A Global Perspective on Challenges for Biorisk and Facilities in Changing Agricultural Landscapes

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Agenda

1. Short introduction of FAO
2. Changing Agricultural Landscapes – changing biorisks
3. Challenges for bio risk and facilities due to world population growth
4. Challenges for bio risk and facilities due to climate change
5. Challenges for bio risk and facilities due to urbanization
6. Challenges for bio risk and facilities due to geo-political changes
7. Challenges for bio risk and facilities due to unequal economic growth
8. Challenges for bio risk and facilities due to intensifying global interconnection
9. Global perspectives
1. Short introduction of FAO- FAOs mandate

- Eliminating Hunger
- Fighting Poverty
- Caring for the Earth
The adoption of the Agenda 2030 shifted the focus from fostering sustainable production per se, to enhancing the contribution of the sector to the SDGs.
How do we get the job done?

- Putting information within reach
- Providing a meeting place for nations
- Sharing policy expertise
- Bringing knowledge to the field
FAO : emphasis on development

5th International Biosafety and Biocontainment Symposium, Baltimore, USA, 12 February 2019
821 million undernourished people in 2017

815 million go hungry

2. Changing Agricultural Landscapes - changing biorisks
Global biorisk today
Rinderpest today

Status of Rinderpest Virus in the Laboratories (Nov 2018)

Status in 2012: 35 countries storing

- Destroys/disquarters RRV (2011-2016)
- Destruction of virus to be officially reported to FAO and OIE
- Rinderpest Holding Facility (RHP)
- Holding RRV outside the RHP
- RHP in pathway of official designation
- Application for RHP under review
- Storing rinderpest virus (not to destroy virus)
- Reported absence of RRV since global declaration in 2011

5th International Biosafety and Biocontainment Symposium, Baltimore, USA, 12 February 2019
Changing agricultural landscapes and the rise of AMR

Estimates of the use of antimicrobials in the livestock sector in the World

63,153 tons used in livestock globally in 2010

Van Boeckel et al. Science, 2017
biorisk, biosafety, biosecurity and bio-threats
Changing disease landscapes
Drivers of global agricultural biorisk changes

- Population growth
- Climate change
- Urbanization
- Geo-political changes
- Unequal economic growth
- Intensifying global interconnection
3. Population growth

![World population growth, 1750-2100](image)

Growth not equally divided

The World Health Organization estimates that one third of the world is well-fed, one third is under-fed and one third is starving. By 2050 that number could be significantly larger when the world’s population is expected to reach a whopping 9 billion. The world’s driest regions in Northern Africa and the Middle East are also the fastest growing, putting them at an especially high risk of furthering the food crisis.
Growth in Africa and Asia

The world’s population will reach 8.6 billion by 2030 and 9.8 billion by 2050

Of the 2.2 billion expected half will be in Africa

Source: UN, World Population Prospects, 2017 Revision
Data visualization: FAO, AGAL, Livestock Policy Lab (LPL)
Challenges for biorisk and facilities due to world population growth
India, Sub-Sahara Africa, S.E. Asia

**DENSITIES OF RURAL POOR LIVESTOCK KEEPERS (2010)**

- Poor livestock keepers per km²
  - 0
  - 0.2 - 2
  - 2 - 5
  - 5 - 20
  - > 20
  - No data

Rise of the world population is rise of biorisk
4. Challenges for biorisk and facilities due to climate change

Projected impact of climate change on agricultural yields

* A key culprit in climate change – carbon emissions – can also help agriculture by enhancing photosynthesis in many important (...) crops such as wheat, rice, and soybeans. The science, however, is far from certain on the benefits of carbon fertilisation.*

This map represents the case of beneficial carbon fertilisation processes.

Change in agricultural productivity between 2003 and the 2080s

Source: Cline W., 2007, Global Warming and Agriculture.
Climate and natural resources use - Animal Feed

Global livestock feed ration composition

6 BILLIONTONNES
DRY MATTER

40% GRASS & LEAVES

19% CROP RESIDUES

8% FODDER CROPS

5% OIL SEED CAKES

5% BY PRODUCTS

3% OTHER NON-EDIBLE

13% GRAINS

edible to humans

inedible to humans

straws, stover, sugar cane tops, banana stems

grain and legume stubble, fodder by products

brans, corn gluten meal and feed, molasses, torrified and spent distillers grains, fish meal, synthetic amino acids, live

second grade cereals, meal, fish meal, synthetic amino acids, live

1% OTHER EDIBLE

edible to humans, beans or soy beans, rapeseed and sun oil
Agriculture and global water withdrawal

[Diagram showing global water withdrawal from 1900 to 2010, with data from AQUASTAT and Evaporation from artificial lakes.]
5. Challenges for biorisk and facilities due to urbanisation

Population and urbanisation

Asia and Africa

By 2030 the world’s population will be 60% urban and 40% rural

Source: World Urbanization Prospects
Data visualization: FAO, AGAL, Livestock Policy Lab (LPL)
Biorisk in urban environment
Reducing biorisks
Urban dairy
High densities of livestock in urbanized areas
Urban growth mainly in sub-sahara Africa
challenges for biorisk and facilities due to geo-political changes
Geopolitical food producing units

115 Geopolitical Regions X 126 Water Basins

281 “Food Producing Units”
Meltdown of Himalaya and biorisk
India, China and sub-Saharan Africa

Growth in Demand for Milk 2000 - 2030

Value in kg/sqkm
- < 0
- 0
- 0 - 200
- 201 - 500
- 501 - 1,000
- 1,001 - 2,500
- 2,501 - 5,000
- > 5,000

No Individual country data available for Europe

September 2011
7. Challenges for biorisk and facilities due to unequal economic growth
Extreme poverty is a biorisk

Globally there are 746 million people in extreme poverty (in 2013)

Sub-Saharan Africa (390 M)          South Asia (249 M)

<table>
<thead>
<tr>
<th>Country</th>
<th>Population</th>
<th>Country</th>
<th>Population</th>
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<tr>
<td>Nigeria</td>
<td>85.2</td>
<td>Democratic Republic of Congo</td>
<td>54.1</td>
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<tr>
<td>United Republic of Tanzania</td>
<td>23.3</td>
<td>South Africa</td>
<td>11.7</td>
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<td>Madagascar</td>
<td>17.9</td>
<td>Vietnam</td>
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<tr>
<td>Mozambique</td>
<td>16.9</td>
<td>Kenya</td>
<td>14.1</td>
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<td>Angola</td>
<td>7.4</td>
<td>Cameroon</td>
<td>19.8</td>
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<tr>
<td>South Sudan</td>
<td>8.5</td>
<td>Indonesia</td>
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<tr>
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<td>Pakistan</td>
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Est Asia & Pacific (74 M)

Source: FAO (2018) based on data from World Bank
The next years will see major changes in countries’ shares of global GDP

**2011**
- China: 17%
- India: 7%
- United States of America: 23%
- Japan: 7%
- Other OECD: 18%
- Other non-OECD: 11%
- Euro area: 17%

**2030**
- India: 11%
- China: 28%
- United States of America: 18%
- Japan: 4%
- Other OECD: 15%
- Other non-OECD: 12%
- Euro area: 12%

Source: OECD, 2012
Growth of middle class

While increasing Chinese spending tops the news, the East Asia Bureau of Economic Research forecasts that spending in India and Indonesia will grow at similar rates.
2050: 70% Rise in the demand of animal protein
Growth in global meat production

Poultry meat will remain the primary driver of growth in global meat production

Source: OECD-FAO Agricultural Outlook 2017-2026
Rising demands for animal source foods

The demand for animal source foods is expected to increase by 2030

Source: OECD-FAO Outlook, 2017
8. intensifying global interconnection
Any Transport is a biorisk
9. Global perspectives

Meat stand in Côte d’Ivoire
Food Safety essential to reduce animal-human biorisks

Rate estimate of sheep and goats slaughtered at slaughter houses / slabs

N.B. Since herd turnover of sheep and goats is approx. 3 – 4 years normally in Africa, the above rates were estimated as:

\[ \text{Number of sheep and goats in official slaughter record} / (\text{total population and import of sheep and goats of the country} / 4) \]

- at a slaughtered houses/slabs
- consumed without slaughterhouses/slabs

- Egypt: 16%
- Djibouti: 48%
- Guinea-Bissau: 3%
- Sierra Leone: 10%
- Liberia: 4%
- Ghana: 4%
- Benin: 4%
- Nigeria: 4%
- Cameroon: 4%
- Tanzania: 10%
- Zambia: 2%

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Shift towards large scale farming with routine use of antimicrobials and new biorisk challenges
Pastoralists in Mongolia
Pastoral intensification in Mongolia
Animal health management

Overview of holistic animal health management. A continuous dialogue between the farmer and veterinarian is crucial in this process.

- Good Animal Husbandry
- Effective Biosecurity
- Improved Animal Health, Welfare and Productivity
- Prudent and Medically Efficient Use of Antibiotics
- Relevant Vaccinations
Good animal husbandry forms the basis of disease prevention, effective biosecurity act as a broad-range filter of infectious agents and vaccinations target specific pathogens.
Farm security is the basis of biorisk prevention

Effective biosecurity protects the farm from introduction and spread of infectious diseases.
Prevent: Some FAO Biorisk tools
Prevent: Raising awareness

15 May

Improving the livelihoods of small-scale livestock producers through the farmer field school approach
DETECT:
FAO-OIE-WHO
Global Early Warning System (GLEWS)
RESPOND: EMPRES (Emergency Prevention System) and EMC

Modernize and Rebrand

- **Purpose:**
  To enhance country, regional and international capacity to be better prepared to respond to animal health emergencies.

- **Vision:**
  A world prepared to manage high impact animal health emergencies.
Conclusions

- Investing in good animal husbandry and veterinary services is key to reduce biorisks.
- Agriculture is a locally oriented, continuously developing human activity.
- Drivers of changing global agricultural landscapes will continuously increase global biorisk.
- Everything outside any Agricultural Facility is a Biorisk for that facility.

Farming is local, Agriculture is regional, Biorisk is global.
a Biorisk anywhere

Is

a Biorisk everywhere
• Thank You

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