

**Biosecurity:  
Which Path of Progress  
In A NAE Poultry Production Scenario?**

**Mark Alistair BEGHIAN**  
Unitec srl



# The Industry Model Is A Kind Of Building?

Raffaella – è meglio foto di Sir Winston? La cartolina si riferisce di più al concetto di «building»

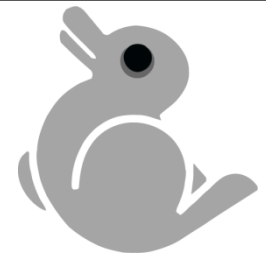


«We shape our buildings;  
thereafter they shape us.»

Winston Churchill  
1874 -1965

Statesman. Army Officer. Writer. Nobel Prize. Greatest Briton.

## ABF POULTRY PRODUCTION: A PARADIGM SHIFT?



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# City Planning: Landmarks Or *Perspectives*



**MINDSET ALWAYS MARKS THE DISRUPTION WITH THE PAST**



# AMR: Need 4 High Performing Frontline

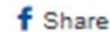
## Study finds MCR-1 is widespread in Chinese ecosystem



Center for Infectious  
Disease Research & Policy

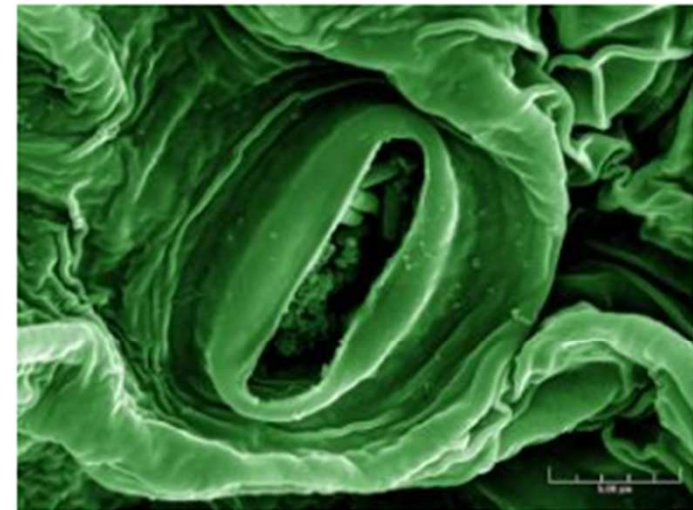
Filed Under: **Antimicrobial Stewardship; E coli; Foodborne Disease; MCR-1**

Chris Dall | News Reporter | CIDRAP News | Sep 29, 2017



New research out of China indicates that the colistin-resistance gene MCR-1 is prevalent in the country's water supply, animals, food, and human population.

In a study yesterday in *Eurosurveillance*, a research team from Hong Kong Polytechnic University reports that MCR-1-harboring bacteria, mainly *Escherichia coli*, were detected in 71% of water samples, 51% of farm animal fecal samples, 36% of food products, and 28% of human subjects. The researchers say the findings indicate the gene, which was first discovered in China in 2015, will not only be difficult to eliminate, but could potentially spread in the hospital environment within a short period.



Texas A&M AgriLife Research / Flickr cc

E coli growing inside the stoma of a lettuce leaf.



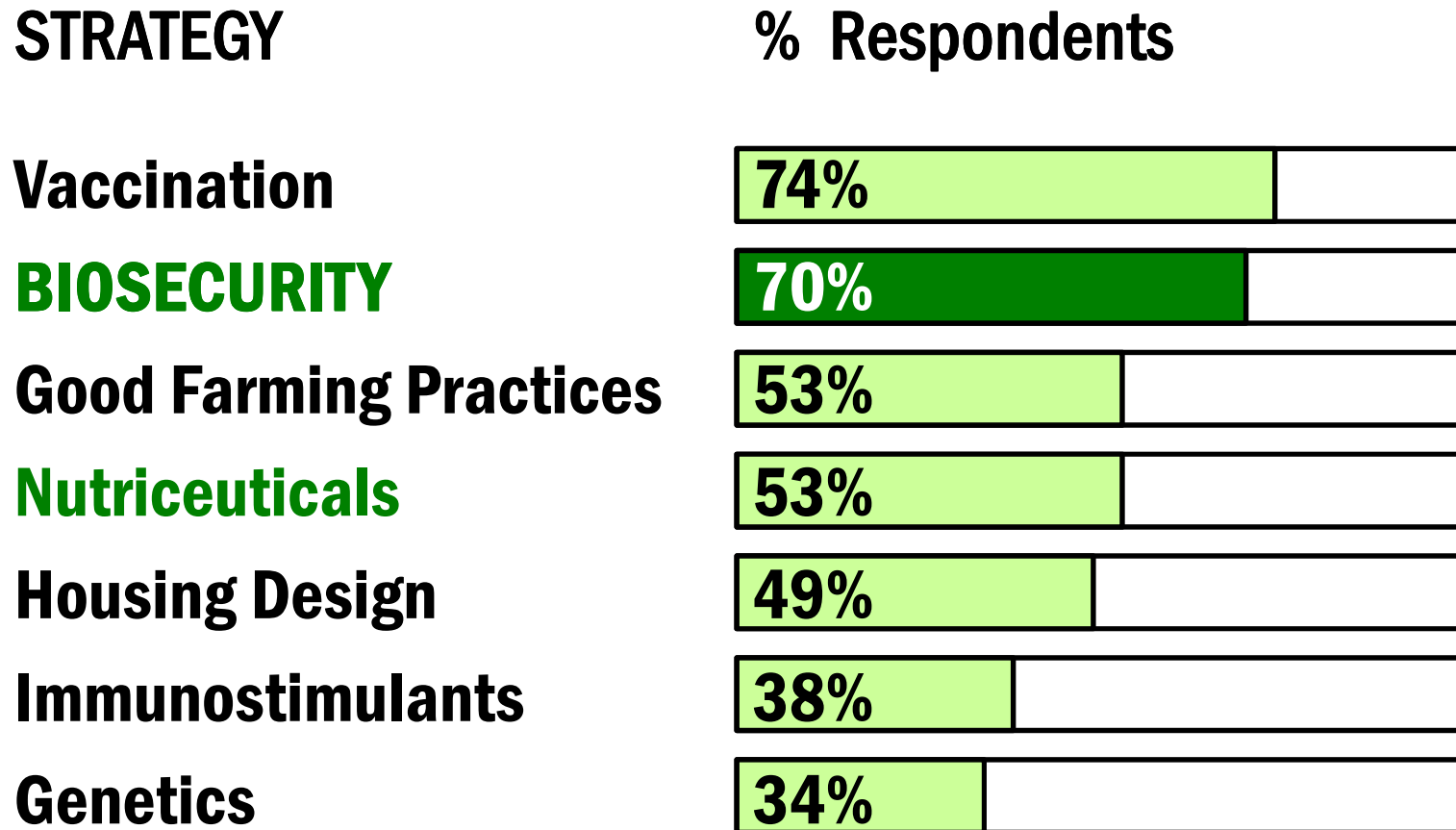
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# Which Strategy To Reduce Antibiotics?



Source: Brakke Consultants (USA) – New Animal Health Strategies (16/01/2017)



# Biosecurity: Perspective 4 ABF Production

**POULTRY  
WORLD**

Health

Background | Sep 4, 2017 | 3418 views

## Gut health and immunity key in antibiotic-free poultry production

There is a global urgency to reduce antibiotic use, and more and more poultry producers are showing that it is possible to reduce or eliminate antibiotic use without sacrificing performance and health. A key emphasis has been placed on bird immunity and gut health.



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**6**



# Top-7 Actions 4 ABF Poultry Production

## STEP ACTION

## RECOMMENDATION

**Downtime**

**≥ 14 days, C&D protocols**

**Stock Density**

**+ 0.05 sqft/bird than conventional**

**Litter Management**

**Dryness + ammonia control**

**Environmental Control**

**T°C, %RH, air quality**

**Pre-starter Feed**

**Diet strategy/design**

**Water Quality**

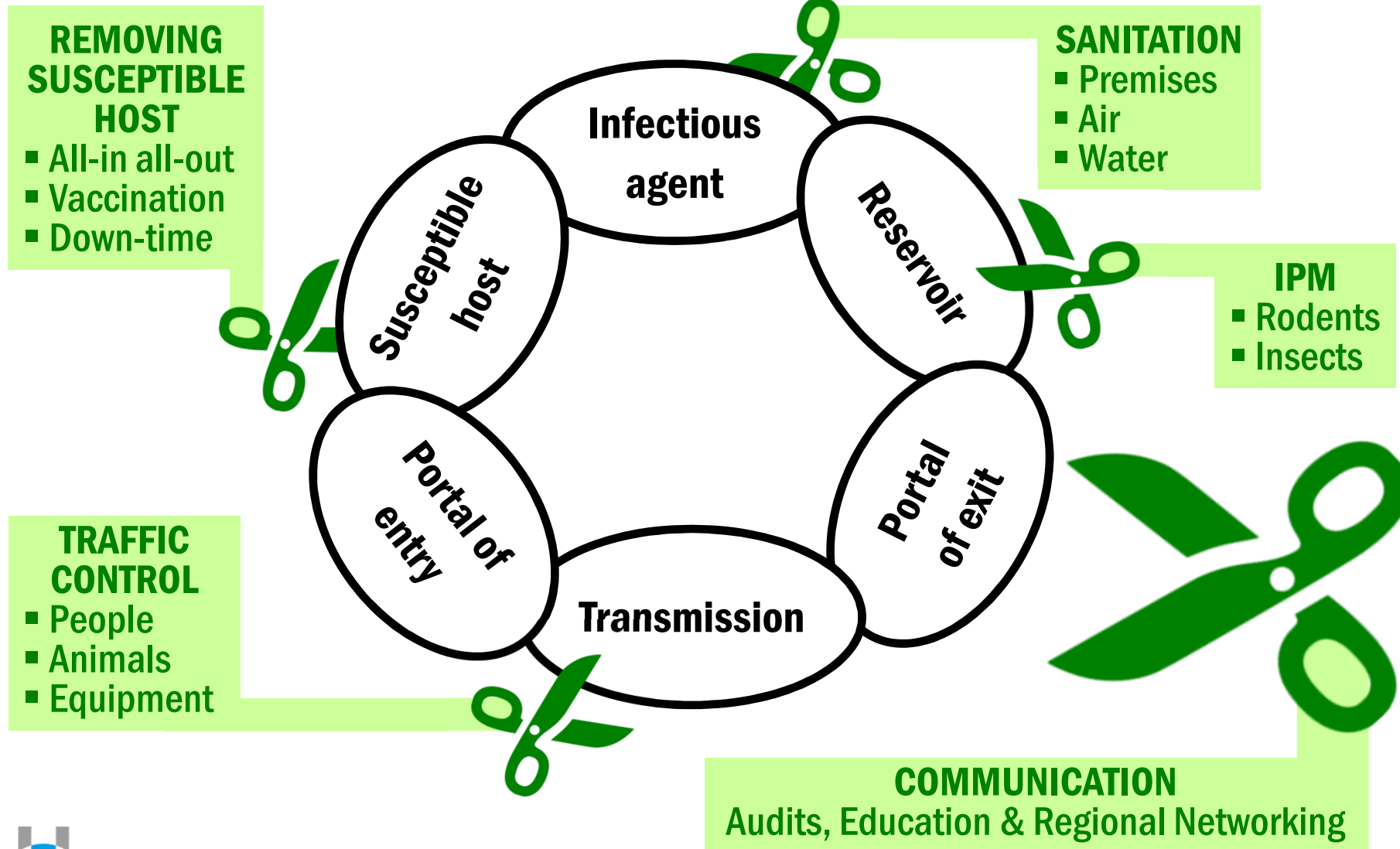
**Sanitation, biofilm control**

**Functional Feed**

**Nutriceuticals**



# Biosecurity: The “Vintage” Vision







# Time To Wear The (Re)thinking Hat!



January 24, 2017

Reducing the use of antimicrobials and finding alternatives is not enough.



There is a need to re-think the livestock system by implementing farming practices that prevent the introduction and spread of the disease into farms and by considering alternative farming systems which are viable with reduced use of antimicrobials.



EUROPEAN MEDICINES AGENCY  
SCIENCE MEDICINES HEALTH

Education and awareness of AMR should be addressed to all levels of society but in particular to veterinarians and farmers.



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# Doing Biosecurity: A *HandFULL* Of Issues

## 1. Mega-Trend Impact

Climate change/OneHealth Approach

## 2. The Whirlwind in Daily Farming

Field Cases From H5N8 Outbreak

## 3. Biosecurity A Management Tool

From Strategy To Execution

## 4. Economic Sustainability

Cost/Benefit Appraisal

## 5. Takehome Messages

Step Actions in ABF Production





# Biosecurity In ABF Production: Issue # 1



## The Impact of Mega-Trends



# Changing Times In A Changing World



Courtesy  
Vaillancourt JP., 2016

**"Pathogens are now transported in the world faster than their average incubation period"**

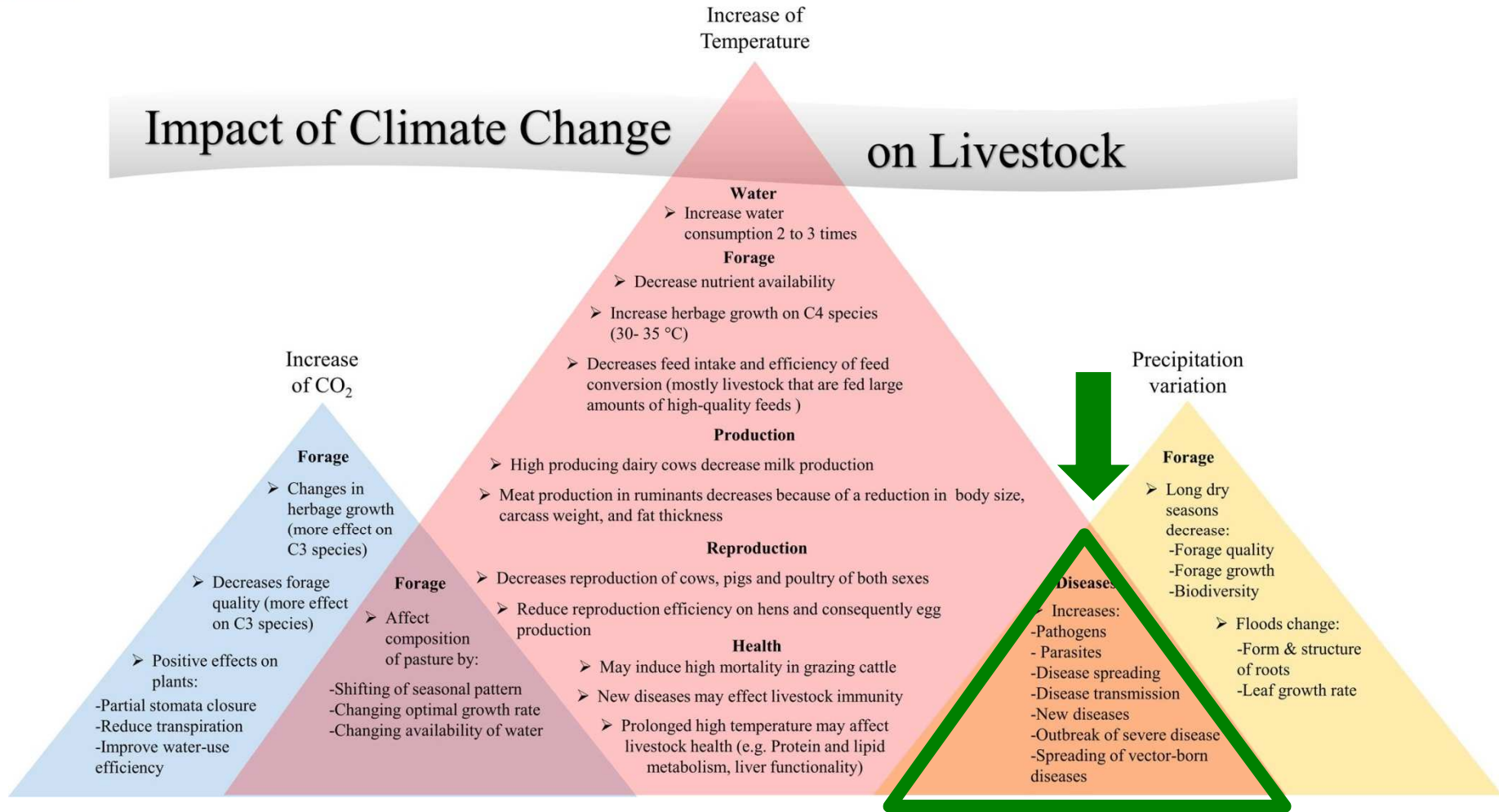
**"Climate change and human behaviour allows for the colonisation of new territories by vectors and the pathogens they carry"**

Bernard Vallat, Director of OIE, 2011





# Climate Change Risk Management

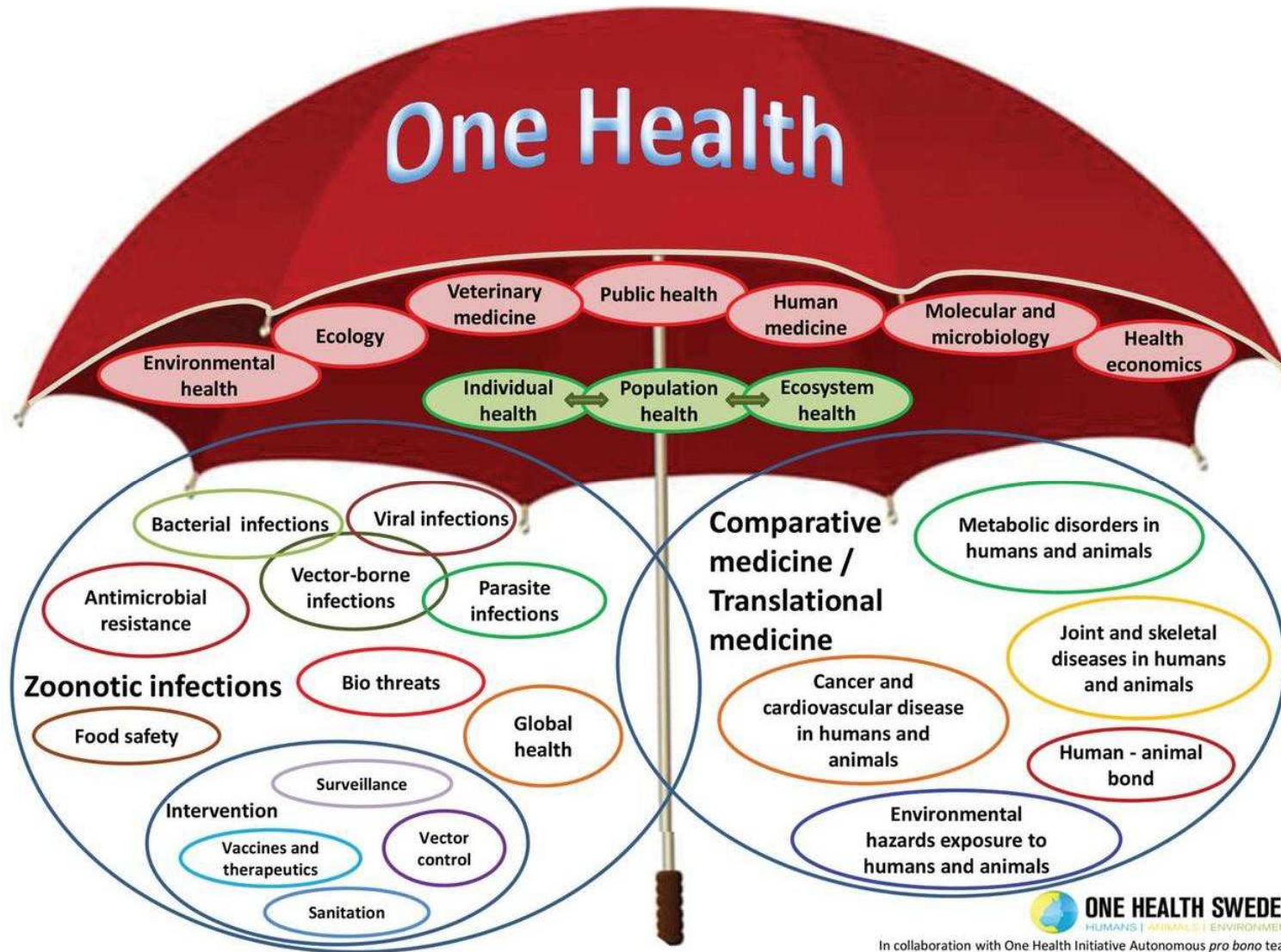


Source: Rojas-Downing MM et al. Climate change and livestock: impacts, adaptation and mitigation (2017)





# The OneHealth Approach



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# OneHealth: A Different Mindset vs AMR



Human, animals and environmental health systems are interconnected and co-reliant. We all need to **use antibiotics responsibly**



# Disease: More Than A Productivity Loss

Health for Animals

UP TO **20%**  
OF GLOBAL ANIMAL  
PRODUCTION IS LOST  
TO DISEASE

The infographic features a central globe surrounded by animal icons. A blue arc on the left side of the globe contains several icons with a red 'X' over them, indicating disease-affected regions. The background is orange.



WORLD ORGANISATION FOR ANIMAL HEALTH  
*Protecting animals, preserving our future*



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# Poultry Disease: A «Billionaire Waste»

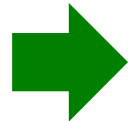


20% OIE = €€€€€€

€ 1,000,000,000

Tabella 1.2 – I valori economici della filiera avicola per fase produttiva in Italia

ALLEVAMENTO	
Totale PLV avicola (2015*, mln €)	4.200
- carne avicola	2.850
- uova	1.350
TRASFORMAZIONE	
Capi macellati totale avicolo (2015, milioni)	570,5
- polli e galline	533,8
- tacchini	30,3
- altre specie avicole	6,4
Produzione di carne (2015, .000 t)	1.307
- polli	915
- tacchini	313
- altre specie avicole	79
Produzione di uova da consumo (2015, miliardi)	12,8
Fatturato (2015, mln €)	5.650
- carne avicola	4.600
- uova	1.050
COMPARTI COLLEGATI	
Produzione di mangimi per l'avicoltura (2015, .000 t)	6.000
Fatturato dei mangimifici** (2014, mln €)	6.360



\*Stima.

\*\*Il dato si riferisce al fatturato complessivo dell'industria di produzione di alimenti zootecnici.

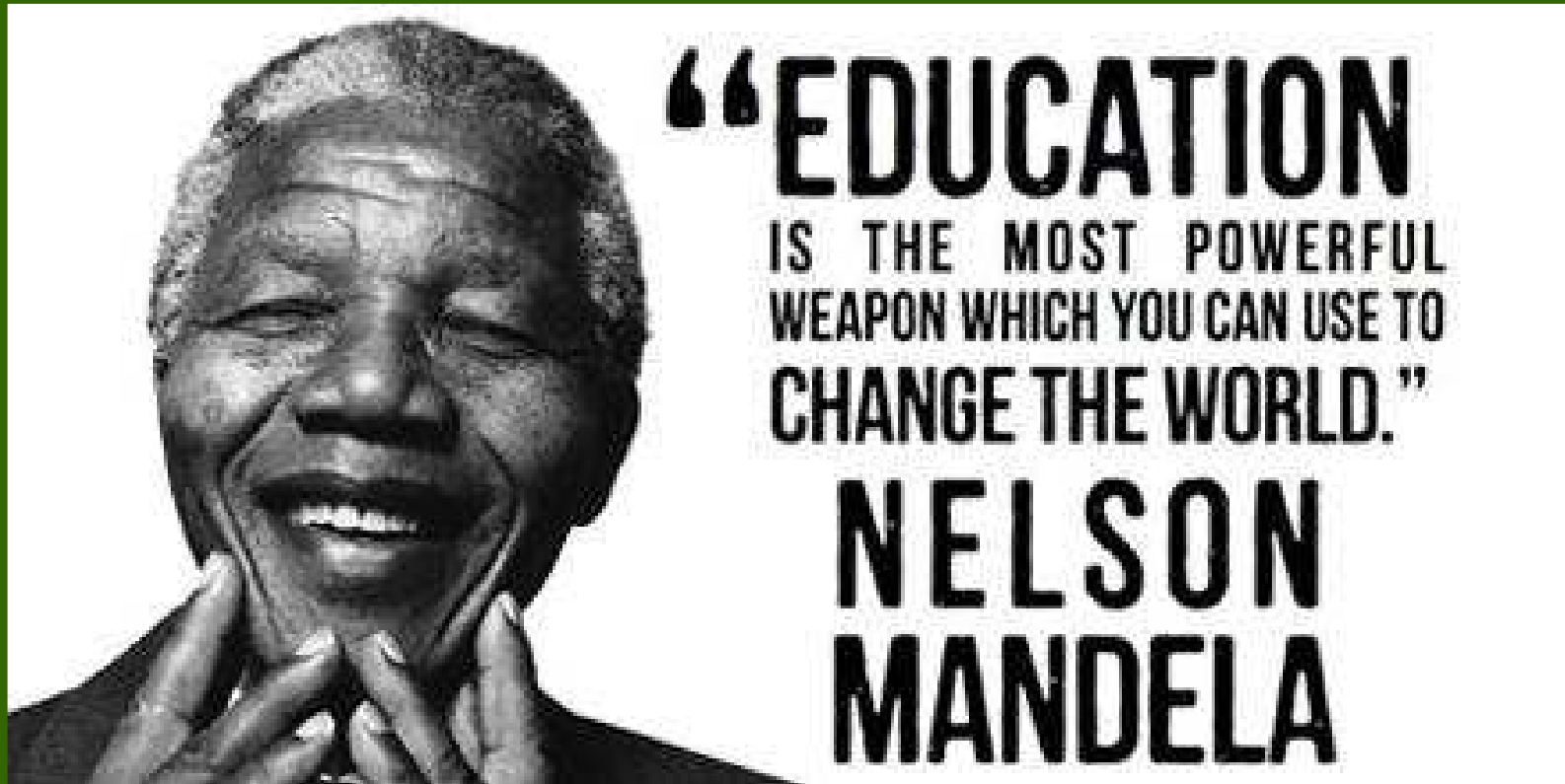


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# Biosecurity: A Multifaceted *Inner*Attitude





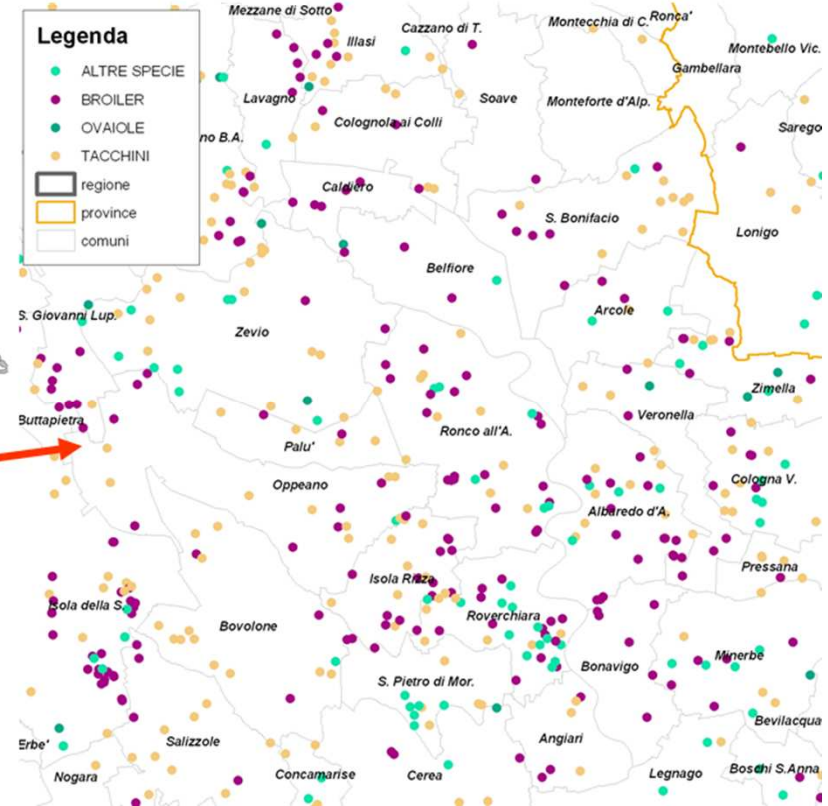
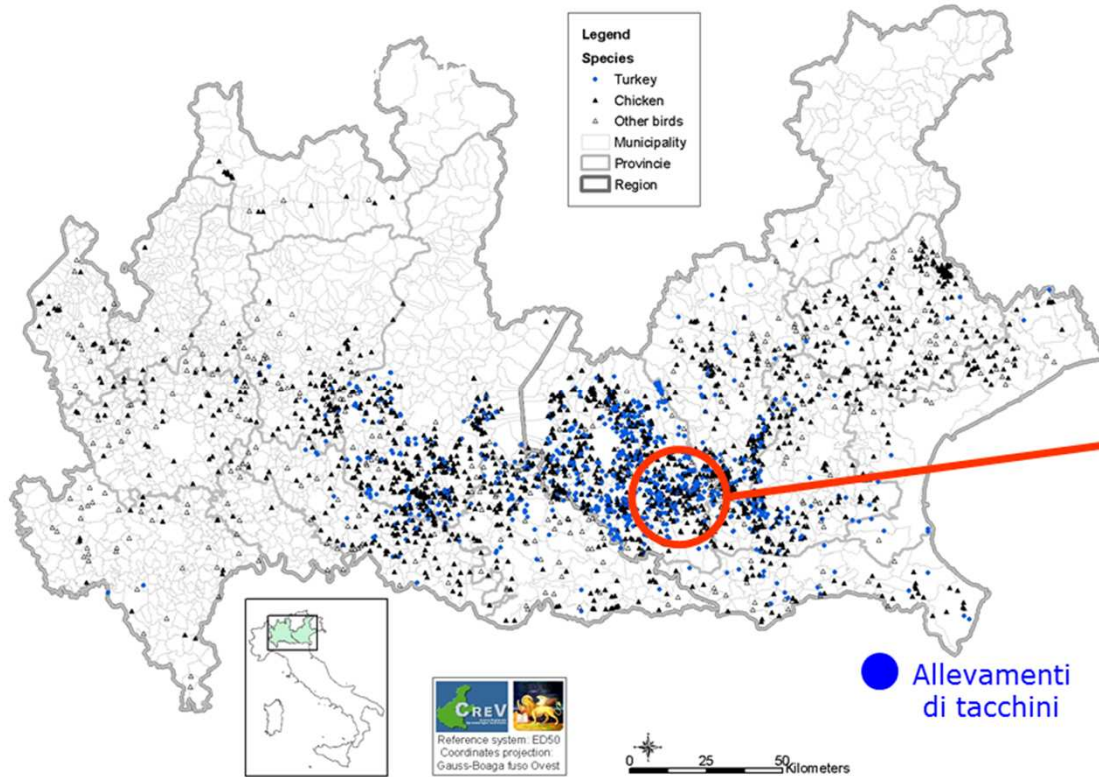
# Biosecurity In ABF Production: Issue # 2



## The Whirlwind In Daily Farming



# H5N8: The Po Valley Proximity Issue



← 250 miles →  
< 30% JNB - CPT

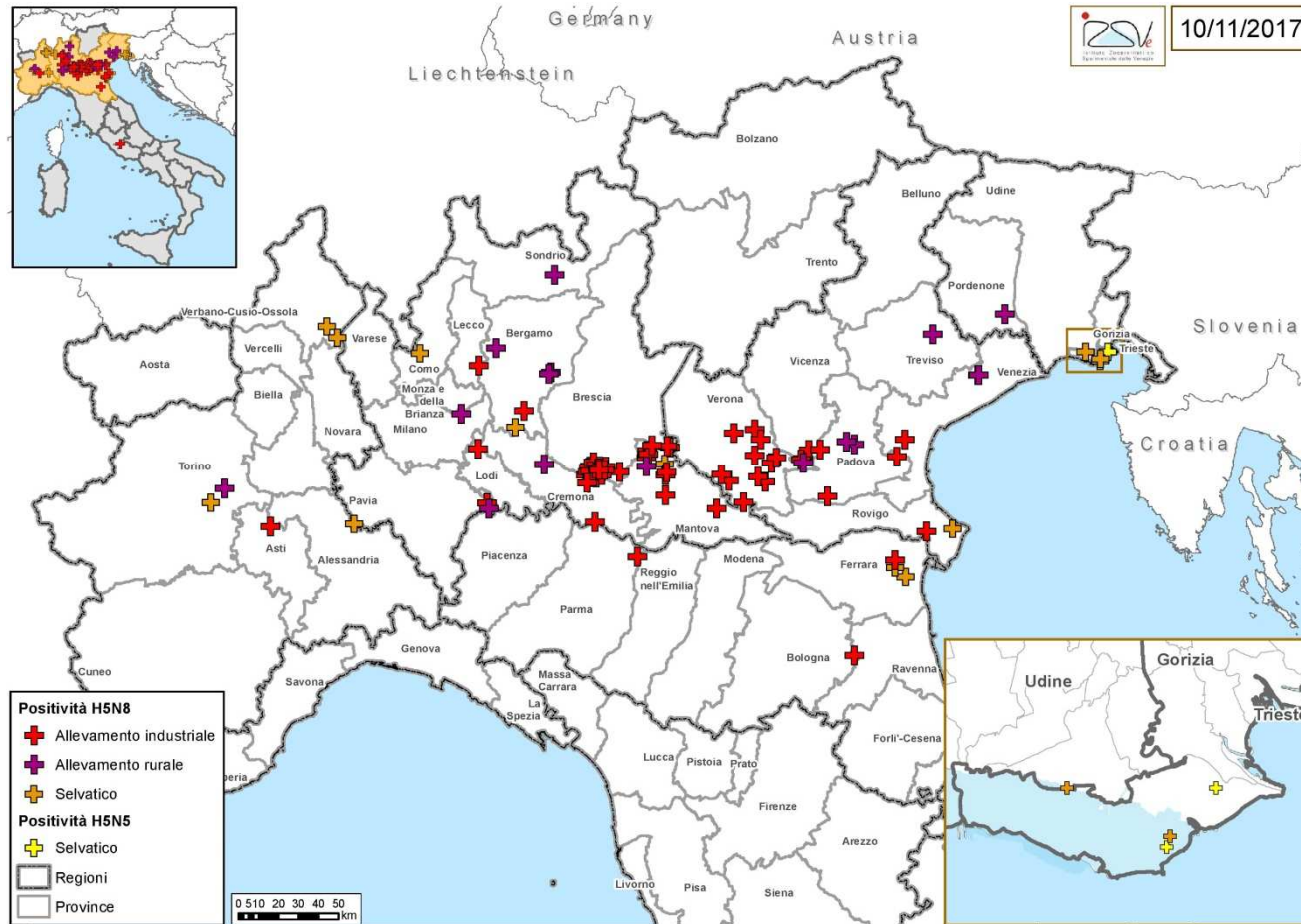


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# H5N8: Map of Outbreaks – Nov. 11, 2017



Istituto Zooprofilattico delle Tre Venezie



Mark Alistair Beghian



# H5N8: A 9/11 Outbreak Case Study

**Influenza aviaria in un allevamento, abbattute 1.600 anatre e oche**  
*Focolaio scoperto dall'allevatore: animali soppressi nel giro di 48 ore, danno di almeno centomila euro di Nicola Cesaro*

**Compensation**

**Nizzetto Poultry Farms**  
13,000 sqm  
18.5 broilers/sqm  
50 days «forced» downtime  
€100K+ lost profit at € 9/sqm

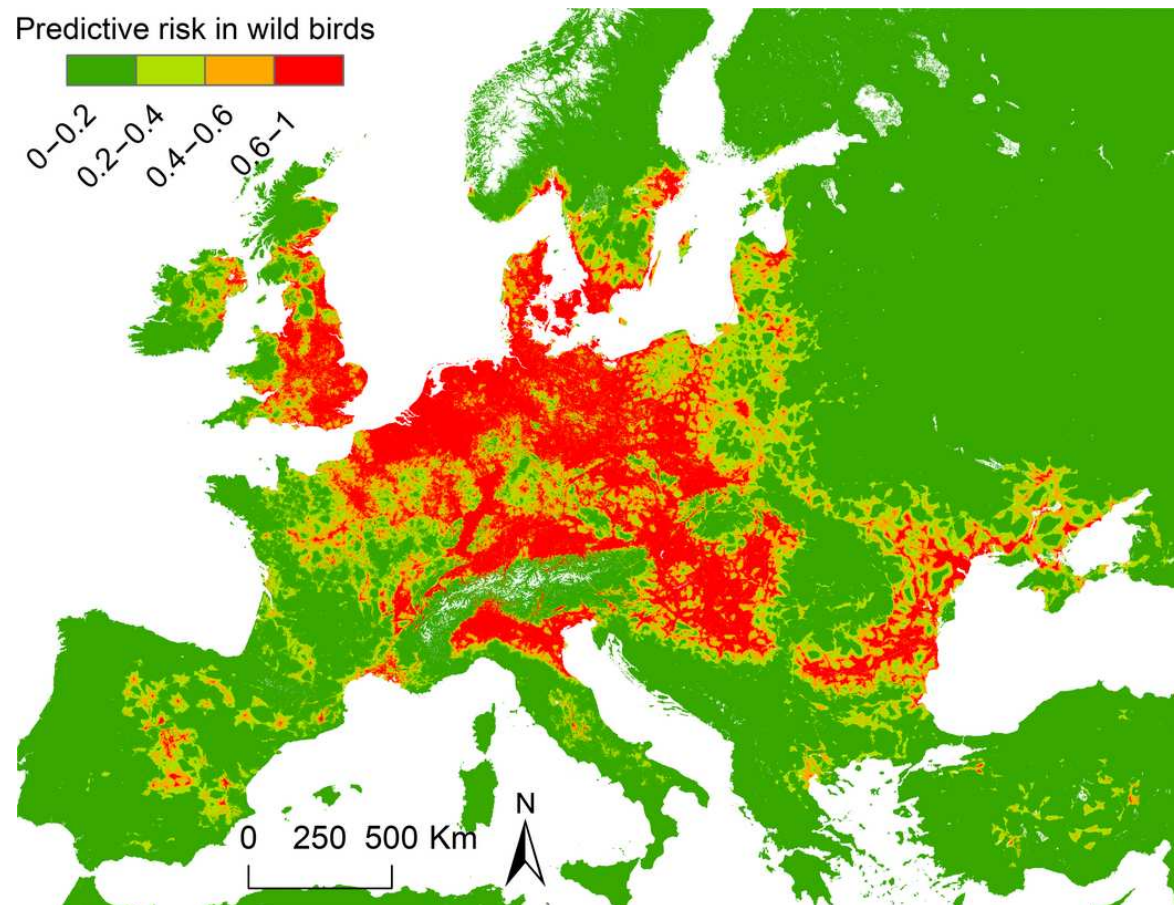
**Farm Direct Cost/Loss**

< 500 yards

© 2017 Google



# H5N8: Relative Risk Map Wild Birds in EU



EFSA Journal

Volume 15, Issue 10, 16 OCT 2017 DOI: 10.2903/j.efsa.2017.4991

<http://onlinelibrary.wiley.com/doi/10.2903/j.efsa.2017.4991/full#efs24991-fig-0013>



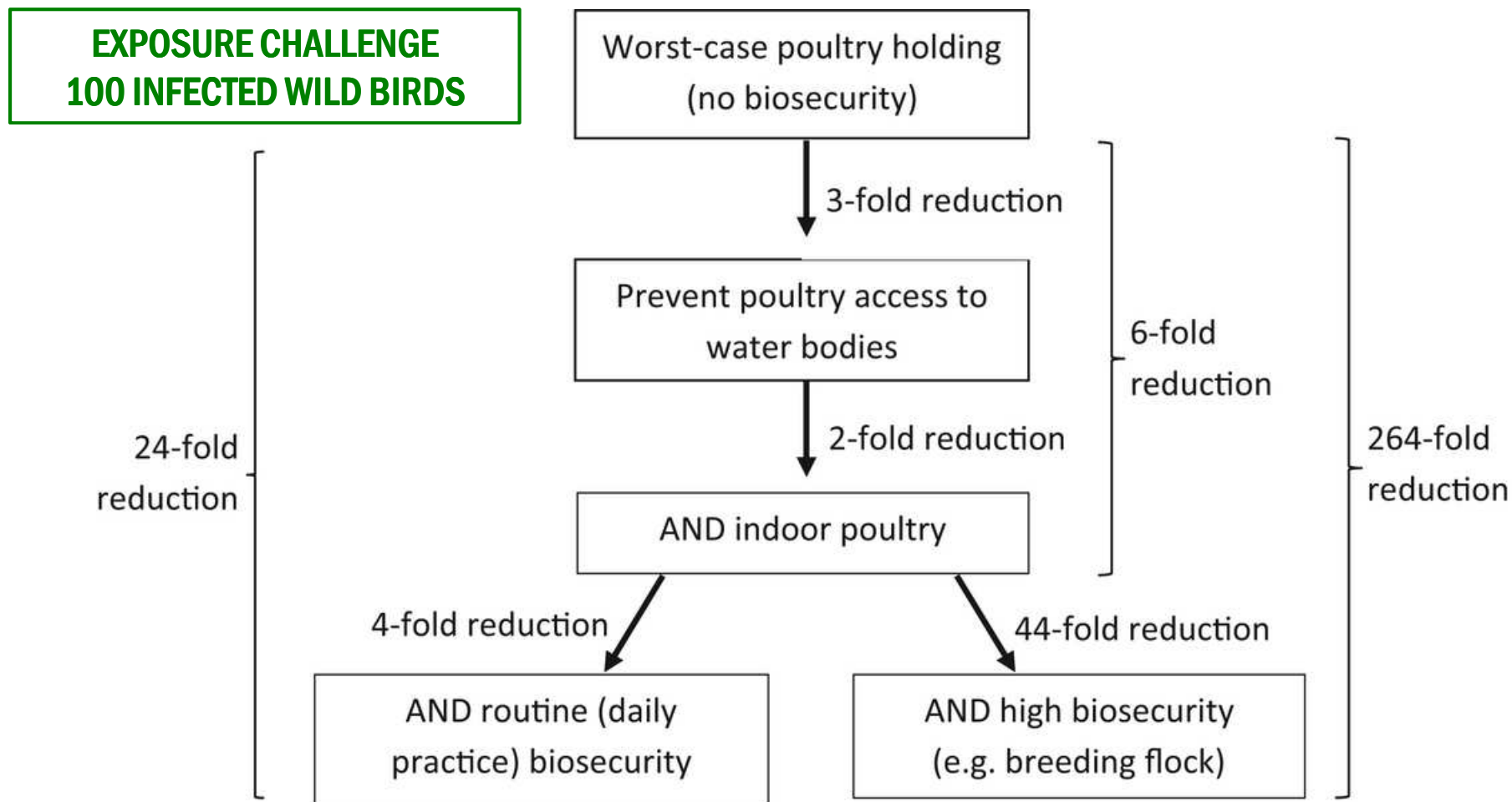
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# H5N8: Outcome Of 'Wartime' Biosecurity



EFSA Journal

Volume 15, Issue 10, 16 OCT 2017 DOI: 10.2903/j.efsa.2017.4991

<http://onlinelibrary.wiley.com/doi/10.2903/j.efsa.2017.4991/full#efs24991-fig-007>



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# Biosecurity In ABF Production: Issue # 3



## Biosecurity A Management Tool



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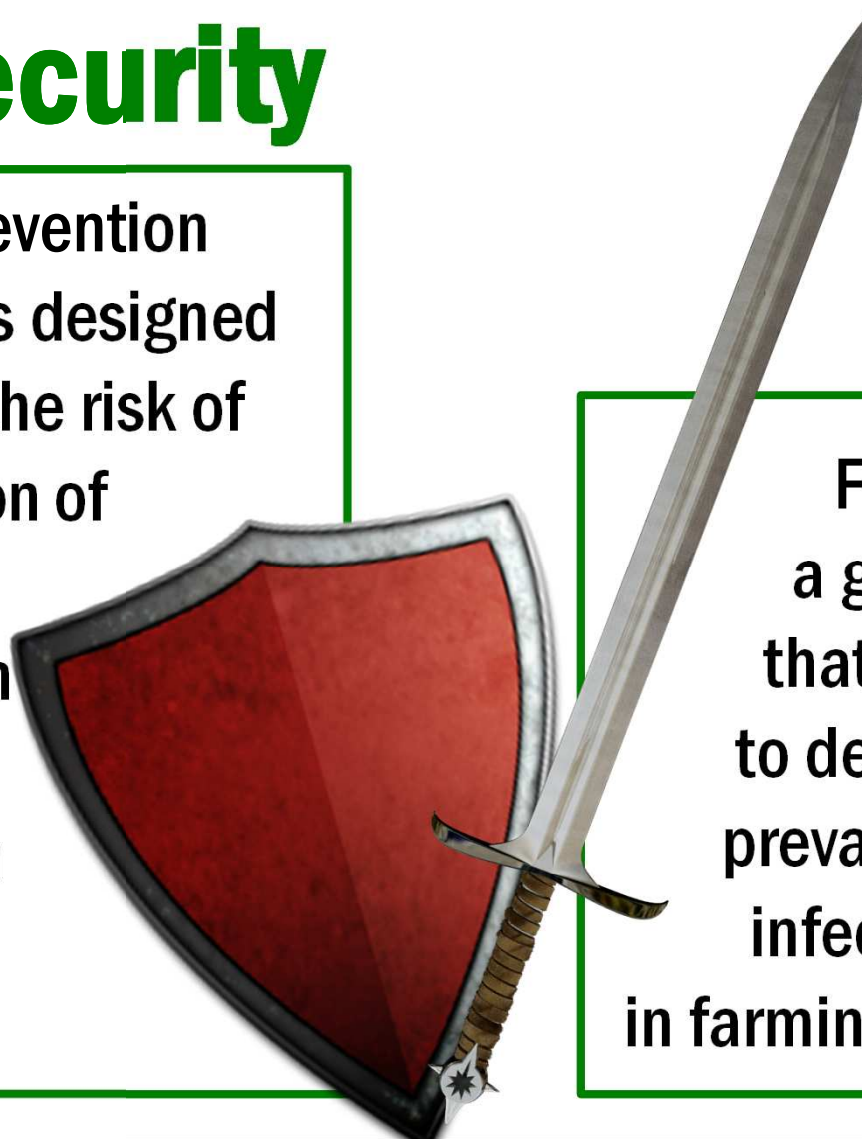
25



# Not A Matter Of Semantics Only

## Biosecurity

A set of prevention procedures designed to reduce the risk of transmission of infectious diseases in animal production



## C&D

Farm hygiene is a group of actions that have the goal to decrease the prevalence of infectious agents in farming environments





# Biosecurity & C&D: Integrated Approach

## Biosecurity

### Structural

linked to the farm



### Behavioural

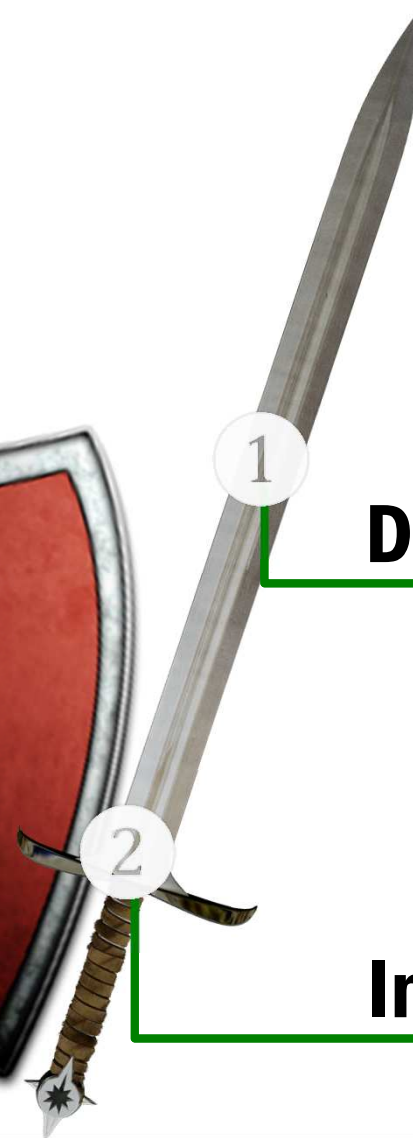
related to the men

## C&D

### During downtime

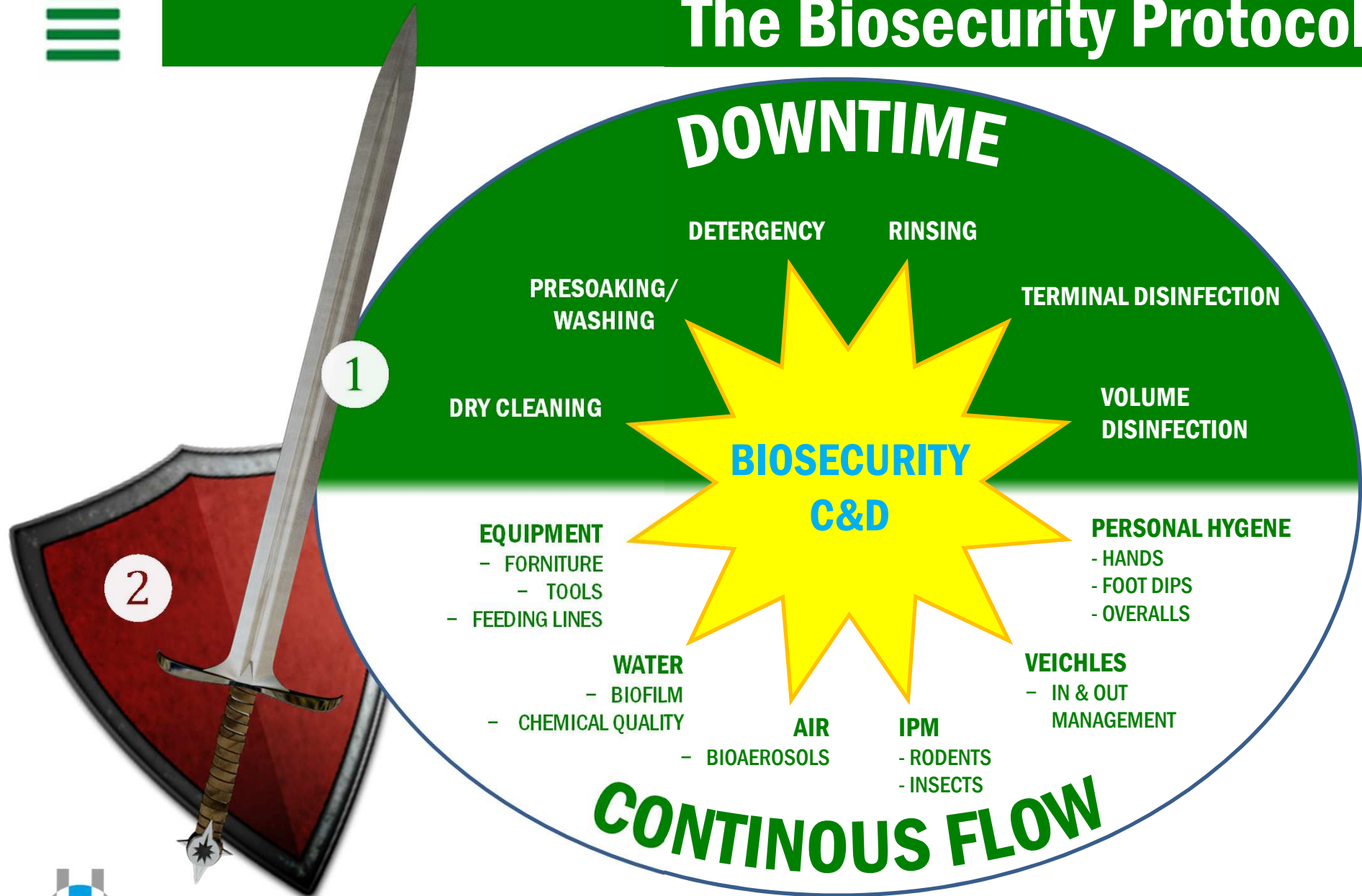
(whole farm or a part of it)

### In continuous flow





# The Biosecurity Protocol





# Biosecurity: A Quality Assurance Provider



## Biosecurity Structural

Requirement	Application	Compliance
Major/Minor	Yes/No	Fully/Partly/Not

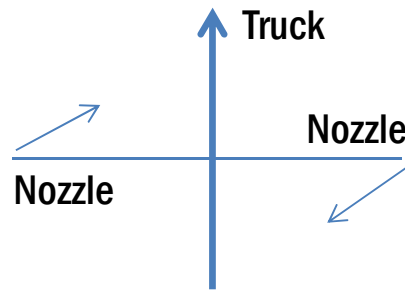
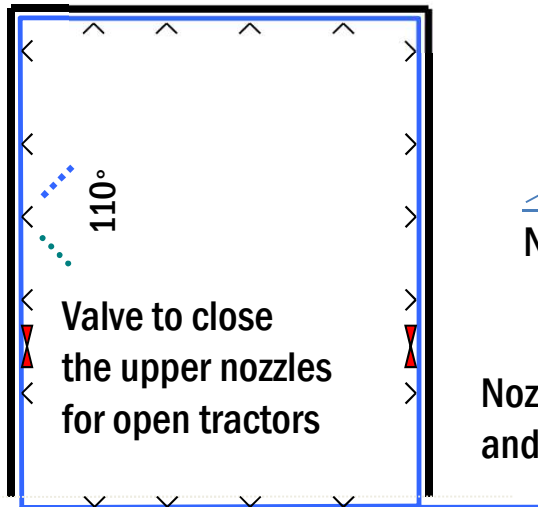
### Check-list

- Visitor Log Book at Farm Gate
- Parking Lot (availability of shoe overall)
- Disinfection Arch (design)
- Fences
- Dead Animal Disposal & Management (different access-concrete floor)
- Farm Pathways (covered/disinfectable)
- Restrooms
- Passing Through Showers
- Dressing Code (different shoes/colored overalls)
- Foot Dips
- Hand Hygiene
- Quarantine Room (small item decontamination)
- Laundry Facility
- Appropriate Boots/Shoes
- Biosecurity Critical Control Points Signpost



# Some Useful Insights

## Biosecurity Structural



Nozzles angle alternately 80° and 110° to spray all the surfaces

### Disinfection Arch

Main Features to consider are:

- number of nozzles (Poultry/Pig)
- pump flow rate
- nozzle width



Fences/Gate  
Disinfection Arch



Passing trough shower



# Some Useful Insights

## Biosecurity Behavioural



### Boots/Shoes Recommendations

- Smooth shaft for hygienic cleaning
- Dirt repellent design
- No organic material in the foot dips

### Biosecurity Signposts

Individual signposts placed at the appropriate position and overall signpost at main office for vocational training





# Thinking like a Quality Assurance Scheme



## Biosecurity Behavioural

Set And Share Operating Procedures

Ex.

Farm Staff

Visitors

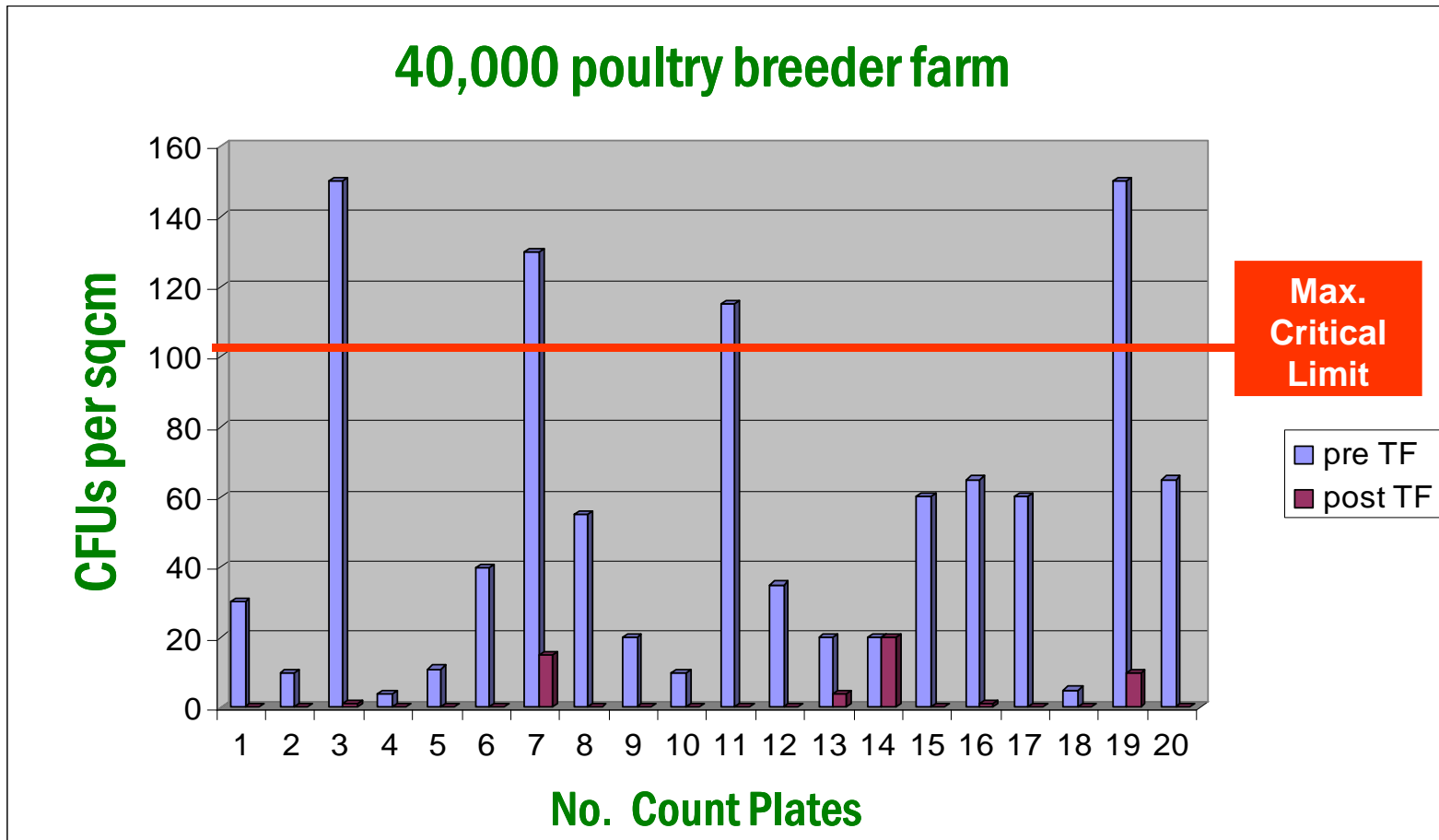
Suppliers

**Medium-term goal: FOSTERING  
a biosecurity oriented mindset on the farm.**





# Biosecurity Outcome In Poultry Farms



Source: AIA Veronesi – Italy (personal communication, 2009)



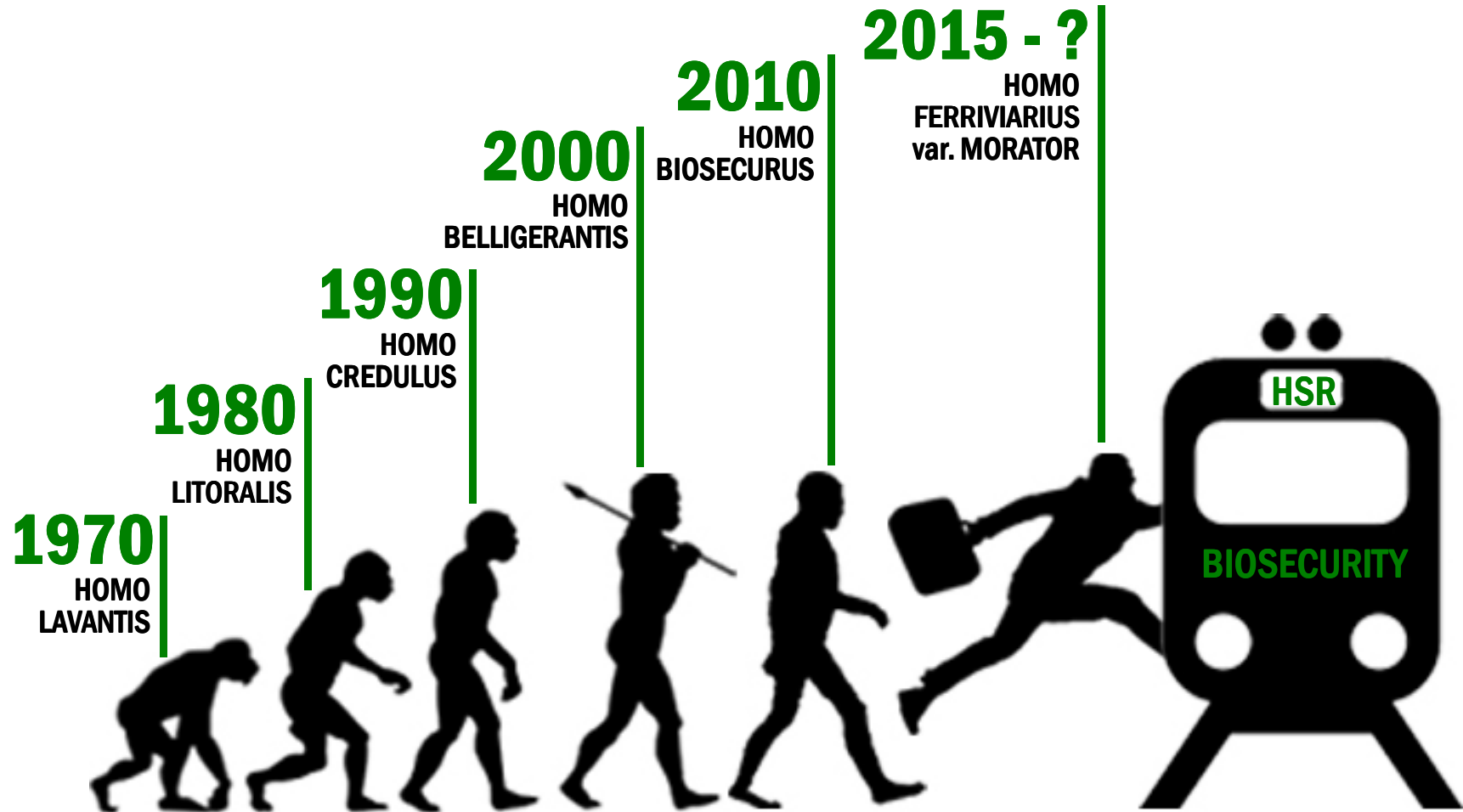
# Golden Biosecurity: A True Teamwork



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# Biosecurity: *Anthropological* Review



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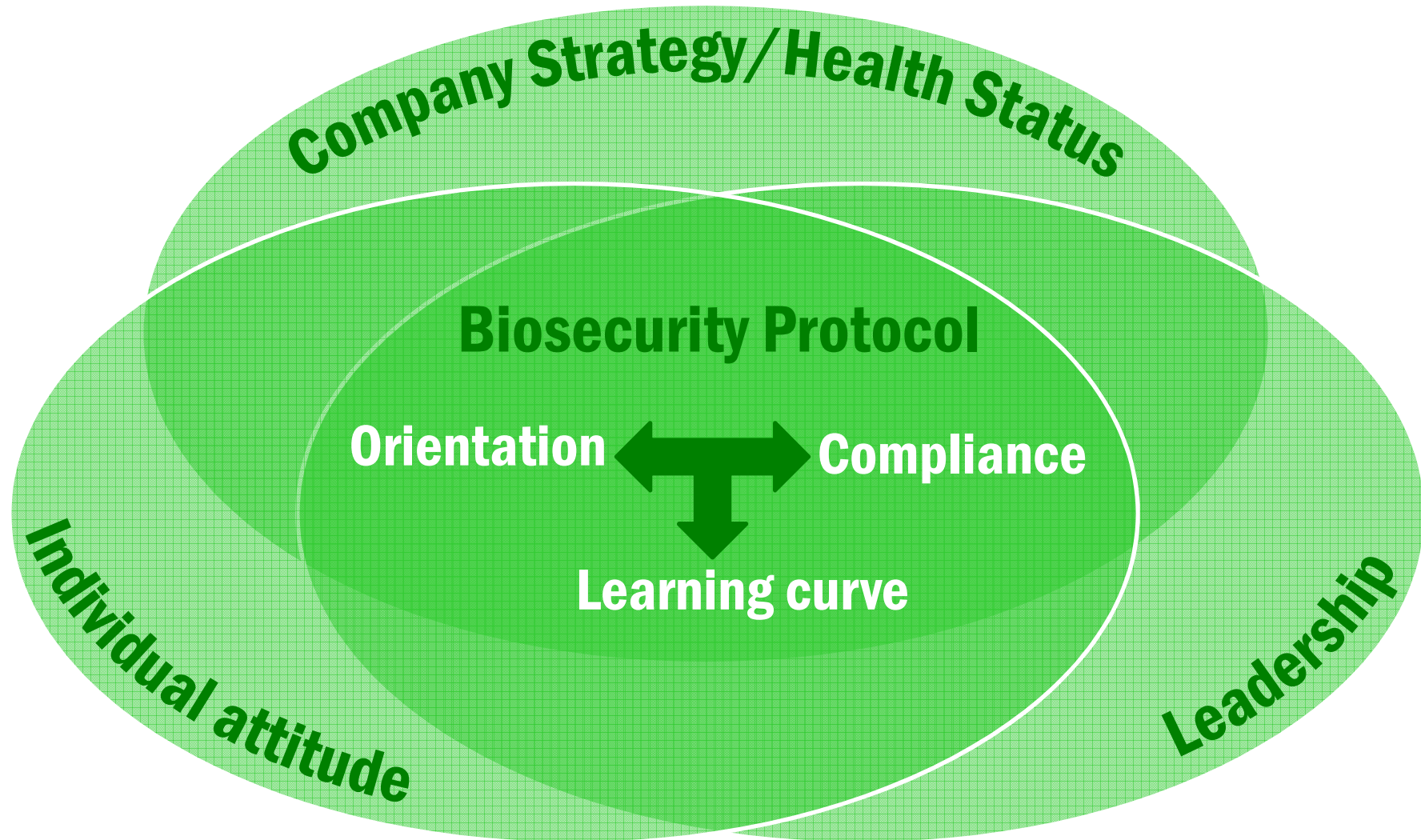


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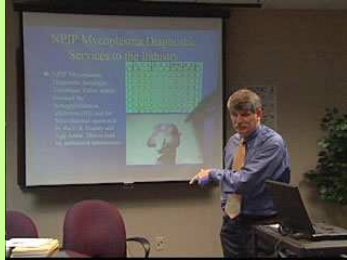


# Learning Curve: On-Farm Dynamics





# Biosecurity: No Stop HR Coaching



Clarity	42%
Commitment	18%
Discipline	50%
Enabling	10%
Collaboration	33%
Trust	30%
Accountability	50%

**100% COMMUNICATED**

**3% ADOPTED**



Covey S., 2003





# Biosecurity Compliance # 1

## Control group

- No intervention
- Hidden camera in entrance
- Non functional camera elsewhere in the barn



- Certificate from the ethic committee for research on human beings
- Participants knew they were filmed >>> had to agree to take part in the study

Racicot et al. 2011





# Biosecurity Compliance # 2

Set up of instructions regarding entry and exit biosecurity measures according to grower specifications

## Control group

- Hidden camera in entrance
- Non functional camera elsewhere in the barn
- No intervention

## Audit group

- Hidden camera in entrance
- Non functional camera elsewhere in the barn
- 3 audits in 6 months
- Poster

## Camera group

- Visible camera in entrance for 6 months
- Poster advising that monitoring is done

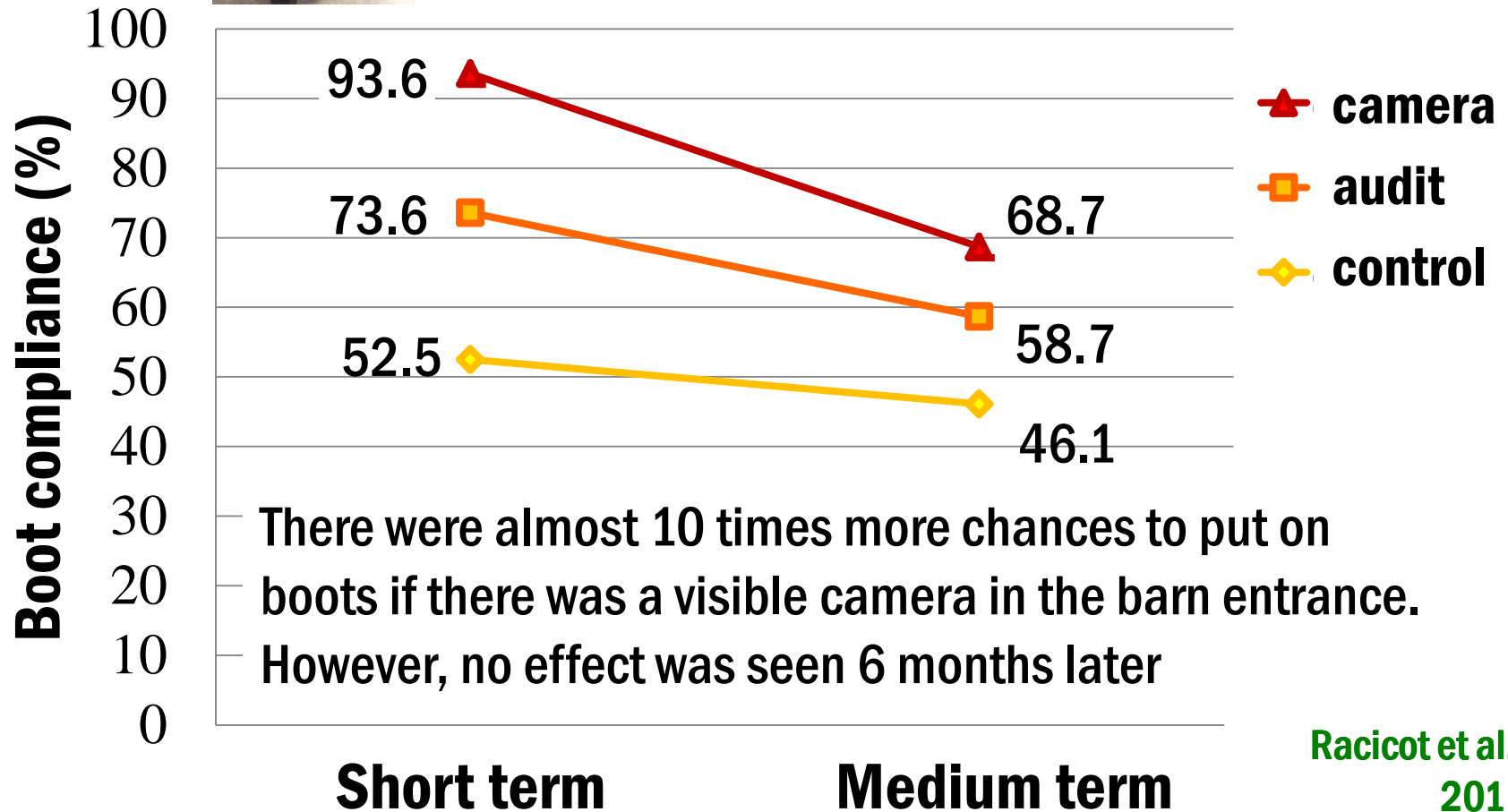




# Biosecurity Compliance #3

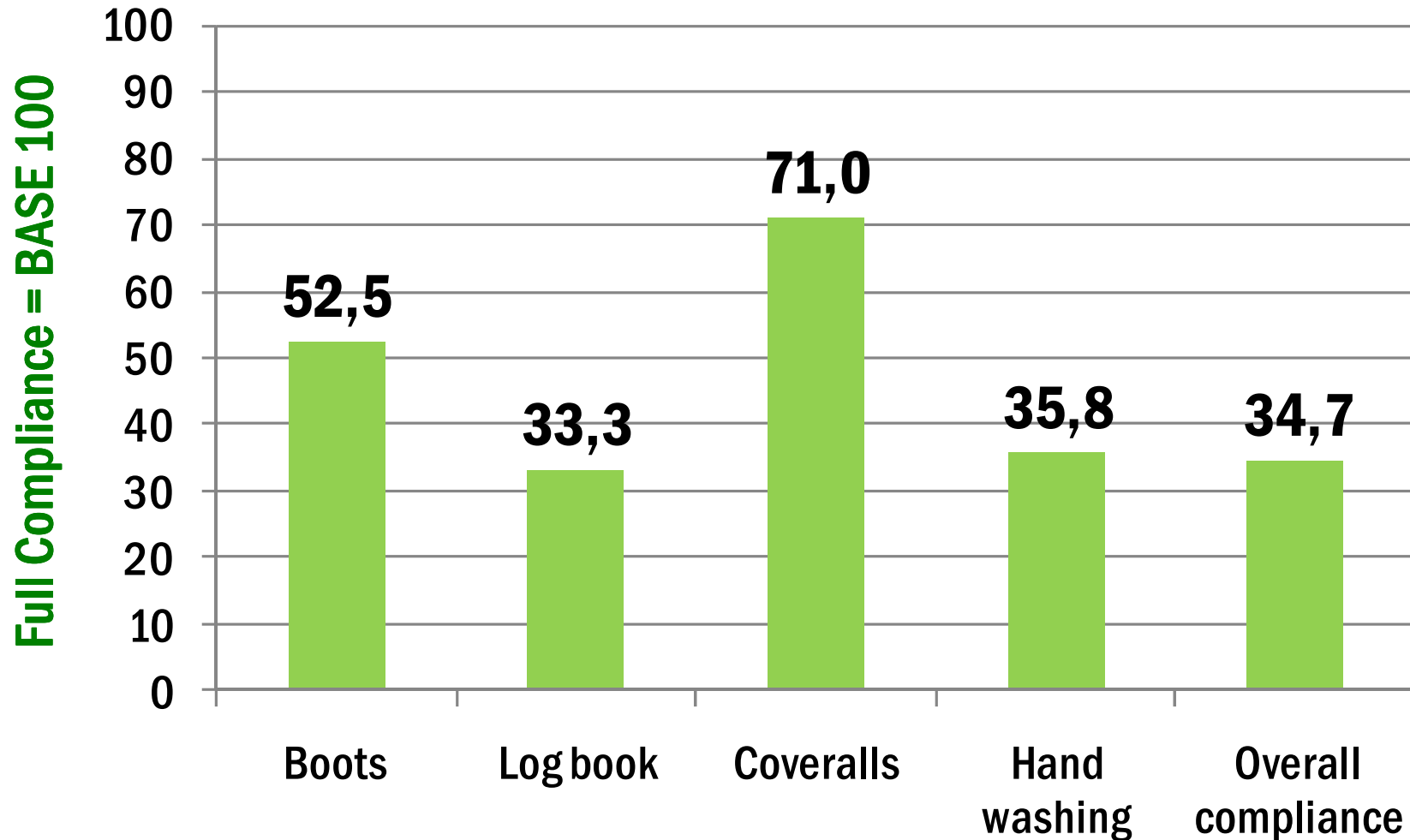


## Boot compliance according to the study group and the observation period





# Expected Biosecurity Compliance



Racicot et al. 2011



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# Biosecurity: A 4-Step Action Approach

Raffaella - ORDINE >>>> 1 >>>>2 (1,2 sopra) >>>3 >>> 4 (3,4 sotto). Grazie



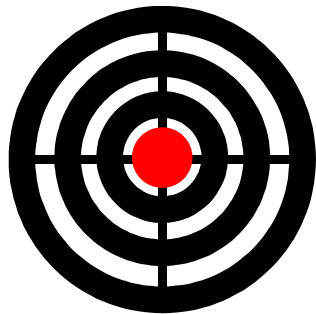
## Inserire # 3

KEEP A  
COMPELLING  
SCOREBOARD



## Ins. # 2

ACT ON  
LEAD MEASURES



## Da mettere come #1

FOCUS ON THE  
WILDLY IMPORTANT



## Inserire # 4

CREATE A CADENCE OF  
ACCOUNTABILITY



# # 1 Biosecurity & ABF Production Enemy

WHIRLWIND



THE DAY JOB



Raffaella – puoi mettere icona vortice sotto in concomitanza con whirlwind e icona obiettivo in concomitanza con goal.

Qui ci vuole il tocco creativo tuo.

GOAL



NEW ACTIVITIES







# ABF Poultry Production: Selective Focus

ABF POULTRY PRODUCTION – quale immagine? Allevamento antibiotic free? Icona?

LAG MEASURES



GOAL MEASUREMENT



AB CURB  
ANTIBIOTIC CONSUMPTION  
(KG or %)



SET FACTUAL TARGETS  
1. START LINE  
2. FINISH LINE  
3. DATELINE

Creare sezione «piè pagina»

LEAD MEASURES



- 1. PREDICTIVE
- 2. INFLUENCABLE



NUTRICEUTICALS ADDED  
FEED PRODUCTION  
(TONNES)  
COMPLIANCE WITH GOLDEN  
BIOSECURITY  
PROGRAMMES  
(% FARMS)

# GOALS DIRECTED*	2-3	4 - 10	11 - 20
# GOALS ACHIEVED*	2-3	1-2	0

\*in addition to «Whirlwind» source: McChesney C et al. The 4 disciplines of Execution (2016)





# Biosecurity: Fomites Are The Levers 4 WIGs

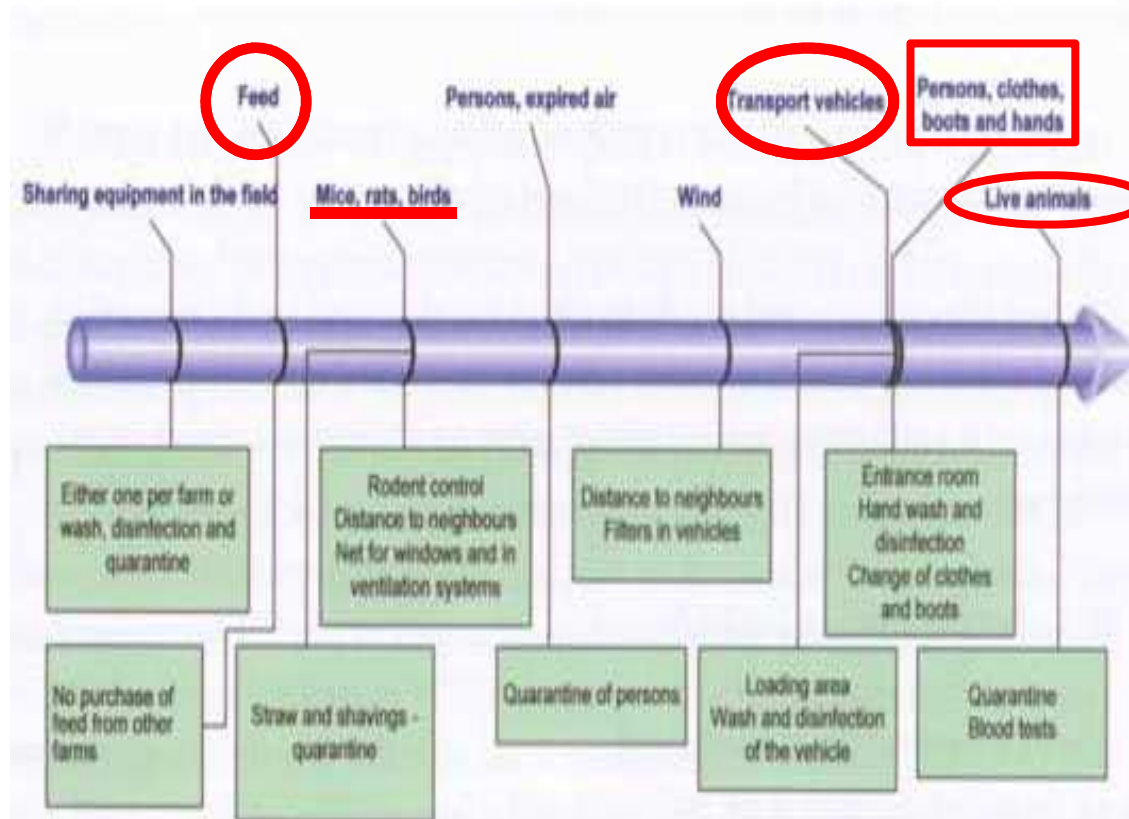
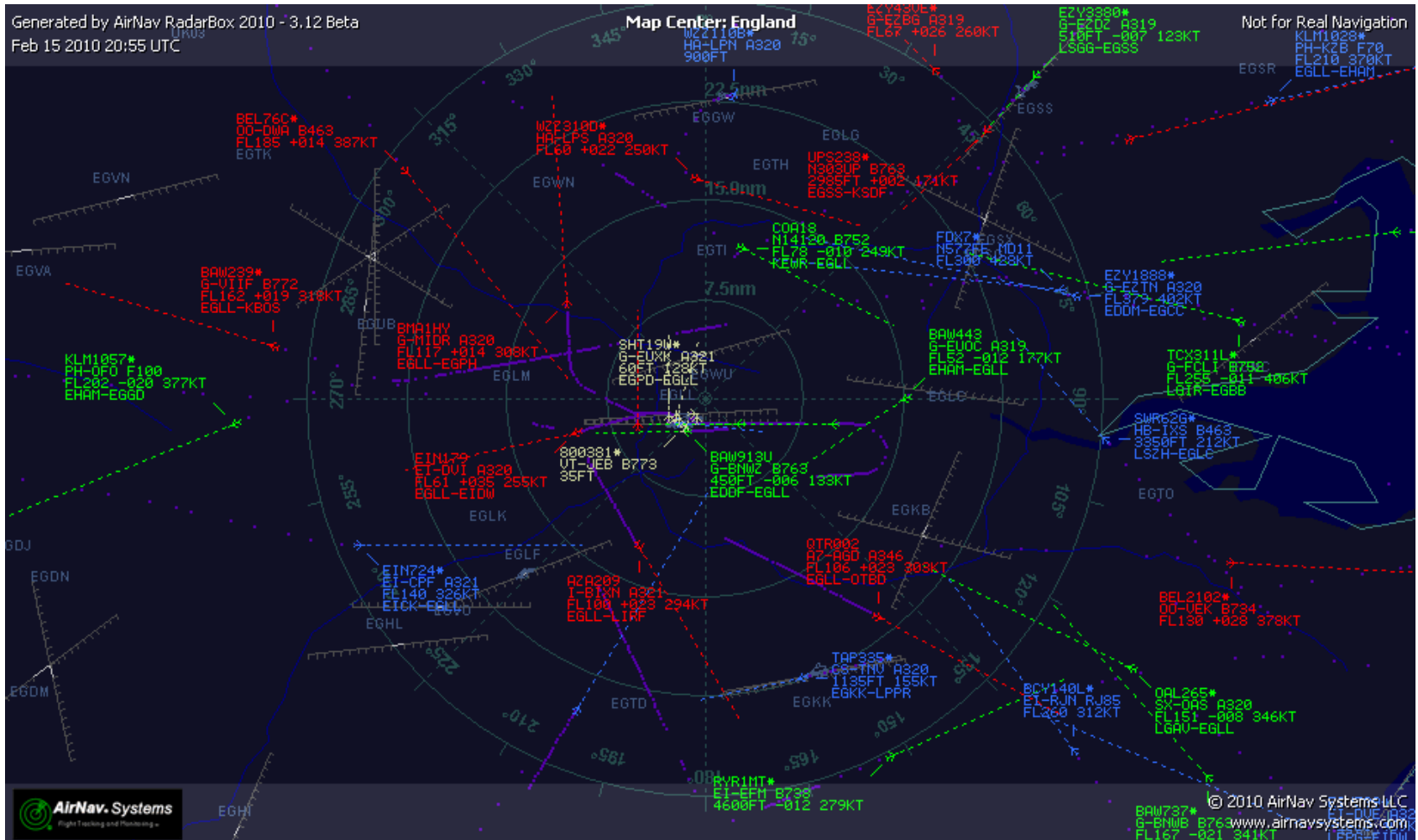


Figure 3.1  
Qualitative ranking of transmission routes in relation to the risk of transfer of pathogens. The risk increases to the right. The green boxes describe how the different risks can be reduced (Alban and Boklund, 2008).



# WIGs: Mimick Air Traffic Controllers



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# Biosecurity In ABF Production: Issue # 4



## Economic Sustainability Appraisal



# Biosecurity: The Untapped «Tesoretto»

**5.3% improvement of feed efficiency**

**4.5% reduction in overall mortality**

**7% increase of egg production**

**No need to upgrade vaccination programme**

**€ 0.20 reduction medication of per bird**

**Overall cost/benefit ratio appraised at 1:46**



**C'è di meglio  
per riferirsi  
all'anno  
1996?**



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# Biosecurity: Pioneering The Future

<b>COST ITEM</b>	<b>CONVENTIONAL</b>	<b>FORMULATED PRODUCTS</b>
<b>LIVESTOCK (%)</b>	<b>1.31</b>	<b>2.42</b>
<b>FEED (%)</b>	<b>78.18</b>	<b>79.92</b>
<b>VACCINATION (%)</b>	<b>1.70</b>	<b>1.72</b>
<b>MEDICATION (%)</b>	<b>4.37</b>	<b>0.74</b>
<b>BIOSECURITY(%)</b>	<b>0.29</b>	<b>0.42</b>
<b>OVERHEADS (%)</b>	<b>14.15</b>	<b>14.78</b>
<b>TOTAL (%)</b>	<b>100.00</b>	<b>100.00</b>

Raffaella:  
mi sistemi la  
tabella?  
Grazie





# Biosecurity: A Wall *vs.* Disease Challenge

**POULTRY  
WORLD**

Health

Background | Jun 19, 2017 | 1691 views | 1 comment

## Activating the immune system can come at an expense

During the pan-European poultry seminar in Amsterdam the most renowned immune system experts worldwide gave their vision on how to protect poultry best. One way to minimise losses due to immune activation is immunomodulation but this doesn't replace good management or genetics.

During a challenge of the immune system, a significant amount of energy isn't used for protein accretion (lean meat deposition). Instead it's used by the immune system.

Lance Baumgard, IOWA STATE UNIVERSITY



**Mark Alistair Beghian**

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# Biosecurity: «Evergreen» Economics



## Measuring the costs of biosecurity on poultry farms: a case study in broiler production in Finland

[Kirsi-Maarit Siekkinen](#)<sup>1</sup>, [Jaakko Heikkilä](#)<sup>002</sup>, [Niina Tammiranta](#)<sup>1</sup> and [Heidi Rosengren](#)<sup>1,3</sup>

[Author information](#) ▶ [Article notes](#) ▶ [Copyright and License information](#) ▶

This article has been [cited](#) by other articles in PMC.

### Abstract

Go to:

### Background

Farm-level biosecurity provides the foundation for biosecurity along the entire production chain. Many risk management practices are constantly in place, regardless of whether there is a disease outbreak or not. Nonetheless, the farm-level costs of preventive biosecurity have rarely been assessed. We examined the costs incurred by preventive biosecurity for Finnish poultry farms.



€ 0.0355 per broiler



€ 0.75 per egg layer



# Biosecurity In ABF Production: Issue # 5



## Takehome Messages For ABF Production



# Doing Biosecurity In Pig Farms



## Take Home Messages



# ABF Poultry Production: A New Model?



«The real voyage of discovery consists not in seeking new landscapes, but in having new eyes.»

Marcel Proust  
1871-1922

Early XX century French Novelist. World-renowned Author of the 7-volume/3,200 page novel *In Search Of Lost Time*.





# Biosecurity: «B-Community» Mindset

**Be Seen Be Safe Administrator**

Pascal Randall  
demo\_admin@beeseenbesafe

Overview

Property Directory

Create Visitor Book

User Directory

Broadcast Message

Simulate Outbreak

Account Settings

Overview

Transactions of the Last 12 Months

YTD Transactions Reported: 55457

Last Month's Transactions: 4895

My Recent Activity

Search Activity By Date

START DATE: 11/23/2016

END DATE: 11/23/2016

Device Holder	Property	Timestamp	Duration
Pascal Randall Ltd.	Bransley Farms Ltd.	Nov 3, 4:10 - 5 AM	an hour
Pascal Randall Ltd.	Bransley Farms Ltd.	Nov 12, 4:20 - 5 AM	40 minutes
Pascal Randall Ltd.	Jonah Farms Ltd.	Nov 14, 9:11 - 10 PM	an hour
Pascal Randall Ltd.	Bransley Farms Ltd.	Oct 24, 10:28 - 11 PM	32 minutes
Pascal Randall Ltd.	Bransley Farms Ltd.	Nov 16, 11:23 PM - Nov 20, 12 AM	40 minutes

Outbreak Report

- Enterer has 17 total entries from pathogen across 1000, 1000, 1000
- Enterer has 17 total entries from pathogen across 1000, 1000, 1000
- Enterer has 17 total entries from pathogen across 1000, 1000, 1000
- Enterer has 17 total entries from pathogen across 1000, 1000, 1000
- Enterer has 17 total entries from pathogen across 1000, 1000, 1000
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- Enterer has 17 total entries from pathogen across 1000, 1000, 1000
- Enterer has 17 total entries from pathogen across 1000, 1000, 1000



**Be Seen Be Safe Administrator**

Pascal Randall  
demo\_admin@beeseenbesafe

Overview

Property Directory

Create Visitor Book

User Directory

Broadcast Message

Simulate Outbreak

Account Settings

Property Directory

Show 10 entries

Operating Name	Address	Owners
Halla Farms Ltd.	104-7537 Vitae Rd.	Cleo Whitley
Vance Farms Ltd.	1050 Connecticut Av.	Devon Christensen
Cadman Farms Ltd.	1068 Tristricque Ave	Arsenio Nichols
Rhea Farms Ltd.	107-2666 A St.	Joy Willis
Leslie Farms Ltd.	113-5674 Suspendisse Ave	Aoye Farley
Akeem Farms Ltd.	117-4825 Sit Avenue	Driscoll Nieves
Tank Farms Ltd.	1189 Non Ave	Tank Harmon
Mave Farms Ltd.	1191 Nc St.	Mark Rasmus
Willia Farms Ltd.	122-6467 Egg Ave	Palmer Vazquez
Mari Farms Ltd.	1227 Damm St.	Karleigh Gomez

Property Details

104-7537 Vitae Rd.

OWNERS

- Cleo Whitley

ADDRESS

ADDRESS LINE 1: 104-7537 Vitae Rd.

ADDRESS LINE 2: Address Line 2

ADDRESS LINE 3: Address Line 3

CITY: Guelph

PROVINCE: ON

COUNTRY: Canada

POSTAL CODE: L1M8 4G

TRIGGERS

ENTER TRIGGER UUID: 8057547d030e1c31f9ebf5fa928dcd03

EXIT TRIGGER UUID: 73e7c3d95718a924817302323a01811

Production Type

**Be Seen Be Safe Administrator**

Pascal Randall  
demo\_admin@beeseenbesafe

Overview

Property Directory

Create Visitor Book

User Directory

Broadcast Message

Simulate Outbreak

Account Settings

Create Visitor Book

DATE RANGE

START DATE: 10/03/2016

END DATE: 11/23/2016

PROPERTIES

Show 10 entries

Operating Name	Address	Owners
Aquila Farms Ltd.	2339 Sapient Ave	Malcolm Dennis

Reports

Rhoda Farms Ltd.

Copy	CSV	Print	Search
Device Holder	Property	Timestamp	Duration
HE4bghvRVPe0S	Rhoda Farms Ltd.	Nov 14, 2:50 - 3:27 PM	37 minutes
Lael Graham	Rhoda Farms Ltd.	Nov 17, 11:14 - 11:48 AM	34 minutes
Lael Graham	Rhoda Farms Ltd.	Nov 17, 11:03 - 11:08 AM	5 minutes
Walker Merrittan	Rhoda Farms Ltd.	Oct 17, 8:01 - 8:25 AM	24 minutes
Walker Merrittan	Rhoda Farms Ltd.	Oct 15, 10:28 - 11:01 AM	33 minutes
Walker Merrittan	Rhoda Farms Ltd.	Oct 15, 10:14 - 10:19 AM	5 minutes

**FARM HEALTH MONITOR**

Profile Reports Create a Farm Entry

Welcome back Joe

YTD Transactions Reported	YTD Symptoms Reported	YTD Symptoms Reported	YTD Sampled Sites
15852	956	5210	2044
LAST WEEK'S TRANSACTIONS: 235	LAST WEEK'S TOTAL: 59	LAST MONTH'S TOTAL: 136	LAST MONTH'S TOTAL: 106

TRANSACTION STATS

SYMPTOM STATS



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# Biosecurity: People, People, People







# Disinfection: A God Example Not To Follow



**Surface Wettability?**

**Nozzle Choice?**

**Application Volume?**



**Mark Alistair Beghian**



# Biosecurity: Set Up “Arsenal C&D”

HOSES	LANCES	NOZZLES
heavy/light	washing disinfection foaming	flat / rotating / needle / double



Zeno Bernardi



# Biosecurity: Search For Innovations



## PTO Pressure Washer

- Variable FR & P
- Preset solutions feeding
- Two independent pumps
- Timed foaming & rinsing
- No wheel on the clean floor



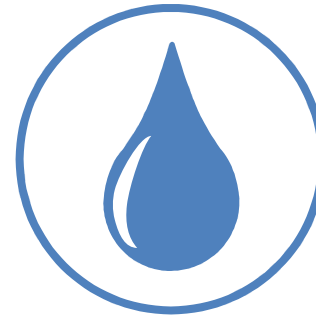




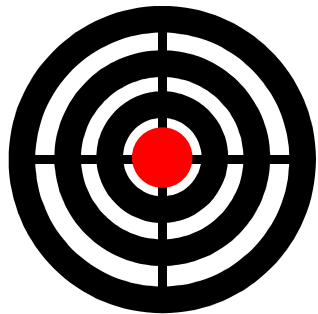
# Biosecurity: Focus On Wet Cleaning



**- 40%**  
WORKING  
TIME



**- 50%**  
WATER  
CONSUMPTION



**X 200**  
BIOCIDAL EFFICACY  
BOOSTING EFFECT



**+25%**  
SAVINGS ON  
FARM LIFE CYCLE COSTS



# Error/Horror Gallery In Wet Cleaning





# Detergent: The Ideal Product Profile

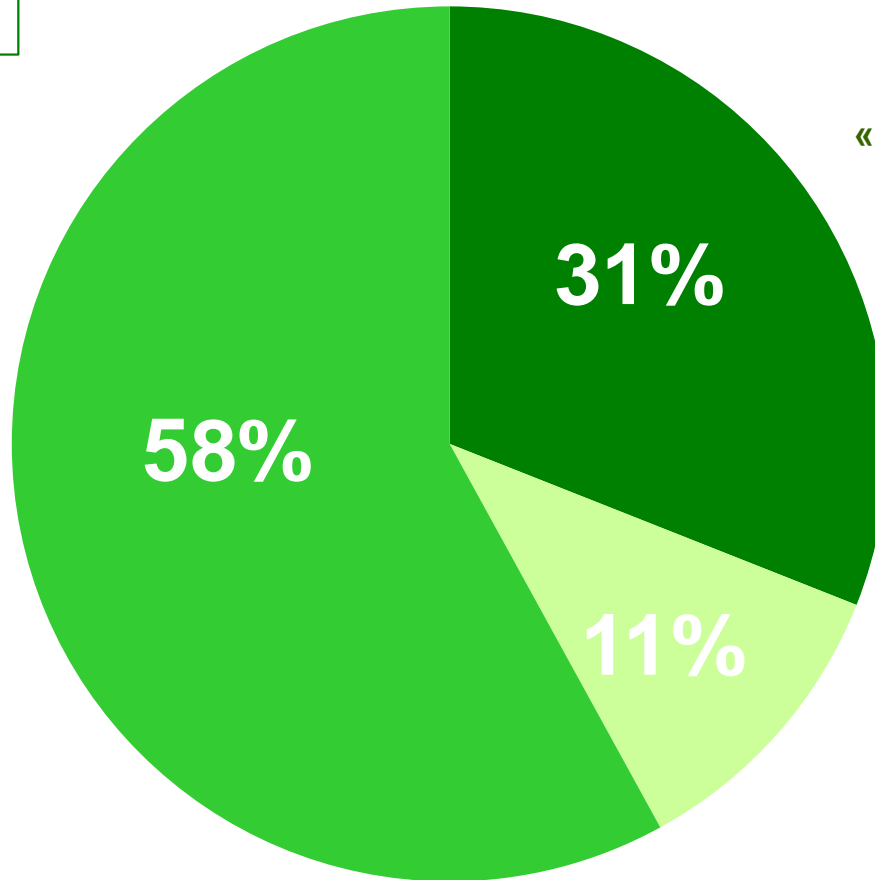




# Water Quality: A Threat 4 Gut Health (1)

AT WITHDRAWAL

«Drinkable» Water  
Safe & Clean



«Not Drinkable» Water  
Pathogen  
Contamination

«Not Drinkable» Water  
Total Bacterial Count

Source: LCB - France (internal audit, 2017)

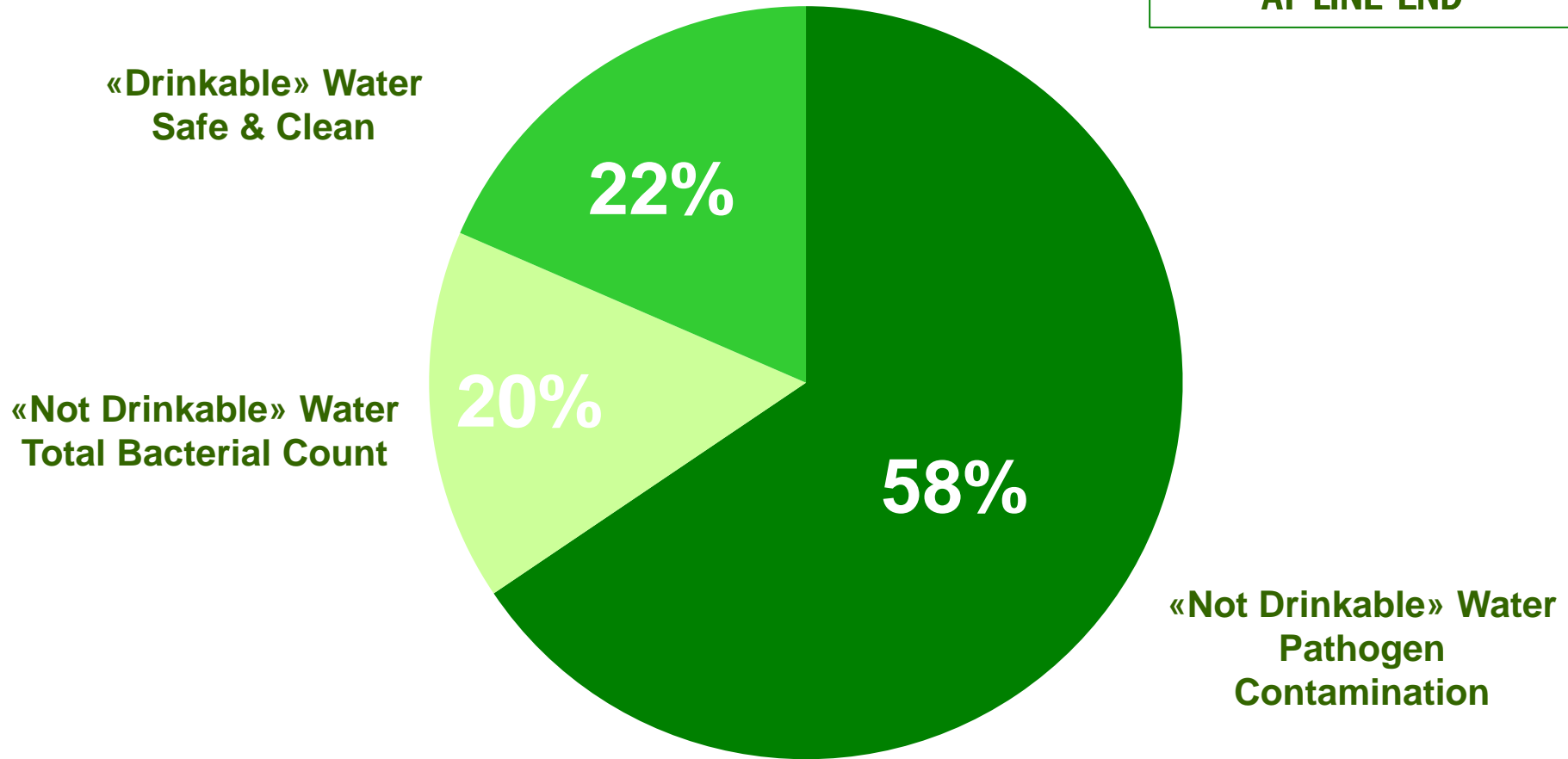


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# Water Quality: A Threat 4 Gut Health (2)

AT LINE END



Source: LCB – France (internal audit, 2017)



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# Water Sanitation: Good Farming Practices

## PROCEDURE

## TARGET

**Well Water Filter System**

**Turbidity < 2 NFU**

**Water Meter**

**Monitoring**

**Dosing Pump**

**Accuracy**

**Pipe Quality**

**PVC or Polyethylene/ Diameter Size**

**Maintenance/ Cleaning**

**Pump/ Drinkers/ Header Tank**

**Water Flushing Procedure**

**Sediment Control**

**Test Kits**

**Sanitation Efficacy**

**Water Analysis**

**At least once a year**





# Water Sanitation: A 3-S Approach



Continuous  
Flow

Downtime



THE  
STRIPPER

1 : 1.000

1 : 40



THE  
SWEEPER

1 : 100



THE  
SHOOTER

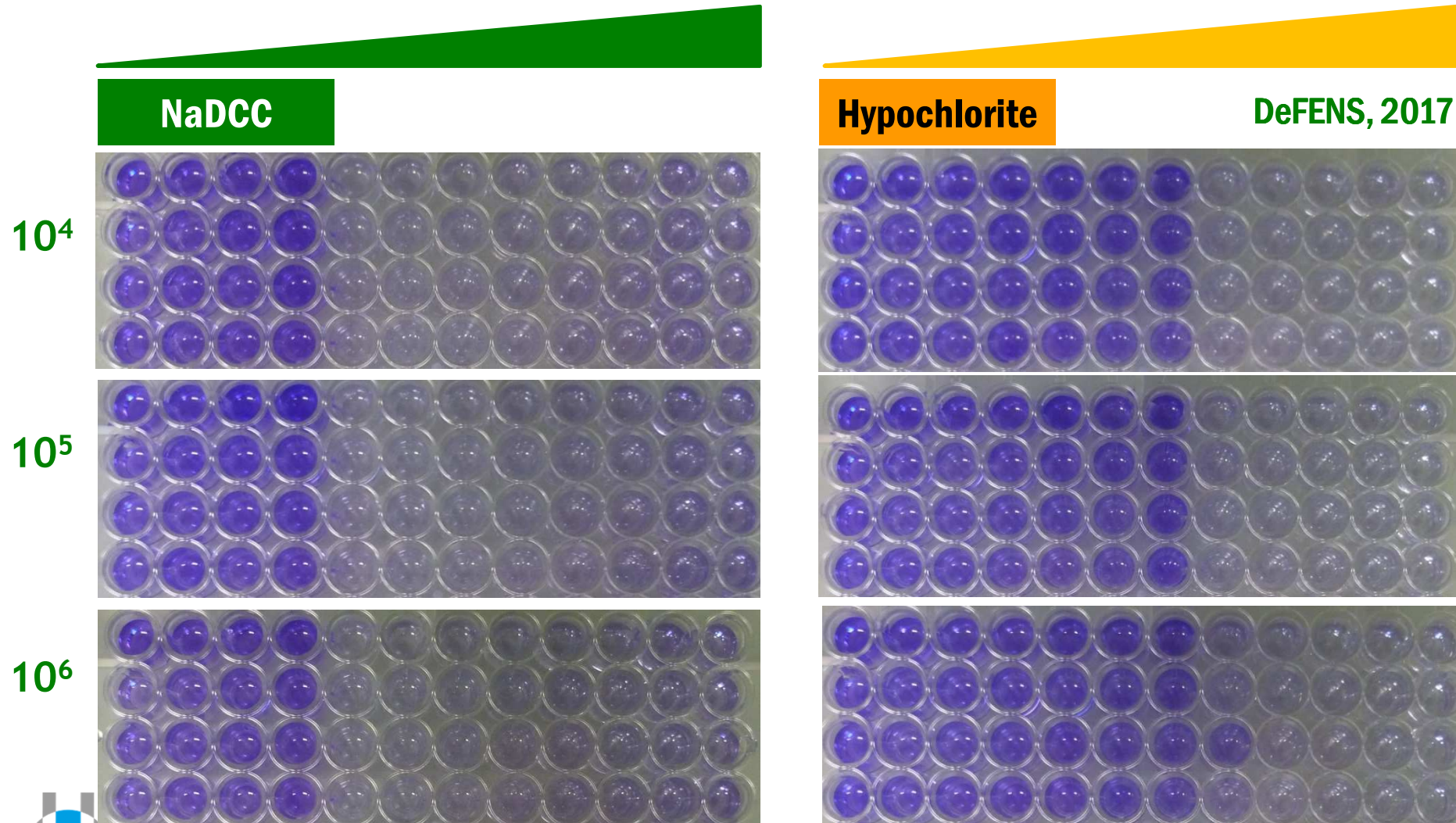
1 : 1.000

1 : 100



# Water Sanitation: Biofilm Biocidal Activity

## Inhibition of cell adhesion to surfaces

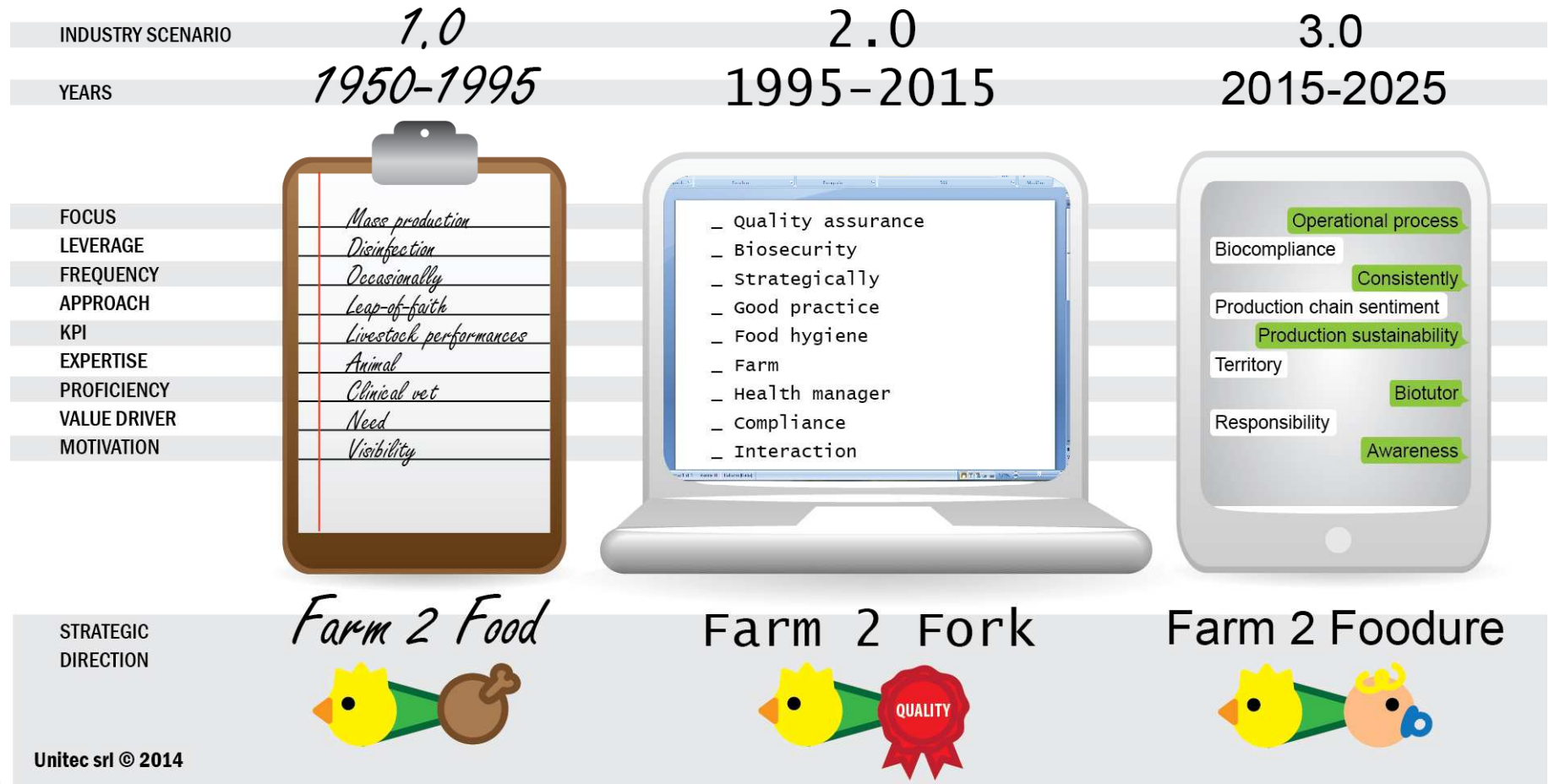




# Biosecurity: Ready For 4.0 Scenario?



## THE INFOGRAPHIC OF FARM HYGIENE IN ITALY: EVOLUTION OF THE STRATEGIES FOR ENVIRONMENTAL DISEASE CONTROL



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# Biosecurity: The OneHealth Perspective

**BIOSECURITY**  
Individual commitment, shared value, global priority.

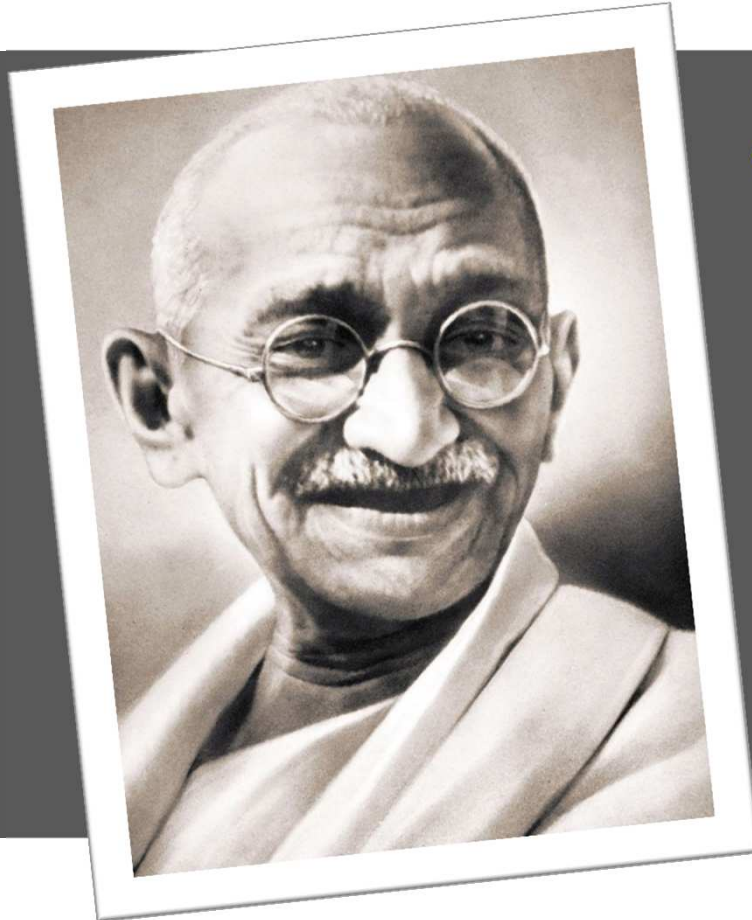


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# Transitional Change – A Duty 4 All Players



«Be the change  
that you wish too see  
in the world.»

Mohandas Karamchand Gandhi  
a.k.a. «Mahatma»  
1869-1948

Statesman. Philosopher. Lawyer. Father of the Nation.  
Theorist of the non violent civil disobedience.



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the hall of biocompliance

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