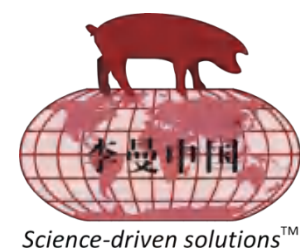


丹俄农业咨询

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SPF BIOSECURITY SYSTEM BUILDUP

STRATEGIES FOR BREEDING FARMS AND

COMMERCIAL FARMS UNDER ASF

非洲猪瘟下种猪场和商品母猪场的SPF生物安全体系构建策略

Science-driven solutions™

DanAg International

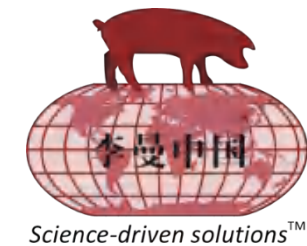
丹俄国际

American system, European management, Chinese solution

美式体系，欧式管理，中国方案

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背景介绍

BACKGROUND INTRODUCTION



- 非洲猪瘟病毒（ASFV）是全球猪肉生产的最大威胁。在过去接近两年的时间里，在中国的养猪业造成了巨大的经济损失。 African swine fever virus (ASFV) is currently the biggest threat to global pork production. In the past nearly two years, it has caused huge economic losses to China's pig industry.
- 由于没有有效的疫苗和药物治疗方法，生物安全是防控非洲猪瘟唯一行之有效的方法。 Since there is no effective vaccine or treatment available, biosecurity is the only effective method to prevent and control African swine fever.
- 受非洲猪瘟影响，猪肉市场稳定居高。规模化猪场和企业为了占有市场，正在加速扩张。如何降低投资风险并维持可观投资回报率成为投资人的主要顾虑。 Affected by African swine fever, pork consumption market continually maintains high demands. Large-scale pig farms and production companies are accelerating expansion in order to occupy the market. How to decrease the risk of investment and have a decent return on investment (ROI) is the main concern of investors.

研究目的

RESEARCH OBJECTIVE



- 借鉴丹麦SPF体系建立适合中国猪场非洲猪瘟背景下的生物安全体系（丹俄SPF体系）。
Drawing on the Danish SPF system to build a biosecurity system(DanAg SPF system) suitable for Chinese pig farm under ASF.
- 本研究着重分析种猪场和大型商品母猪场生物安全体系建设的策略分析，为投资人在非洲猪瘟下的生物安全建设提供参考。 This study focus on the analysis of strategies for buildup biosecurity system for breeding farms and large commercial sow farms, which will help to provide references for investors how to build a biosecurity system in ASF.

材料和方法

MATERIALS AND METHODS

■ 材料 Materials

- 一个存栏1200头母猪的种猪场。 One breeding farm with 1200 sows.
- 一个存栏10000头母猪的商品母猪场。 One commercial sow farm with 10000 sows.

■ 方法 Methods

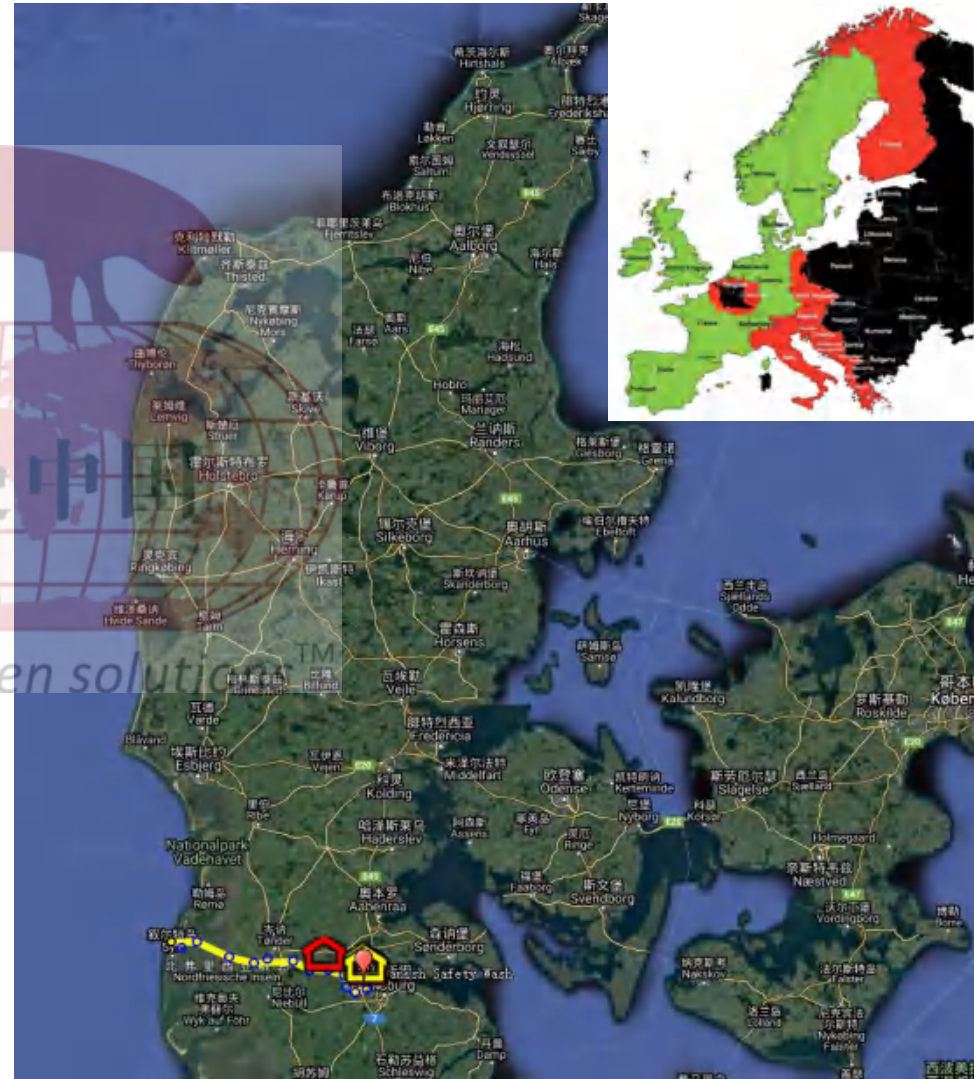
- 丹俄SPF体系建设 Building up of DanAg SPF system
- 生物安全审计 Biosecurity audit
- 生物安全风险监测 Biosecurity risk monitoring
- 非洲猪瘟下种猪场和商品母猪场追加的生物安全投资回报率 ROI of biosecurity investment in breeding farm and commercial farm under ASF

结果-丹麦SPF体系构架（国家层面）

RESULTS- The Danish SPF-System(Country level)



- ✓ 边界控制 Border control
 - 围墙 Fence
 - 洗消中心 Danish Safety Wash
 - 边界出猪台 Border Loading Ramp
 - 车辆隔离政策 Truck down time Policy
 - 国外拜访人员 Foreign Visitors
 - 国家育种体系 Breeding system
- ✓ SPF运输 SPF-Transport
 - GPS追踪 GPS tracking
- ✓ 检测实验室 Lab



结果-丹俄SPF体系构架（农场层面）

RESULTS-DanAg SPF System Structure(Farm level)

- ✓ 连廊&围墙 Corridor & Fence
- ✓ 闭合生产及育种体系 Closed Production and Breeding System
- ✓ 鼠鸟蚊蝇 Rodents, birds, flies and mosquitoes
- ✓ 内部中转出猪台 Internal Loading Ramp
- ✓ 中转料塔 Transfer Silo
- ✓ 洗消中心 Washing Station
- ✓ 车辆管理 Trucks Management
- ✓ 人员隔离站 Quarantine dormitory
- ✓ 物资 Deliveries
- ✓ 检测实验室 Lab
- ✓ 外部中转出猪台 External Loading Ramp
- ✓ 饲料厂 Feed Mill

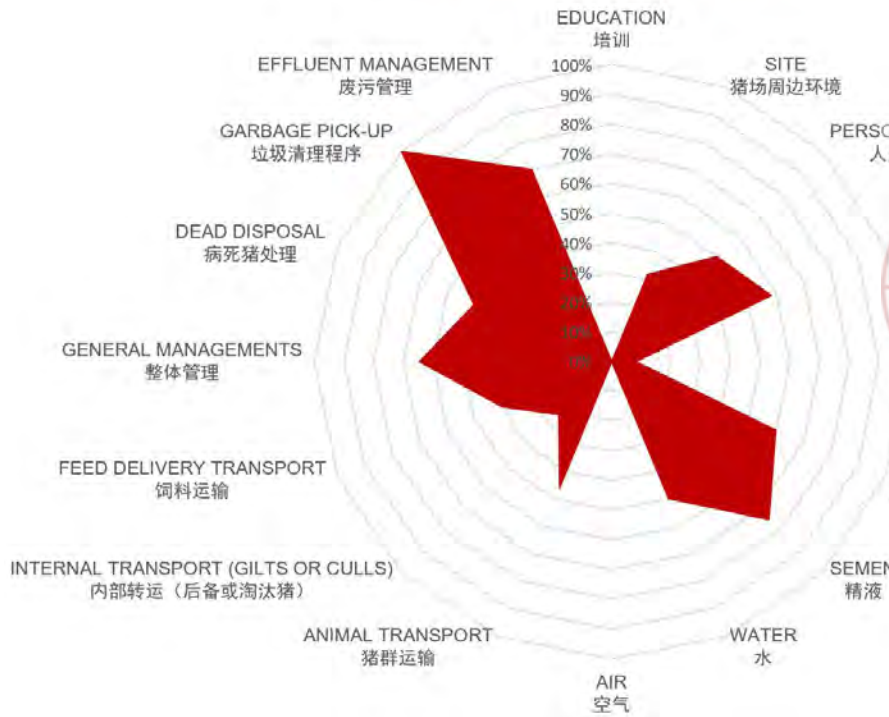


结果-生物安全审计

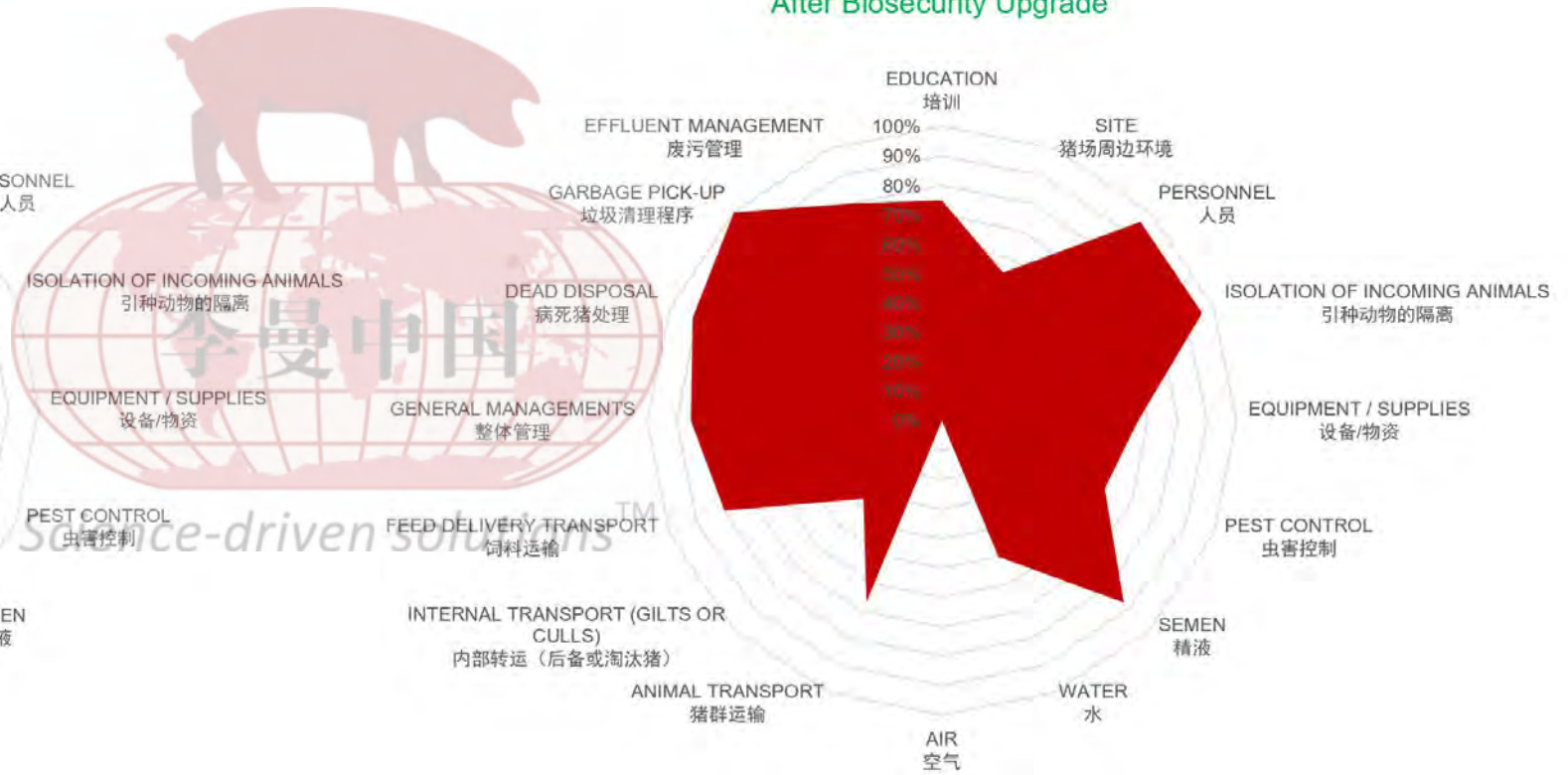
RESULTS- Biosecurity Audit



生物安全升级前
Before Biosecurity Upgrade



生物安全升级后
After Biosecurity Upgrade

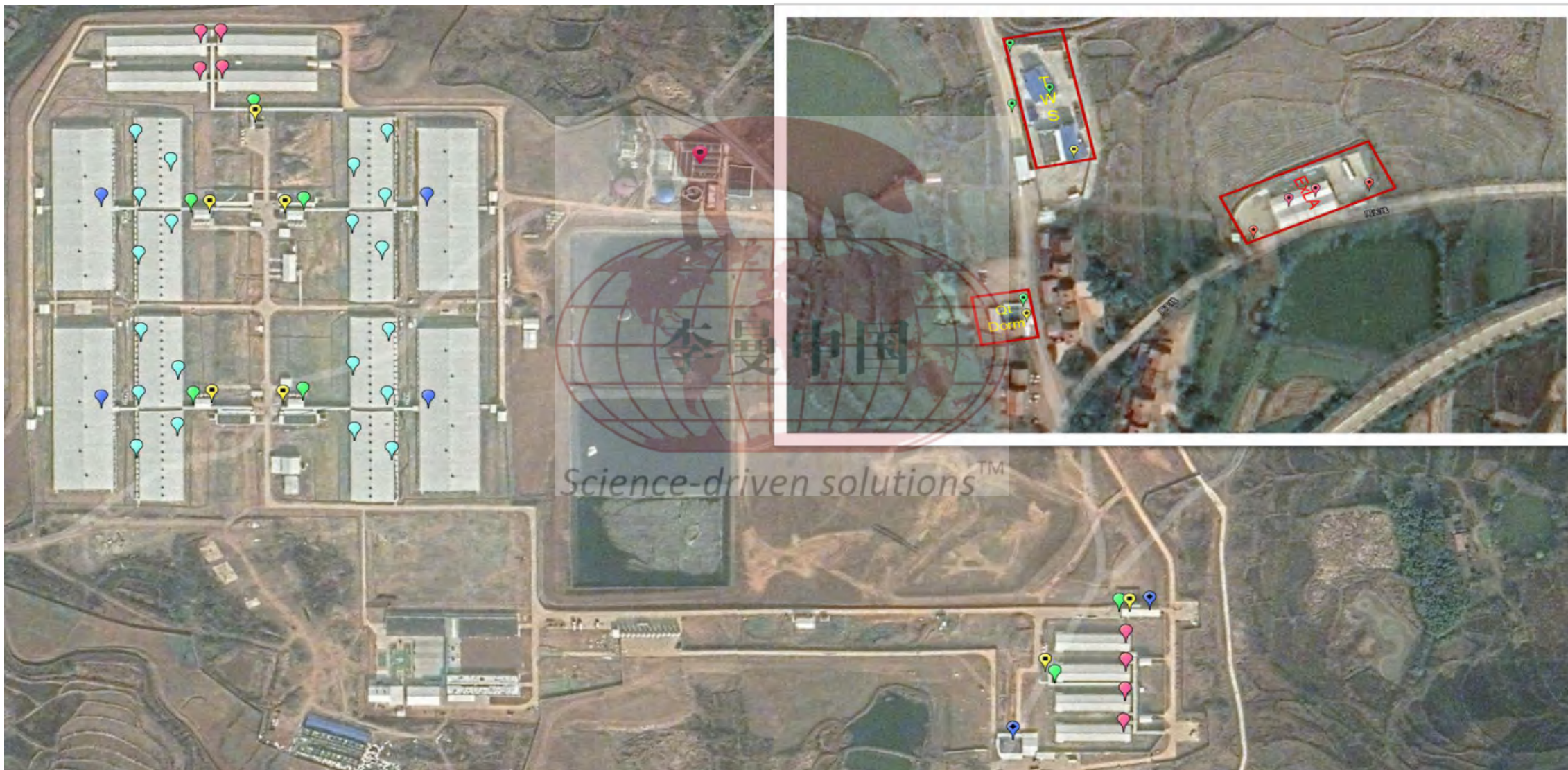


生物安全升级前后的丹俄生物安全评分提升了325分

The DanAg biosecurity score before and after the biosecurity upgrade increased by 325 points

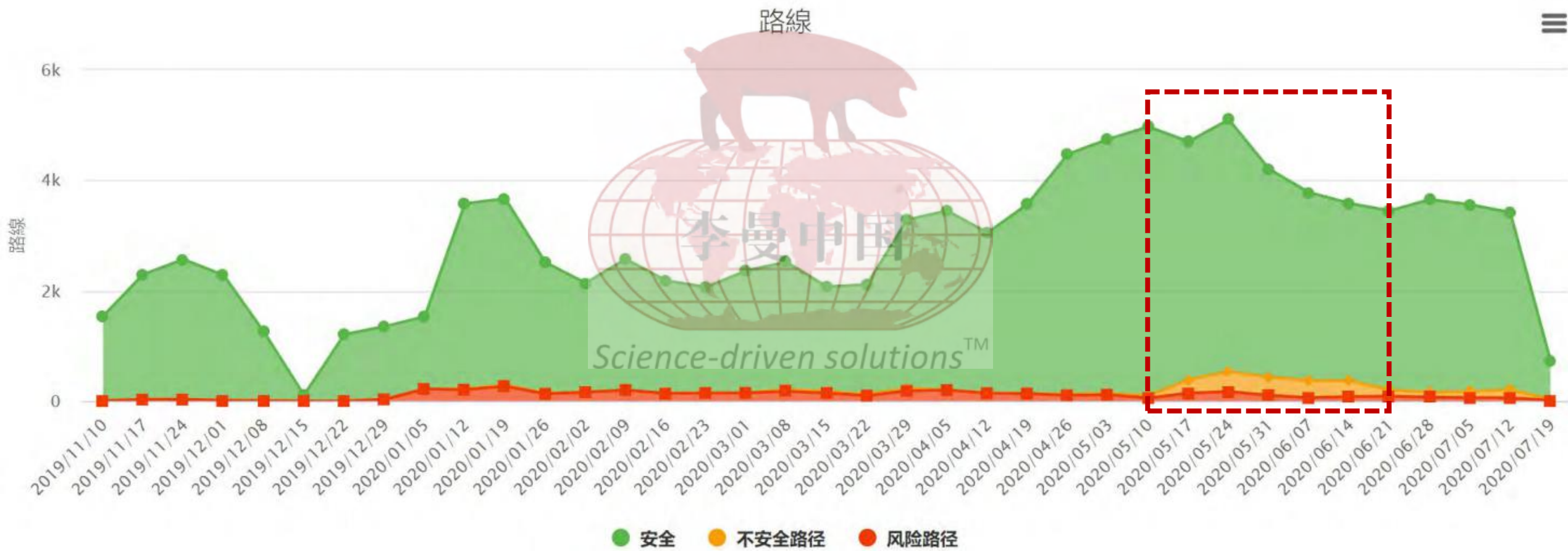
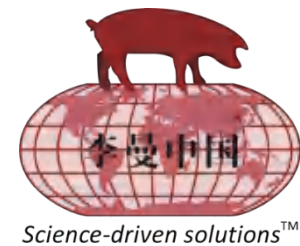
结果-生物安全风险监测

RESULTS-Monitoring BioRisk



结果-生物安全风险监测

RESULTS-Monitoring BioRisk



结果-生物安全投资回报率(种猪场)

RESULTS- ROI of Biosecurity Investment (Breeding farm)



种猪场分娩到断奶投资回报率分析 (不同断奶仔猪价格)

FARROW-TO-WEAN PIG ROI ANALYSIS in breeding farm (Different gross return per pig sold)

断奶销售苗猪/存栏母猪/年 Weaned pigs sold /sow /year		23		
农场规模 (母猪) Herd size (Sow)		1200		
A 平均每头出售猪的毛收益 AVERAGE GROSS RETURNS PER PIG SOLD		1150	1800	2900
每头出售阉公猪的毛收益 Gross return per castrated pig sold		300	600	1800
每头出售种猪的毛收益 Gross return per F1 sold		2000	3000	4000
每头出售猪的成本 COST PER PIG SOLD:				
1.后备母猪料 GDU feed			11.81	
2.妊娠母猪料 Gestation feed			83.81	
3.哺乳母猪料 Lactation feed			45.50	
4.教槽料 Creepy feed			1.00	
5.配种母猪料 Breed feed			5.03	
6.人工 Labor			30.00	
7.兽药/疫苗/物资 Drugs, vaccine and supplies			39.13	
8.公共资源/水电煤气 Utilities, fuel and oil			3.48	
9.运输和销售成本 Transportation and marketing costs			1.30	
10.建筑维护和设备维修 Building and equipment repairs			10.90	
11.种猪/基因费 Breeding/ genetic charge				
a. 折旧费 Depreciation			-1.93	
b. 精液 Semen			8.20	
c. 利息 Interest			1.92	
d. 保险 Insurance			0.31	
12.专业费用 (法务, 会计等) Professional fees (legal, accounting, etc.)			0.26	
13.建筑和设备折旧 Depreciation on buildings and equipment			31.88	
14.建筑和设备利息 Interst on buildings and equipment			15.54	
15.生物安全体系升级投资 Biosecurity upgrade investment				
a. 建筑和设备 (洗消中心,外部中转出猪台,,车辆,实验室,人员隔离站)折旧 Depreciation on buildings and equipment (Washing station,External loading ramp, Vehicle,Lab, Quarantine dormitory)			7.25	
b. 人工 Labor			21.74	
c. 物资 Ssupplies			1.32	
d. 生物安全风险监测 Biorisk			10.87	
B.小计 (每头出售猪的成本) SUBTOTAL (COST PER PIG SOLD)			329.32	
16.一半的运营成本利息 Interst on half operating costs			6.09	
C.总成本 TOTAL COSTS			335.40	
D.除去 (A-C) 总成本后收益 RETURNS OVER TOTAL COSTS (A-C)		814.60	1464.60	2564.60

结果-生物安全投资回报率(种猪场)

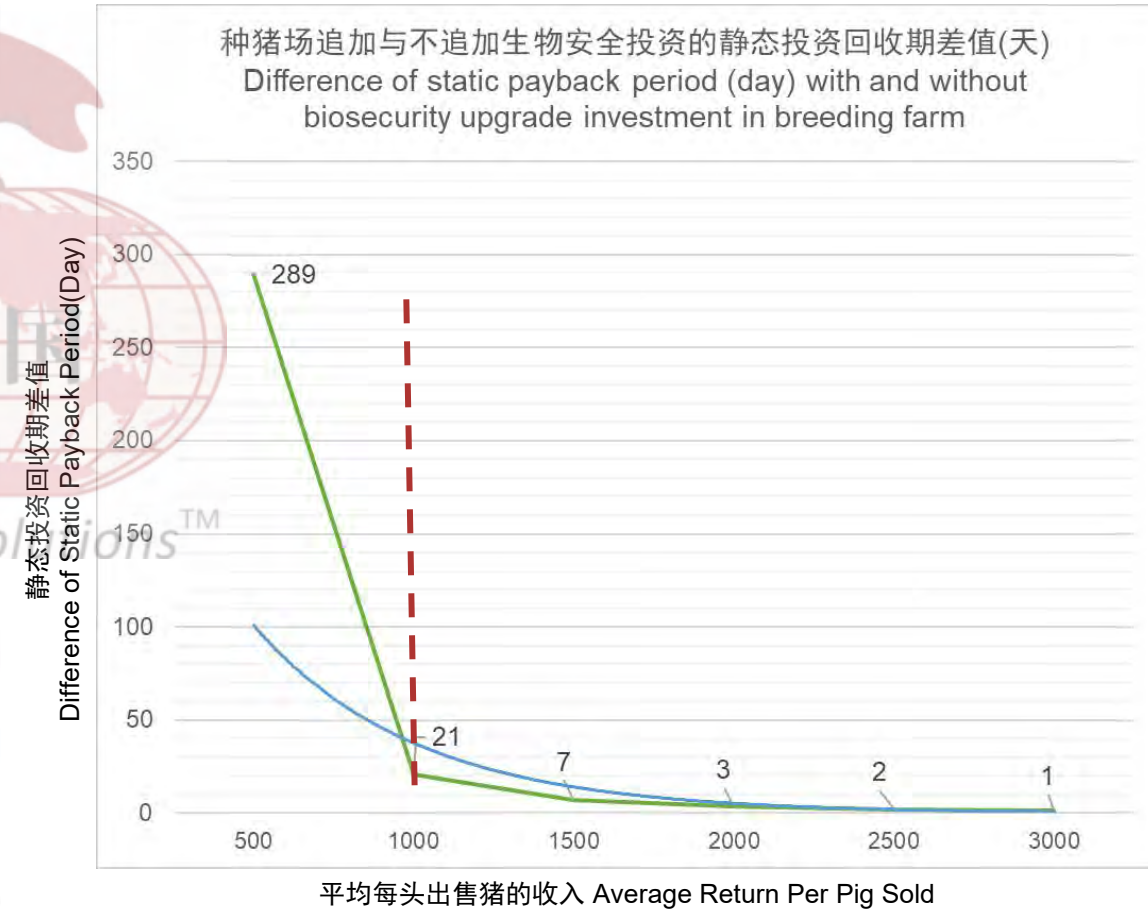
RESULTS- ROI of Biosecurity Investment (Breeding farm)



种猪场静态投资回收期分析 (不同断奶仔猪价格)

Static Payback Period Analysis in breeding farm (Different gross return per pig sold)

断奶销售苗猪/存栏母猪/年 Weaned pigs sold /sow /year	23					
农场规模 (母猪) Herd size (Sow)	1200					
每头母猪总投资 (RMB) Total investment per sow (RMB)	15000					
每头出售猪的收益(RMB) Returns per pig sold(RMB)	500	1000	1500	2000	2500	3000
追加生物安全升级投资 Include biosecurity upgrade investment						
除去总成本后收益(RMB) Returns over total costs(RMB)	164.60	664.60	1164.60	1664.60	2164.60	2664.60
静态投资回收期 (天) Static payback period (Day)	1446	358	204	143	110	89
不追加生物安全升级投资 NOT include biosecurity upgrade investment						
除去总成本后收益(RMB) Returns over total costs(RMB)	205.77	705.77	1205.77	1705.77	2205.77	2705.77
静态投资回收期 (天) Static payback period (Day)	1157	337	197	140	108	88
追加与不追加生物安全投资的静态投资回收期差值(天) Difference of static payback period (day) with and without biosecurity upgrade investment (Day)	289	21	7	3	2	1



结果-生物安全投资回报率(种猪场)

RESULTS- ROI of Biosecurity Investment (Breeding farm)



种猪场分娩到断奶投资回报率分析 (不同农场规模)

FARROW-TO-WEAN PIG ROI ANALYSIS in breeding farm (Different herd size)

断奶销售苗猪/存栏母猪/年 Weaned pigs sold /sow /year	23			
农场规模 (母猪) Herd size (Sow)	1200	2400	3600	4800
A. 平均每头出售猪的毛收益 AVERAGE GROSS RETURNS PER PIG SOLD				
每头出售阉公猪的毛收益 Gross return per castrated pig sold			1800	
每头出售种猪的毛收益 Gross return per F1 sold			4000	
每头出售猪的成本 COST PER PIG SOLD:				
1. 后备母猪料 GDU feed			11.81	
2. 妊娠母猪料 Gestation feed			83.81	
3. 哺乳母猪料 Lactation feed			45.50	
4. 教槽料 Creepy feed			1.00	
5. 配种母猪料 Breed feed			5.03	
6. 人工 Labor			30.00	
7. 兽药/疫苗/物资 Drugs, vaccine and supplies			39.13	
8. 公共资源/水电煤气 Utilities, fuel and oil			3.48	
9. 运输和销售成本 Transportation and marketing costs			1.30	
10. 建筑维护和设备维修 Building and equipment repairs			10.90	
11. 种猪/基因费 Breeding/ genetic charge				
a. 折旧费 Depreciation			-1.93	
b. 精液 Semen			8.20	
c. 利息 Interest			1.92	
d. 保险 Insurance			0.31	
12. 专业费用 (法务, 会计等) Professional fees (legal, accounting, etc.)			0.26	
13. 建筑和设备折旧 Depreciation on buildings and equipment			31.88	
14. 建筑和设备利息 Interst on buildings and equipment			15.54	
15. 生物安全体系升级投资 Biosecurity upgrade investment				
a. 建筑和设备 (洗消中心,外部中转出猪台,,车辆,实验室,人员隔离站)折旧 Depreciation on buildings and equipment (Washing station,External loading ramp, Vehicle,Lab, Quarantine dormitory)	7.25	3.62	2.42	1.81
b. 人工 Labor	21.74	10.87	7.25	7.07
c. 物资 Ssupplies	1.32	1.32	1.32	1.65
d. 生物安全风险监测 Biorisk	10.87	5.43	3.62	3.62
B. 小计 (每头出售猪的成本) SUBTOTAL (COST PER PIG SOLD)	329.32	309.39	302.75	302.29
16. 一半的运营成本利息 Interst on half operating costs			6.09	
C. 总成本 TOTAL COSTS	335.40	315.48	308.83	308.38
D. 除去 (A-C) 总成本后收益 RETURNS OVER TOTAL COSTS (A-C)	2564.60	2584.52	2591.17	2591.62



结果-生物安全投资回报率(种猪场)

RESULTS- ROI of Biosecurity Investment (Breeding farm)



种猪场静态投资回收期分析 (不同农场规模)

Static Payback Period Analysis in breeding farm (Different herd size)

断奶销售苗猪/存栏母猪/年 Weaned pigs sold /sow /year			23		
平均每头母猪总投资(RMB) Average total investment per sow(RMB)			15000		
每头出售猪的收益(RMB) Returns per pig sold(RMB)			2900		
农场规模 (母猪/头) Herd size (Sow/head)	1200	2400	3600	4800	
追加生物安全升级投资 Include biosecurity upgrade investment					
除去总成本后收益(RMB) Returns over total costs(RMB)	2564.60	2584.52	2591.17	2591.62	
静态投资回收期 (天) Static payback period (Day)	93	92	92	92	
不追加生物安全升级投资 NOT include biosecurity upgrade investment					
除去总成本后收益(RMB) Returns over total costs(RMB)		2605.77			
静态投资回收期 (天) Static payback period (Day)		91			
追加与不追加生物安全投资的静态投资回收期差值(天) Difference of static payback period (day) with and without biosecurity upgrade investment	2	1	1	1	

结果-生物安全投资回报率(种猪场)

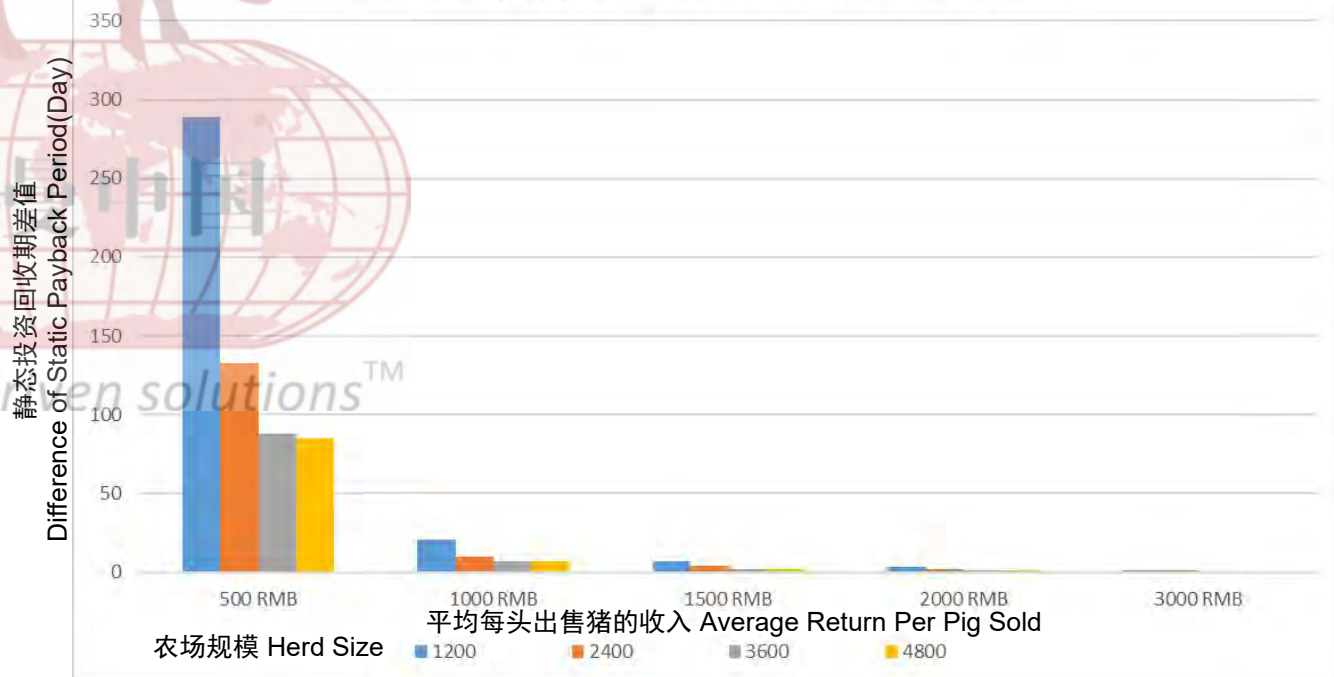
RESULTS- ROI of Biosecurity Investment (Breeding farm)



种猪场追加与不追加生物安全投资的静态投资回收期差值(天) (不同农场规模和断奶仔猪价格)
 Difference of static payback period (day) with and without biosecurity upgrade investment in breeding farm
 (Different herd size and gross return per pig sold)

平均每头出售猪的毛收益 Average gross return per pig sold	农场规模(母猪) Herd size (Sow)			
	1200	2400	3600	4800
500 RMB	289	133	88	85
1000 RMB	21	10	7	7
1500 RMB	7	4	2	2
2000 RMB	3	2	1	1
3000 RMB	1	1	0	0

种猪场追加与不追加生物安全投资的静态投资回收期差值(天)
 Difference of static payback period (day) with and without biosecurity upgrade investment in breeding farm



结果-生物安全投资回报率(商品母猪场)

RESULTS- ROI of Biosecurity Investment (Commercial Sow farm)



商品母猪场分娩到断奶投资回报率分析 (不同断奶仔猪价格)

Farrow-To-Wean Pig ROI Analysis in Commercial Sow Farm (Different gross return per pig sold)

断奶销售苗猪/存栏母猪/年 Weaned pigs sold /sow /year		23		
农场规模 (母猪/头) Herd size (Sow/head)		10000		
A. 每头出售猪的毛收益 GROSS RETURNS PER PIG SOLD		1200	1500	1800
每头出售猪的成本 COST PER PIG SOLD:				
1. 后备母猪料 GDU feed			11.81	
2. 妊娠母猪料 Gestation feed			83.81	
3. 哺乳母猪料 Lactation feed			45.50	
4. 教槽料 Creepy feed			1.00	
5. 配种母猪料 Breed feed			5.03	
6. 人工 Labor			25.00	
7. 兽药/疫苗/物资 Drugs, vaccine and supplies			39.13	
8. 公共资源/水电煤气 Utilities, fuel and oil			3.48	
9. 运输和销售成本 Transportation and marketing costs			1.30	
10. 建筑维护和设备维修 Building and equipment repairs			10.90	
11. 种猪/基因费 Breeding/ genetic charge				
a. 折旧费 Depreciation			-1.93	
b. 精液 Semen			8.20	
c. 利息 Interest			1.92	
d. 保险 Insurance			0.31	
12. 专业费用 (法务, 会计等) Professional fees (legal, accounting, etc.)			0.26	
13. 建筑和设备折旧 Depreciation on buildings and equipment			31.88	
14. 建筑和设备利息 Interst on buildings and equipment			15.54	
15. 生物安全体系升级投资 Biosecurity upgrade investment				
a. 建筑和设备 (洗消中心,外部中转出猪台,车辆,实验室,人员隔离站)折旧 Depreciation on buildings and equipment (Washing station, External loading ramp, Vehicle, Lab, Quarantine dormitory)			0.87	
b. 人工 Labor			3.39	
c. 物资 Ssupplies			1.59	
d. 生物安全风险监测 Biorisk			2.61	
B. 小计 (每头出售猪的成本) SUBTOTAL (COST PER PIG SOLD)			291.60	
16. 一半的运营成本利息 Interst on half operating costs			5.96	
C. 总成本 TOTAL COSTS			297.56	
D. 除去 (A-C) 总成本后收益 RETURNS OVER TOTAL COSTS (A-C)		902.44	1202.44	1502.44

结果-生物安全投资回报率(商品母猪场)

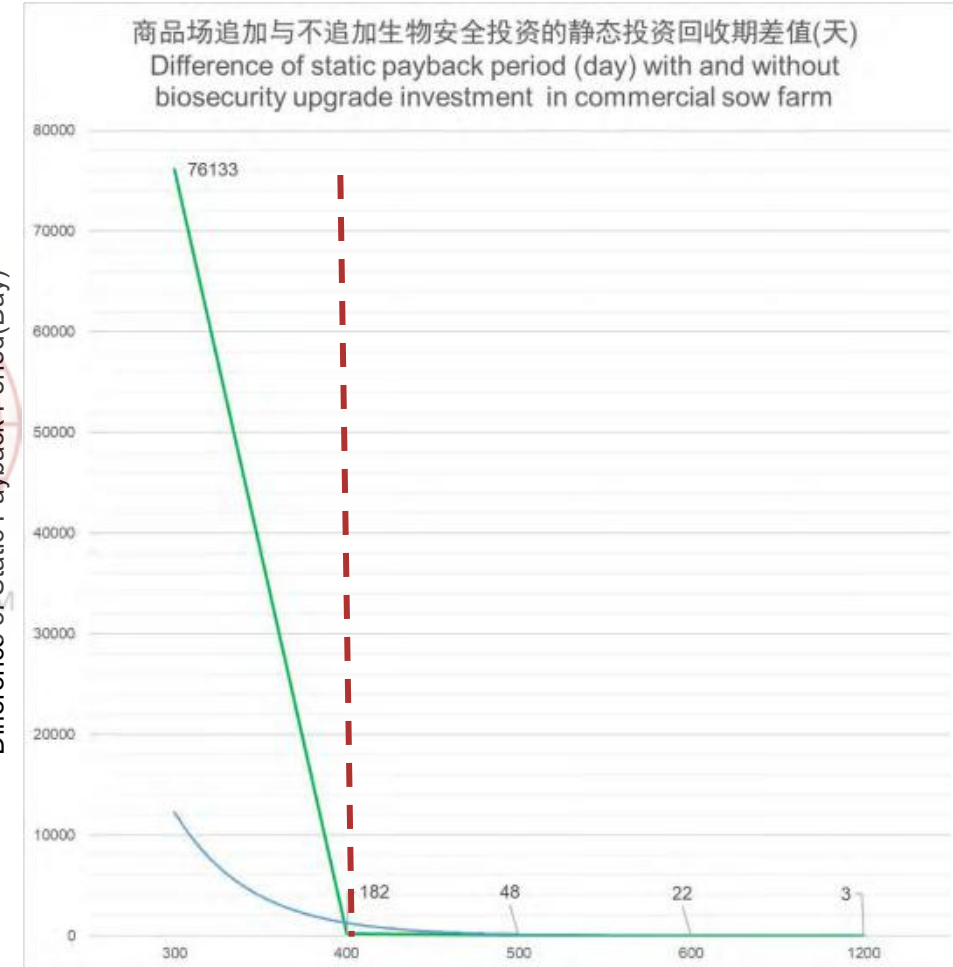
RESULTS- ROI of Biosecurity Investment (Commercial Sow farm)



商品母猪场静态投资回收期分析 (不同断奶仔猪价格)

Static Payback Period Analysis in Commercial Sow Farm (Different gross return per pig sold)

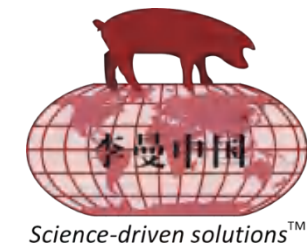
断奶销售苗猪/存栏母猪/年 Weaned pigs sold /sow /year	23				
农场规模 (母猪/头) Herd size (Sow/head)	10000				
每头母猪总投资 (RMB) Total investment per sow (RMB)	15000				
每头出售猪的收益(RMB) Returns per pig sold(RMB)	300	400	500	600	1200
追加生物安全升级投资 Include biosecurity upgrade investment					
除去总成本后收益(RMB) Returns over total costs(RMB)	2.44	102.44	202.44	302.44	902.44
静态投资回收期 (天) Static payback period (Day)	97559	2324	1176	787	264
不追加生物安全升级投资 NOT include biosecurity upgrade investment					
除去总成本后收益(RMB) Returns over total costs(RMB)	11.11	111.11	211.11	311.11	911.11
静态投资回收期 (天) Static payback period (Day)	21426	2142	1128	765	261
追加与不追加生物安全投资的静态投资回收期差值(天) Difference of static payback period (day) with and without biosecurity upgrade investment (Day)	76133	182	48	22	3



每头出售猪的收入 Return Per Pig Sold

结果-生物安全投资回报率(商品母猪场)

RESULTS- ROI of Biosecurity Investment (Commercial Sow farm)



商品母猪场分娩到断奶投资回报率分析 (不同农场规模)

Farrow-To-Wean Pig ROI Analysis in Commercial Sow Farm (Different herd size)

断奶销售苗猪/存栏母猪/年 Weaned pigs sold /sow /year	23					
农场规模 (母猪/头) Herd size (Sow/head)	1000	2000	3000	5000	7500	10000
A 每头出售猪的毛收益 GROSS RETURNS PER PIG SOLD	1800					
每头出售猪的成本 COST PER PIG SOLD:						
1.后备母猪料 GDU feed	11.81					
2.妊娠母猪料 Gestation feed	83.81					
3.哺乳母猪料 Lactation feed	45.50					
4.教槽料 Creepy feed	1.00					
5.配种母猪料 Breed feed	5.03					
6.人工 Labor	25.00					
7.兽药/疫苗/物资 Drugs, vaccine and supplies	39.13					
8.公共资源/水电煤气 Utilities, fuel and oil	3.48					
9.运输和销售成本 Transportation and marketing costs	1.30					
10.建筑维护和设备维修 Building and equipment repairs	10.90					
11.种猪/基因费 Breeding/ genetic charge						
a. 折旧费 Depreciation	-1.93					
b. 精液 Semen	8.20					
c. 利息 Interest	1.92					
d. 保险 Insurance	0.31					
12.专业费用 (法务, 会计等) Professional fees (legal, accounting, etc.)	0.26					
13.建筑和设备折旧 Depreciation on buildings and equipment	31.88					
14.建筑和设备利息 Interst on buildings and equipment	15.54					
15.生物安全体系升级投资 Biosecurity upgrade investment						
a. 建筑和设备 (洗消中心, 外部中转出猪台, 车辆, 实验室, 人员隔离站) 折旧 Depreciation on buildings and equipment (Washing station, External loading ramp, Vehicle, Lab, Quarantine dormitory)	8.70	4.35	2.90	1.74	1.16	0.87
b. 人工 Labor	26.09	13.04	8.70	6.78	4.52	3.39
c. 物资 Ssupplies	1.59	1.59	1.59	1.59	1.48	1.59
d. 生物安全风险监测 Biorisk	13.04	6.52	4.35	3.48	3.48	2.61
B.小计 (每头出售猪的成本) SUBTOTAL (COST PER PIG SOLD)	332.55	308.64	300.67	296.73	293.78	291.60
16.一半的运营成本利息 Interst on half operating costs	5.96					
C.总成本 TOTAL COSTS	338.51	314.60	306.63	302.69	299.74	297.56
D.除去 (A-C) 总成本后收益 RETURNS OVER TOTAL COSTS (A-C)	1461.49	1485.40	1493.37	1497.31	1500.26	1502.44

结果-生物安全投资回报率(商品母猪场)

RESULTS- ROI of Biosecurity Investment (Commercial Sow farm)



商品母猪场静态投资回收期分析 (不同农场规模)
Static Payback Period Analysis in Commercial Sow Farm (Different herd size)

	1000	2000	3000	5000	7500	10000
断奶销售苗猪/存栏母猪/年 Weaned pigs sold /sow /year						
				23		
每头母猪总投资(RMB) Total investment per sow(RMB)				15000		
每头出售猪的收益(RMB) Returns per pig sold(RMB)				1800		
农场规模 (母猪/头) Herd size (Sow/head)	1000	2000	3000	5000	7500	10000
追加生物安全升级投资 Include biosecurity upgrade investment						
除去总成本后收益(RMB) Returns over total costs(RMB)	1461.49	1485.40	1493.37	1497.31	1500.26	1502.44
静态投资回收期 (天) Static payback period (Day)	163	160	159	159	159	158
不追加生物安全升级投资 NOT include biosecurity upgrade investment						
除去总成本后收益(RMB) Returns over total costs(RMB)				1510.90		
静态投资回收期 (天) Static payback period (Day)				158		
追加与不追加生物安全投资的静态投资回收期差值(天) Difference of static payback period (day) with and without biosecurity upgrade investment	5	2	1	1	1	0

结果-生物安全投资回报率(商品母猪场)

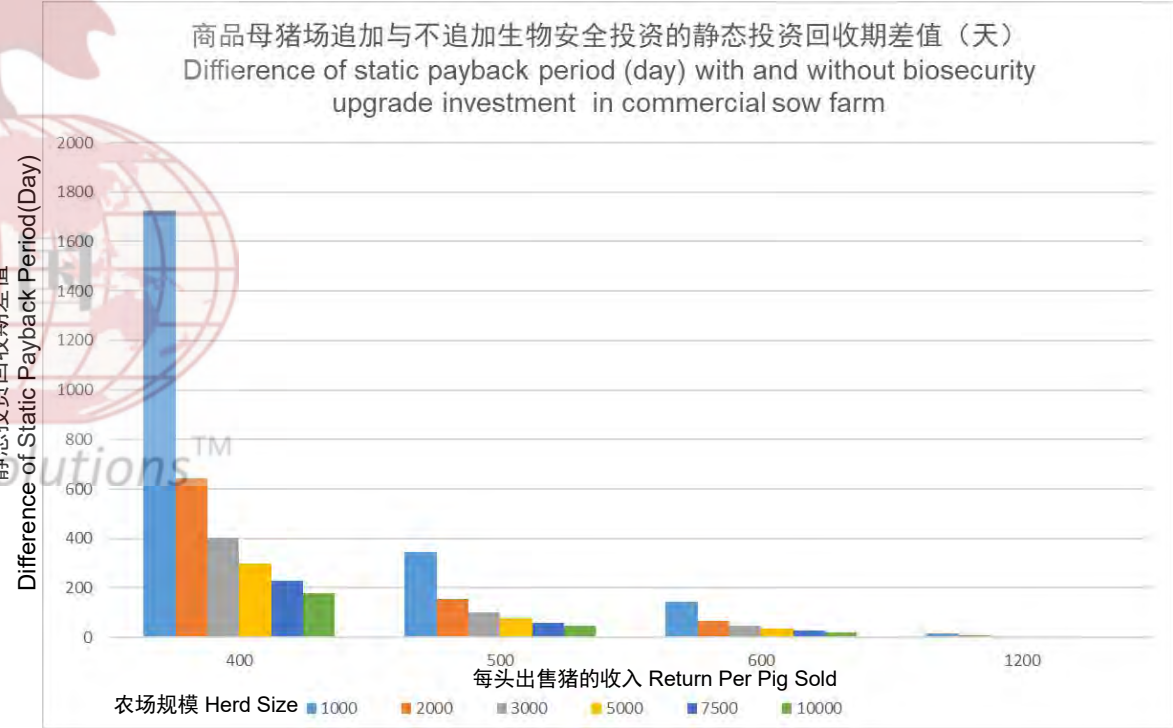
RESULTS- ROI of Biosecurity Investment (Commercial Sow farm)



商品母猪场追加与不追加生物安全投资的静态投资回收期差值(天) (不同农场规模和断奶仔猪价格)

Difference of static payback period (day) with and without biosecurity upgrade investment (Day) in commercial sow farm
(Different herd size and gross return per pig sold)

每头出售猪的毛收益(元) Gross return per pig sold/RMB	农场规模(母猪/头) Herd size (Sow/head)					
	1000	2000	3000	5000	7500	10000
400	1725	641	403	300	228	177
500	345	155	102	78	60	47
600	145	68	46	35	27	21
1200	15	8	5	4	3	2



讨论

DISCUSSIONS



- 规划建立完善的生物安全体系（丹俄SPF体系）。 Build up completed biosecurity system (DanAg SPF system).
- 生物安全升级前后的丹俄生物安全评分提升了325分。通过BioRisk系统对生物安全风险进行监测对管理团队有帮助。 The DanAg biosecurity score before and after the biosecurity upgrade increased by 325 points. Monitoring biosecurity risk by BioRisk is helpful to management team.
- 当种猪场平均断奶仔猪（阉公和二元仔猪）价格超过1000元或农场规模超过2400头母猪时，追加生物安全投资对静态投资回收期影响不显著。 When the average price of weaner (castrated pig and F1) is over 1000 RMB or herd size over 2400 sows, the difference of static payback period with and without biosecurity upgrade investment in breeding farm is NOT significant.
- 当商品母猪场断奶仔猪价格超过400元或农场规模超过2000头母猪时，追加生物安全投资对静态投资回收期影响不显著。 When the price of weaner is over 400 RMB or herd size over 2000 sows, the difference of static payback period with and without biosecurity upgrade investment in commercial sow farm is NOT significant.

致谢

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Science-driven solutions™
Health Management Team of DanAg



感谢关注!

THANKS FOR YOUR ATTENTION!

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