

# EMERGING TECHNOLOGIES WHITE MEAT

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Canada



Presentation at  
DMRI 9-18-17

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# OUTLINE

**Market trends**

**Primary poultry processing**

**Live bird handling**

**Grading - automation**

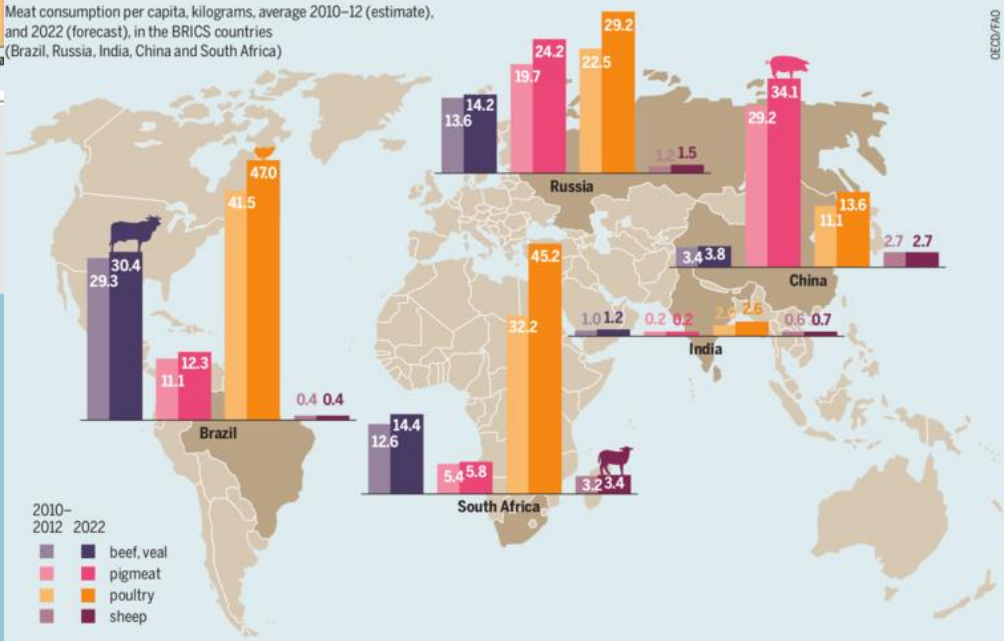
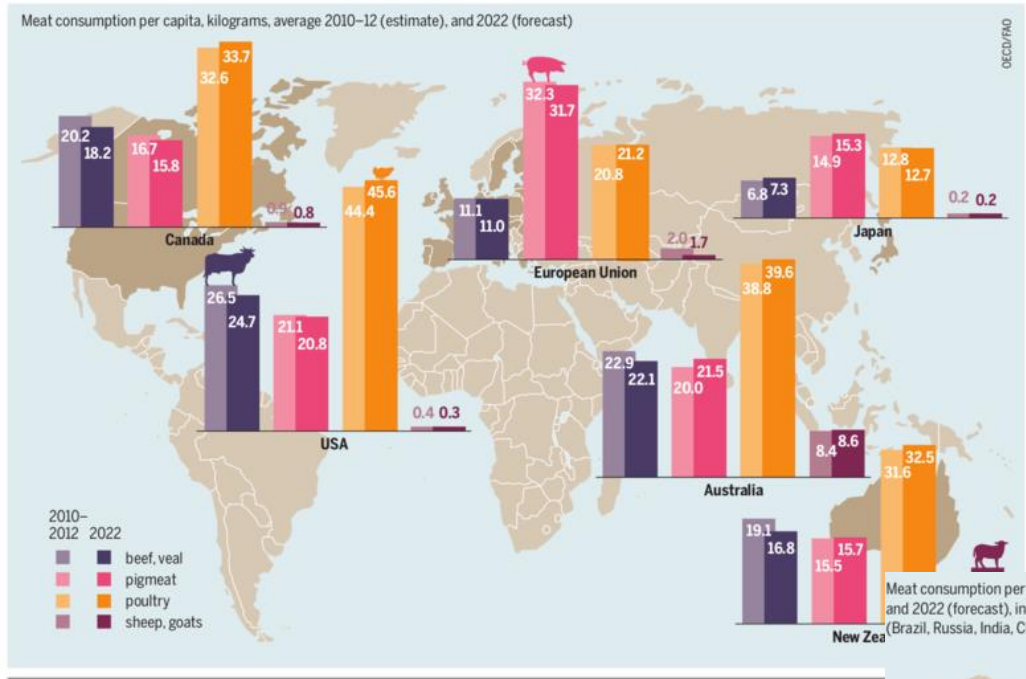
**Deboning (breast, thigh meat)**

**Inspection (x-ray)**

**Packaging (robotics)**

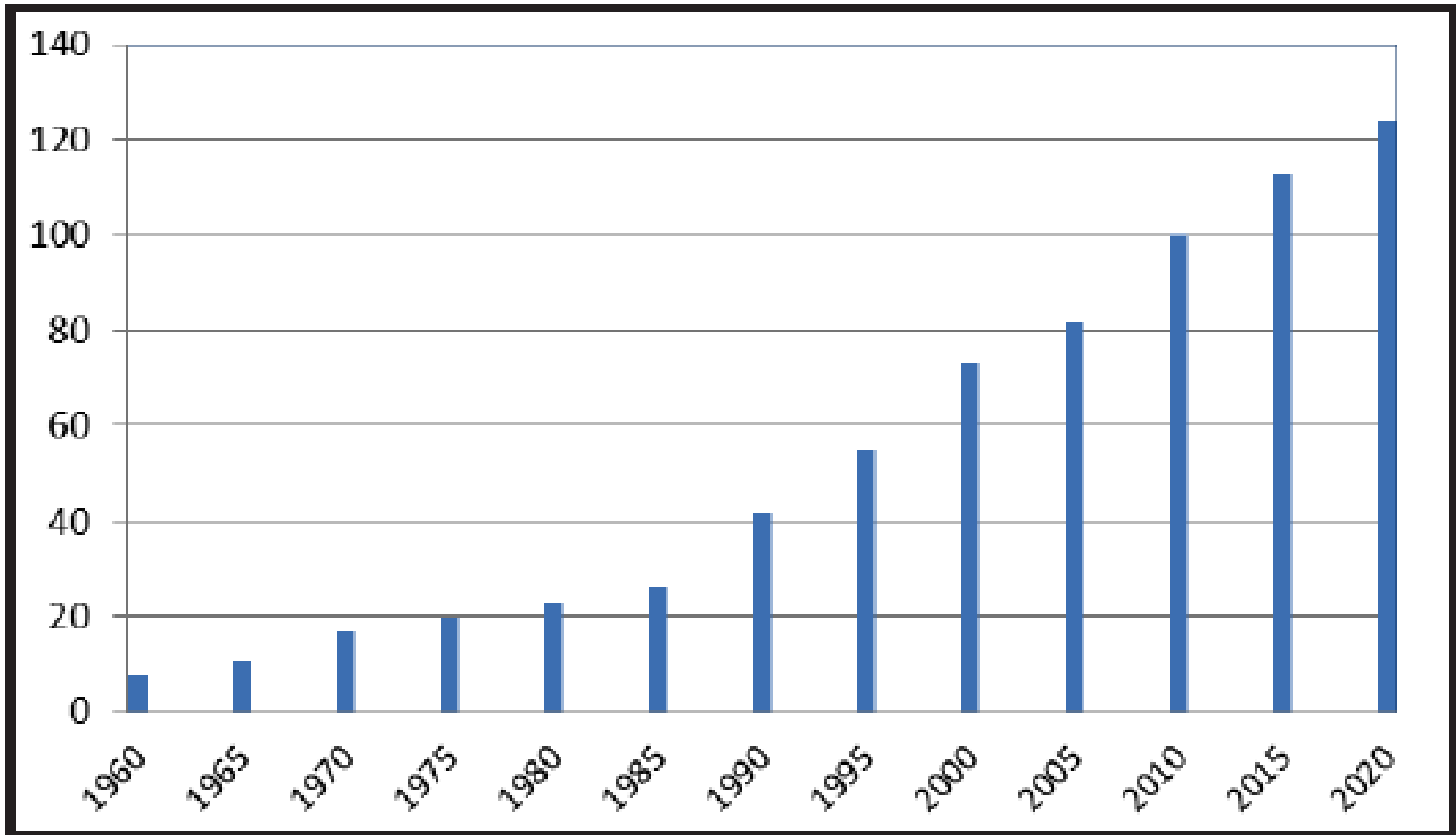
**Conclusions**

# GLOBAL MEAT CONSUMPTION IS INCREASING



Barbut 2015. The Science of Poultry and Meat Processing. On line (Data from FAO)

# GLOBAL POULTRY MEAT PRODUCTION (X 1,000 METRIC TONS OF RTC)

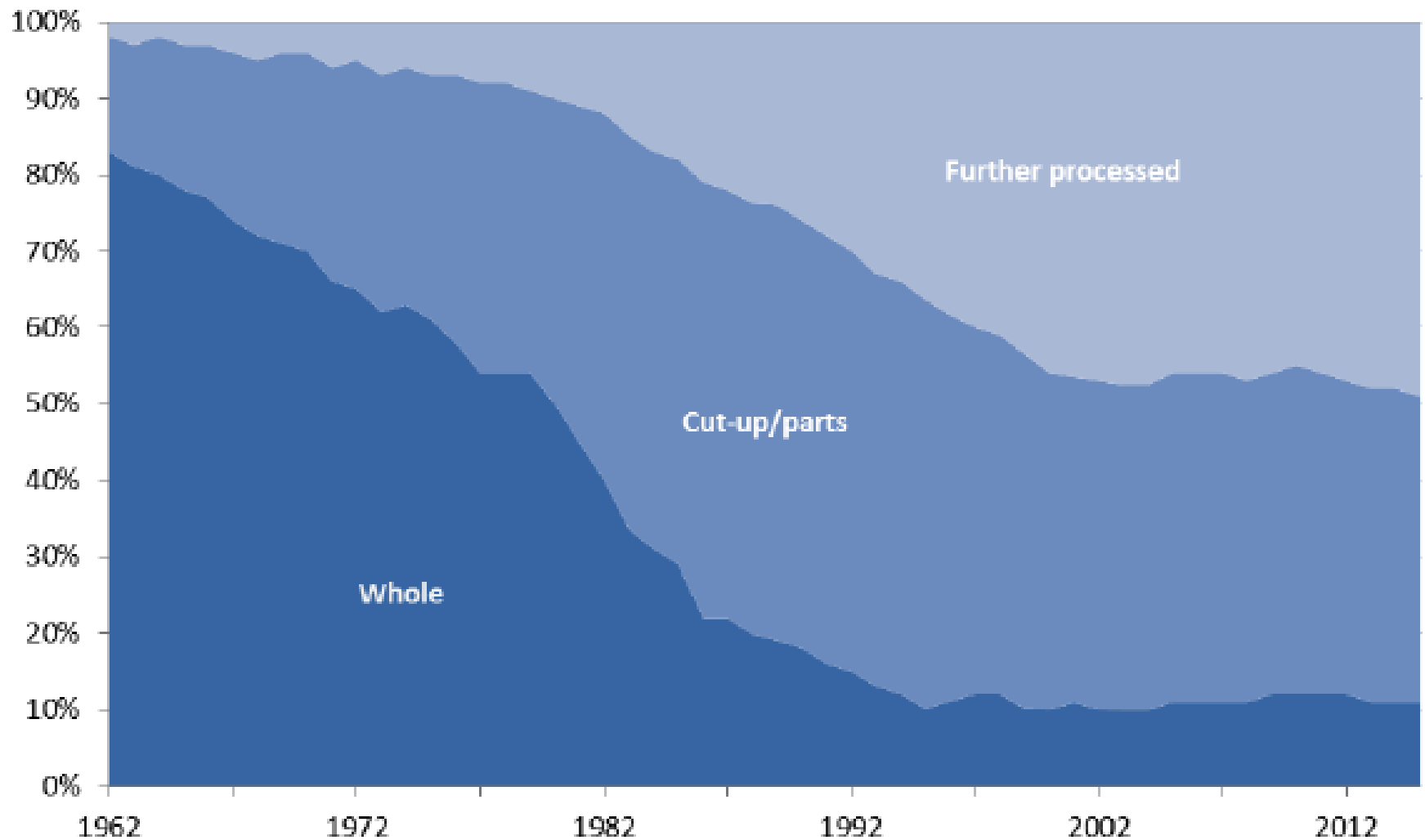


Barbut 2015. The Science of Poultry and Meat Processing.  
On line (Data from FAO)

# IMPROVEMENTS IN POULTRY MEAT PRODUCTION

Year	Age (days)	Weight (lb)	Feed / lb	Mortality (%)
1920	112	2.5	4.7	18
1940	70	2.9	4.0	12
1960	63	3.3	2.5	6
1980	53	3.9	2.0	5
2000	47	5.0	1.9	5
2010	45	5.7	1.9	4

# CHANGES IN MARKETING POULTRY 1967-2017



# MARKET TRENDS

**Improving feed efficiency and size**

**Increasing cut up and processing**

**Higher line speed**

**More automation (farm, plants)**

**Focus on food safety**

**Focus on animal welfare (EC 1099 / 2009)**

# PRIMARY PROCESSING

Receiving and unloading

Stunning

Electrical stimulation \*

Feather / skin / hair / scale removal

Evisceration

Washing\*

Inspection\*

Chilling

Cutting / portioning

Packaging

\* Optional or apply at a different point



# LINE SPEED – BROILERS

<b>Year</b>	<b>Line Speed</b>	<b>Automation</b>
1970	3,000	
1975	4,500	Evisceration
1980	8,000	
1990	9,000	Giblet
2000	10,500	Cut up
2010	12,000	Un loading
2015	13,500	Cut up

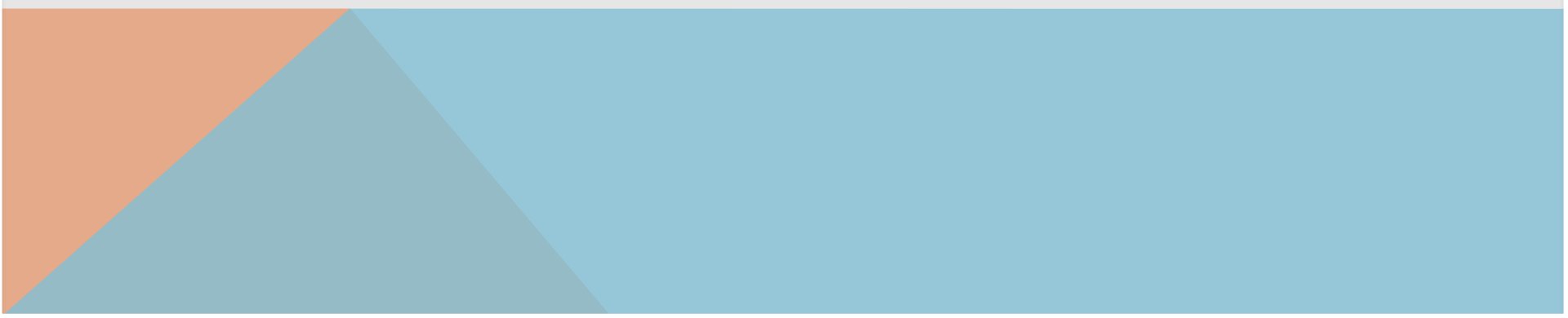
# LABOR IN BROILER PRIMARY PROCESSING PLANTS (USA)

Year	Birds per man hour
1995	210
2000	220
2005	260
2010	285
2015	315

# **LIVE ANIMAL HANDLING LOADING AND UNLOADING POULTRY / BEEF / PORK / FISH**

**Manual**

**Automation**



# LIVE BIRD HANDLING MANUAL LOADING

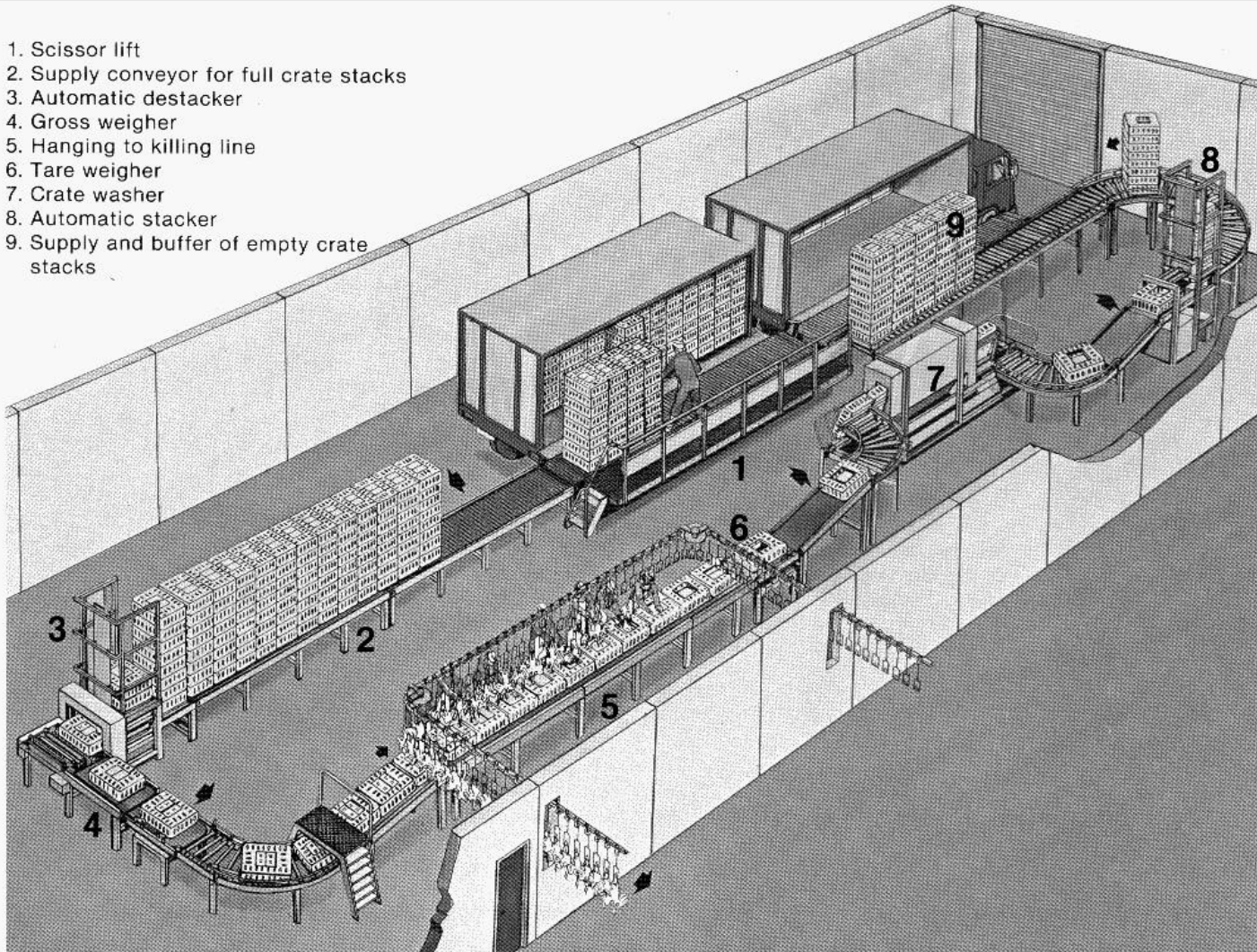


Courtesy of Marel



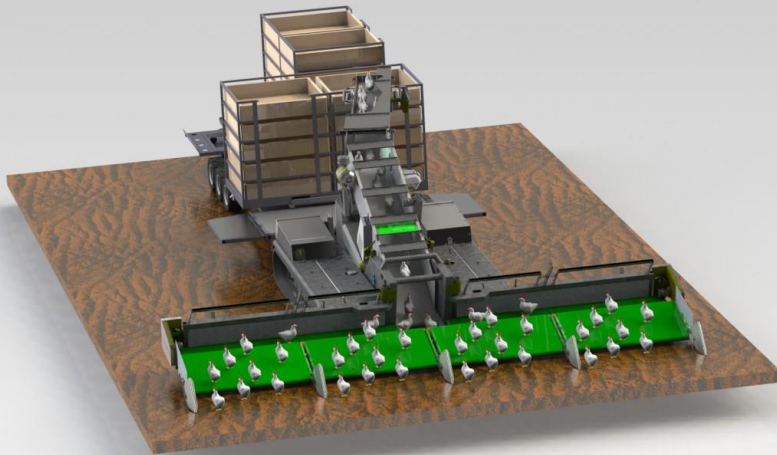
# UN LOADING - MANUAL

1. Scissor lift
2. Supply conveyor for full crate stacks
3. Automatic destacker
4. Gross weigher
5. Hanging to killing line
6. Tare weigher
7. Crate washer
8. Automatic stacker
9. Supply and buffer of empty crate stacks



# LIVE BIRD HANDLING LOADING

## AUTOMATION



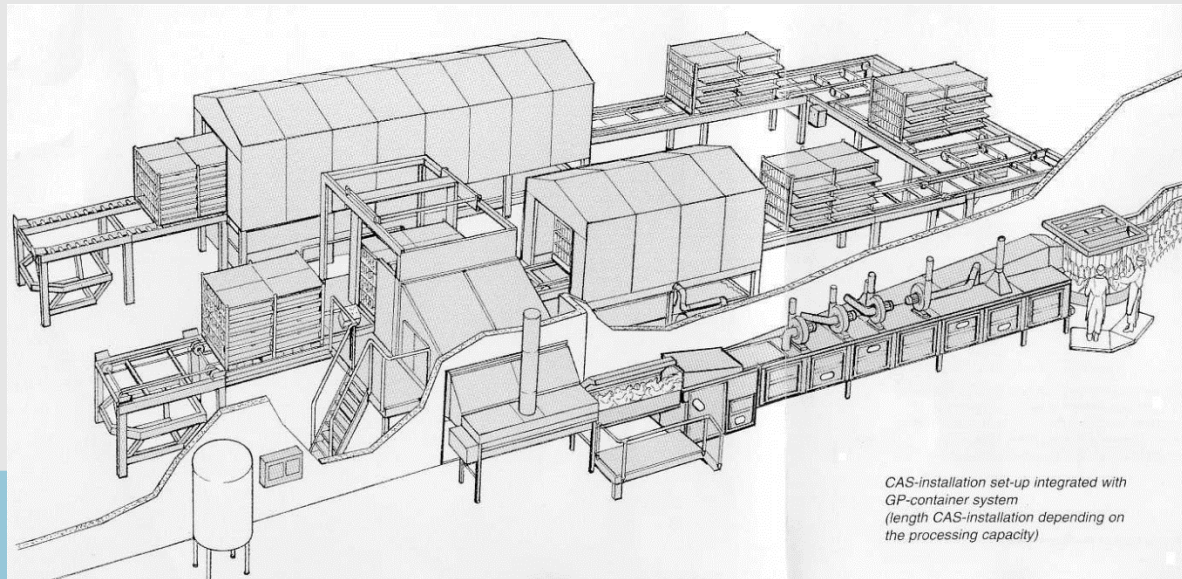
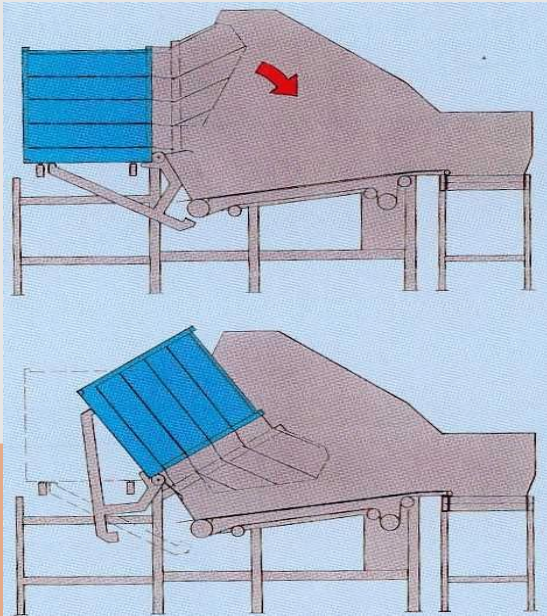
CMC - Italy



Chicken Cat - Denmark



# UNLOADING AND STUNNING AUTOMATIC



*CAS-installation set-up integrated with  
GP-container system  
(length CAS-installation depending on  
the processing capacity)*

# PRIMARY PROCESSING

Receiving and unloading

Stunning & Bleeding

Electrical stimulation \*

Feather / skin / hair / scale removal

Evisceration

Washing\*

Inspection\*

Chilling

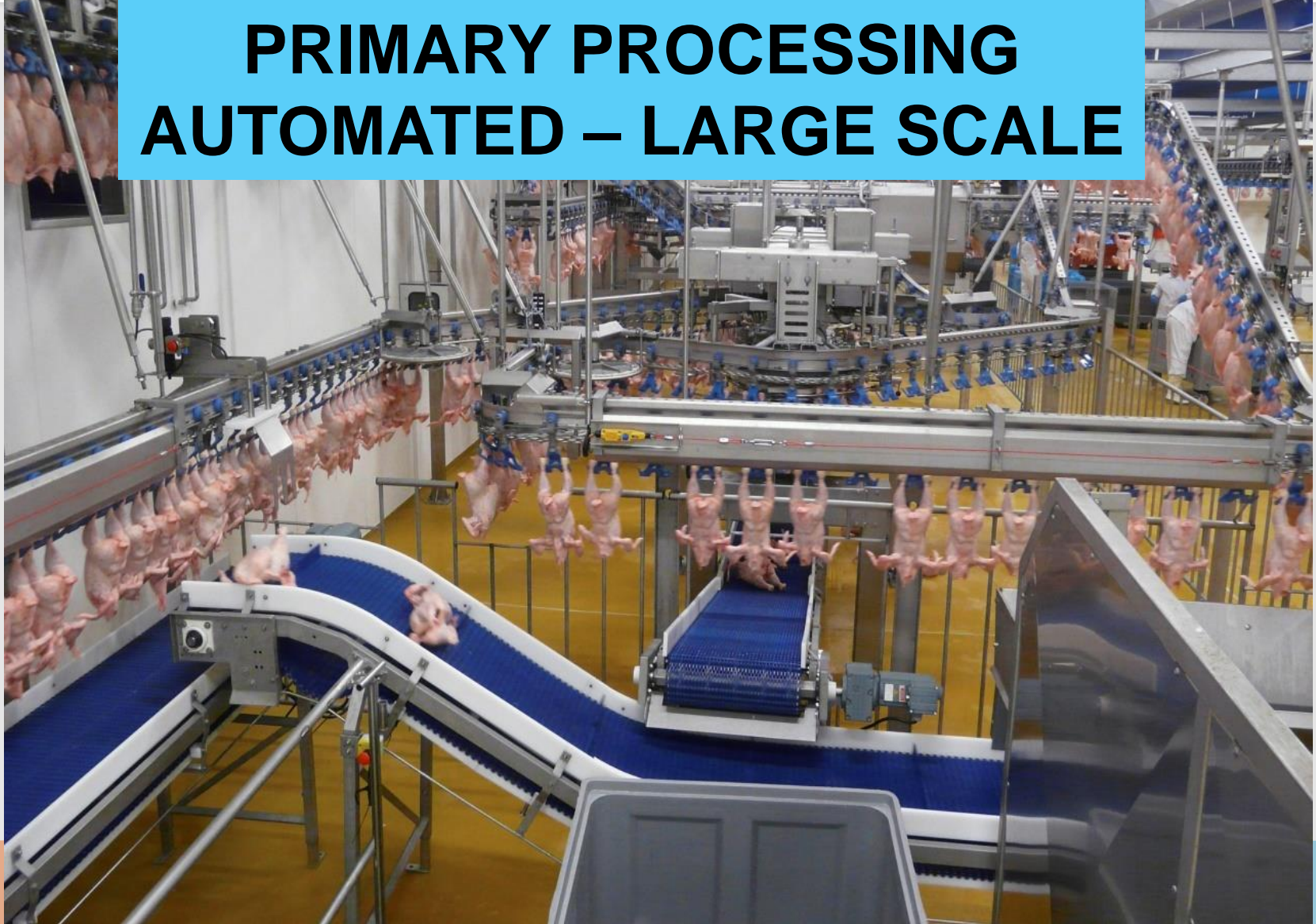
Cutting / portioning

Packaging

\* Optional or apply at a different point



# PRIMARY PROCESSING AUTOMATED – LARGE SCALE



Courtesy of Marel

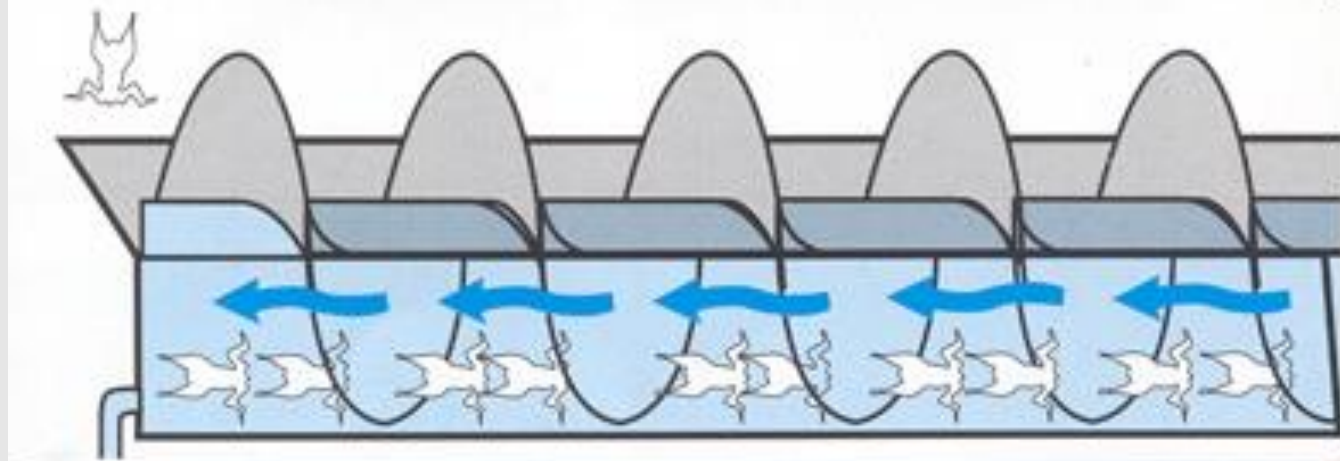
# GRADING / SORTING (IMAGE ANALYSIS)



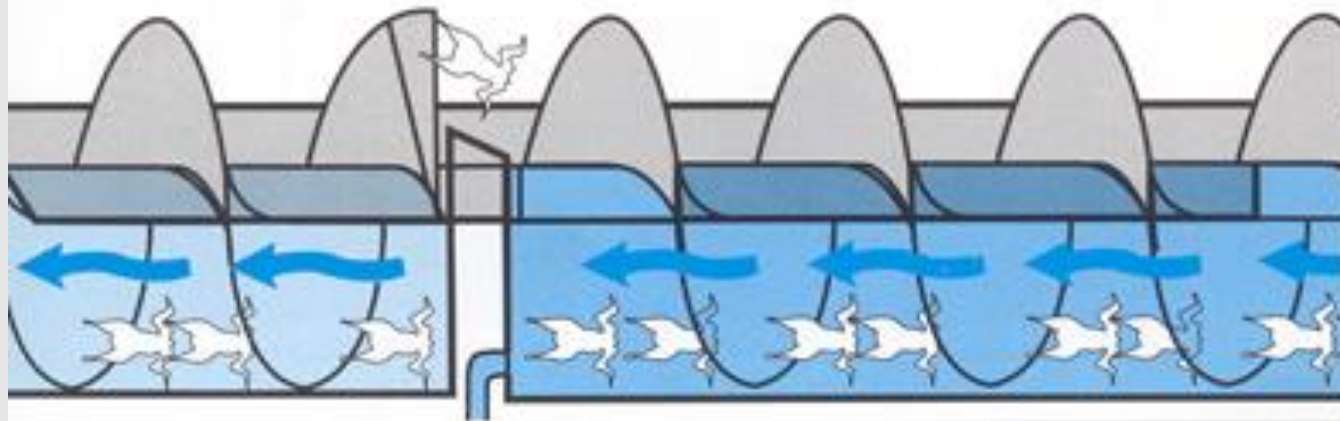
# WATER CHILL

(Simple bath)

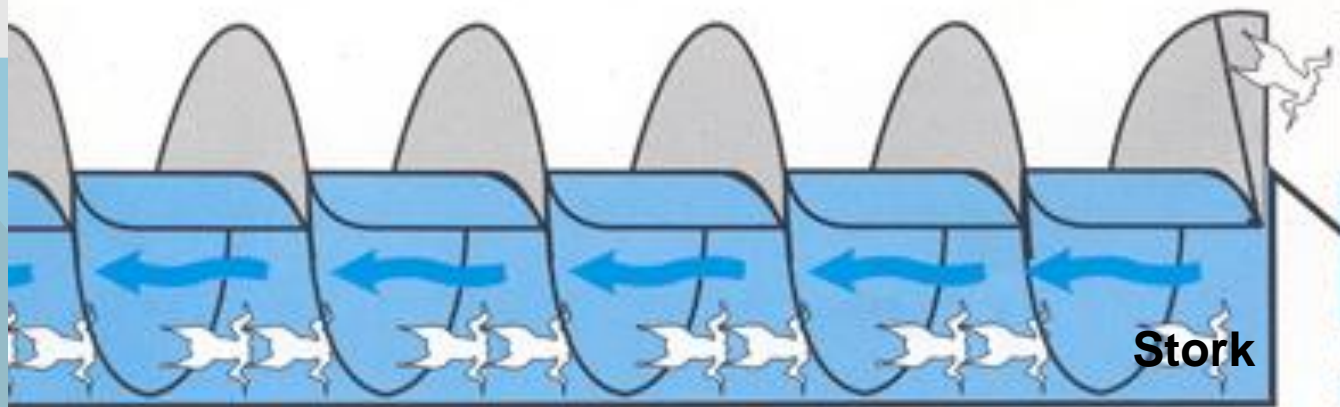
Counter flow



Multiple stages



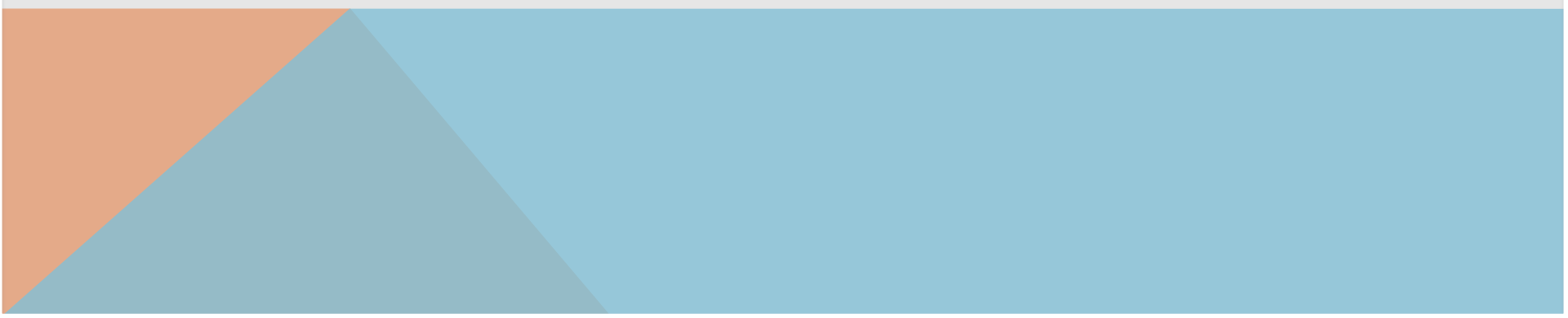
Agitation



# **ELECTRICAL STIMULATION**

**Initially lamb meat**

**Later beef and poultry**





# DEBONING - CHICKEN BREAST FILLETS



Marel

# DEBONING – THIGH MEAT



# INSPECTION – FOR BONES / FOREIGN MATERIAL

**SensorX**  
select lane to display

101

**Settings**

Lane

View **all pieces** ▼

Program **prog0** ▼

**Statistics**

	%	Count

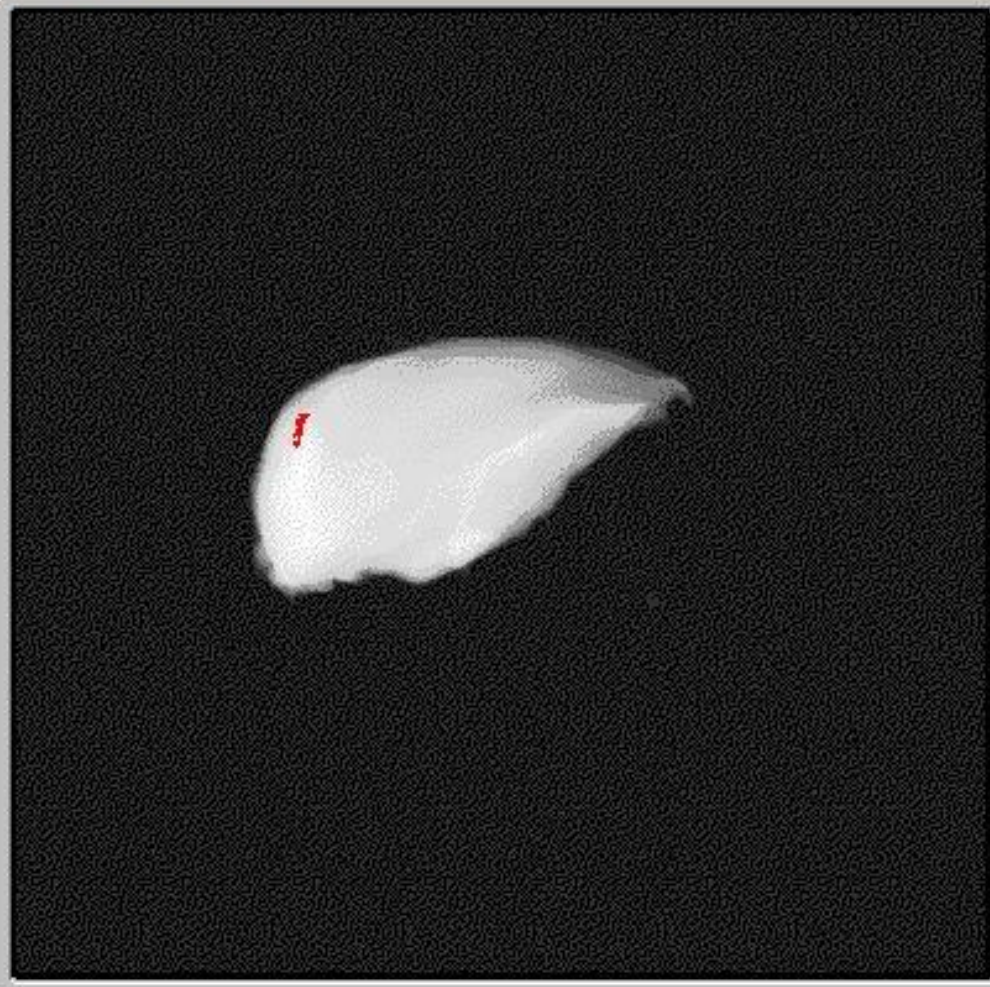
**Status**

**X-ray off**

**PC not running**

**Safety circuit OK**

Actions ▲ Reject ▲ Statistics ▲ X-ray ▲ Calibrate

The main display area shows a grayscale X-ray image of a bone. The bone is white and irregularly shaped, set against a dark, textured background. A small red mark is visible on the left side of the bone.



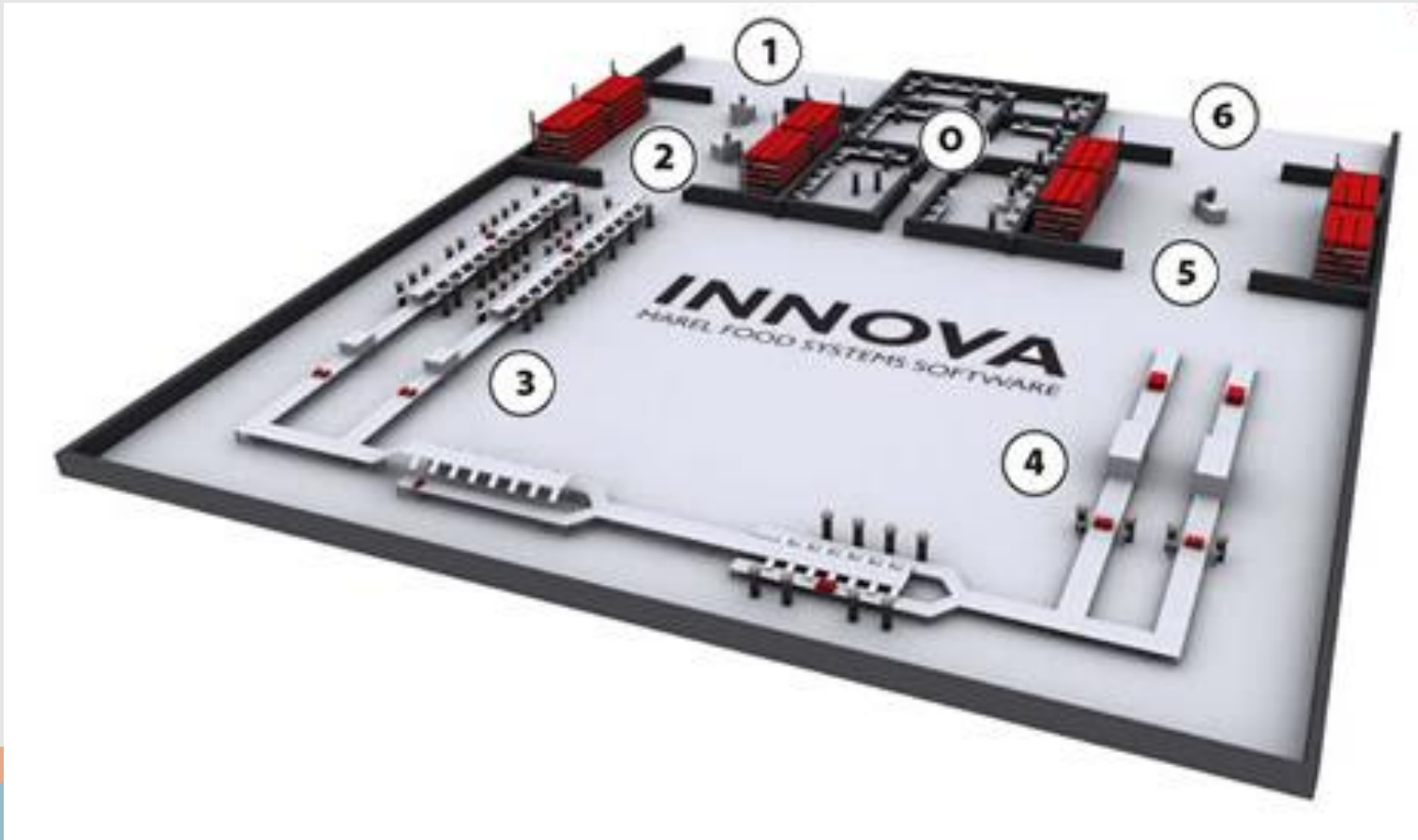
# AUTOMATED – TRAY PACKING





# INTEGRATED COMPUTER CONTROL

1. Receiving Supplies
2. Raw Material Inventory
3. Processing
4. Packing
5. Final Goods Inventory
6. Dispatch



Improved: productivity, inventory control, traceability

# MONITORING PLANT OPERATION / EFFICIENCY (ON YOUR PHONE / TABLET / PC)



# MONITORING PLANT OPERATION / EFFICIENCY (ON YOUR PHONE / TABLET / PC)



# CONCLUSIONS

**Significant progress over the past 50 years**

**Combine knowledge from:**

- animal physiology, meat science, engineering, computer science, animal health and welfare

**Reduced manual labor (repetitive motions)  
and increased automation**

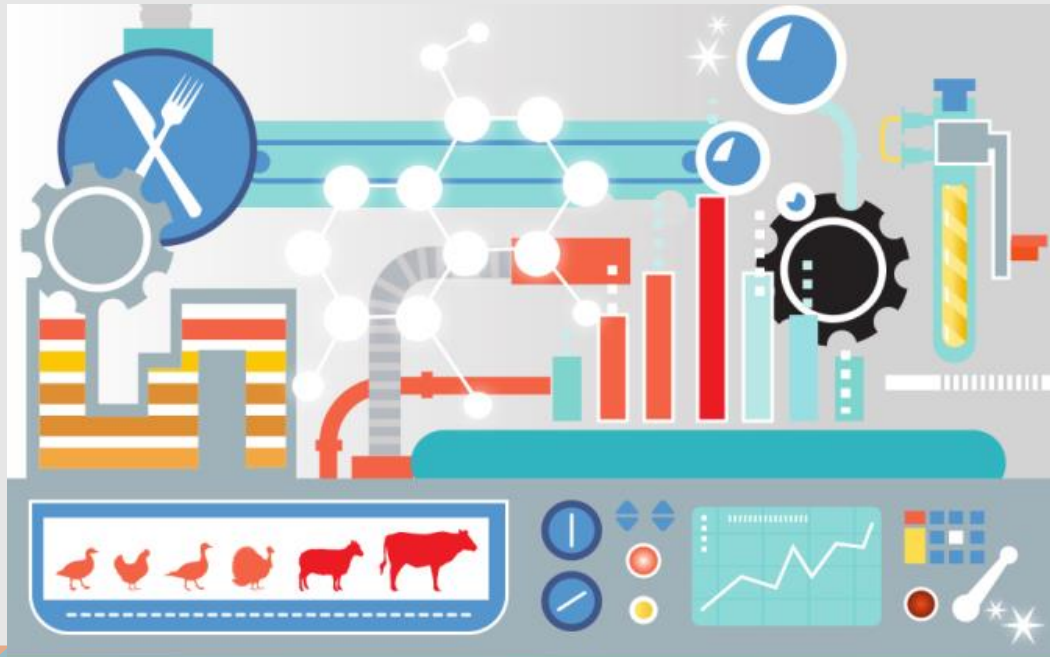
**Allowed moving to higher efficiency, capacity**

**Improved sanitation and traceability**

**Expect more to come...**

# THANK YOU

[www.poultryandmeatprocessing.com](http://www.poultryandmeatprocessing.com)



## The Science of Poultry and Meat Processing

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