recent ecological footprints and carrying capacity.]
Organic can be one option to solve future problems.
The world of Organic Farming 2016

- Northern America: 3.0 mio ha
- Latin America: 6.6 mio ha
- Europe: 11.5 mio ha
- Africa: 1.2 mio ha
- Asia: 3.4 mio ha
- Oceania: 173 mio ha

Legend:
- Green: Agricultural land
- Orange: Other areas (Wild collection, beekeeping, aquaculture, forests, grazed non-agricultural land)

<table>
<thead>
<tr>
<th></th>
<th>USA and EU</th>
</tr>
</thead>
<tbody>
<tr>
<td>citizens</td>
<td>830 mio (11% of all)</td>
</tr>
<tr>
<td>organic farm land</td>
<td>14 mio ha (32%)</td>
</tr>
<tr>
<td>organic purchases</td>
<td>83 billion USD (92%)</td>
</tr>
</tbody>
</table>

(IFOAM 2016)
Future action areas for Organics
5 action areas up to 2050:
1. Conventional can learn from Organic

For example:

- Nutrient cycles
- Crop rotation & mix crops
- Improve animal welfare

Avoiding pesticides with machines and knowledge
2. Organic can learn from Conventional

- Global conventional grain\textsubscript{eq} yields:
  - 1961: 1.4 tons/ha
  - 2014: 3.9 tons/ha

- German organic grain\textsubscript{eq} yields:
  - 1961: 1.4 tons/ha
  - 2014: 2.4 tons/ha
3. Scale-up Good Organic Farming Practice

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

IFOAM 2015
4. Food production meets Food consumption
5. Farming has to change from “commodity related” towards “food needs related” production
+3 action areas for the time after 2050
Less or no livestock

we ♥ veggy

SEX YVE GGY
Local versus global food chains
Food back home
Food back town
Sustainable artificial food components
Artifical food components: why not Glucose from reactors?

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

Artifical sugar would probably need 100 ha for reactor space
Prof. Dr. habil. Gerold Rahmann
President of ISOFAR, world board member IFOAM
OUR AFFILIATES

784 organisations in 117 countries; representing 2.3 mio farmers, processor, trader, research institutions, ...

Prof. Dr. habil. Gerold Rahmann
President of ISOFAR, world board member IFOAM
Join us at the
19th Organic World Congress

9 - 11 November 2017 | New Delhi, India

Scientific Track

Innovative Research for Organic 3.0

The future challenges of global agricultural are severe.

Prof. Dr. habil. Gerold Rahmann
President of ISOFAR, world board member IFOAM
Global Organic Agriculture Research

„bring isolated scientists, ideas, and results together to support the development of the organic sector“

www.ISOFAR.org
Link between movement and public research

Universities

Governmental bodies

International public bodies

Organic companies

Organic movement (IFOAM etc.)

Environmentalist groups

Civil society organisations

Private organic research institutions

Organic companies

Civil society organisations

Environmentalist groups

Organic movement (IFOAM etc.)

Private organic research institutions

International public bodies

Governmental bodies

Universities
ISOFAR-International Organic Expo 2015 in Korea

Biggest Organic Event ever happen: 1 Mio visitors in 3 weeks.

Science meets the public
Organic Agriculture

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Editor-in-Chief: Gerold Rahmann

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Journal no. 13165

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<table>
<thead>
<tr>
<th>Human Development Index</th>
<th>Annual membership Fee*</th>
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<tbody>
<tr>
<td>Very High Developed Countries</td>
<td>60 Euro</td>
</tr>
<tr>
<td>High Developed Countries</td>
<td>30 Euro</td>
</tr>
<tr>
<td>Middle Developed Countries</td>
<td>15 Euro</td>
</tr>
<tr>
<td>Low Developed Countries</td>
<td>7.50 Euro</td>
</tr>
<tr>
<td>Sum</td>
<td>*students 50%</td>
</tr>
</tbody>
</table>

Why becoming member?

- Supporting the networking the global organic researchers
- Free access to Journal of Organic Agriculture
- Involved in scientific activities: conferences, reviews, statements
- Reduced fees for ISOFAR conferences
Thank you