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China's Advancements in Mega Farming: The Evolution of Agriculture

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Throughout history, agriculture and livestock management have sustained humanity. However, as the global population surged during the second industrial revolution, the challenge of providing for an ever-expanding populace prompted the development of innovative solutions. Enter the era of modern mega farms – vast, controlled environments where hundreds to thousands of animals are nurtured, monitored, and milked using state-of-the-art technology.

1. IoT and Technological Integration in Farming:

The integration of cutting-edge technology revolutionized farming practices. Smart animal monitoring systems emerged, enhancing farm efficiency and enabling remote management through mobile devices. These systems empowered farmers to identify and address health issues in animals promptly, regardless of their location.



Fig.1 Illustration of Chinese using technology to bring betterment in livestock management

2. China's Transition from Traditional Farming:

Prior to 1990, Chinese cattle farming adhered to traditional methods, resulting in modest yields despite immense effort. Predominantly small family-owned operations catered to local needs. However, as China embraced globalization and became a global manufacturing hub, these practices proved insufficient. Recognizing this challenge, the Chinese government intervened, facilitating the adoption of modern farming and breeding techniques. This intervention bore fruit, propelling China to become the sixth-largest milk producer globally.

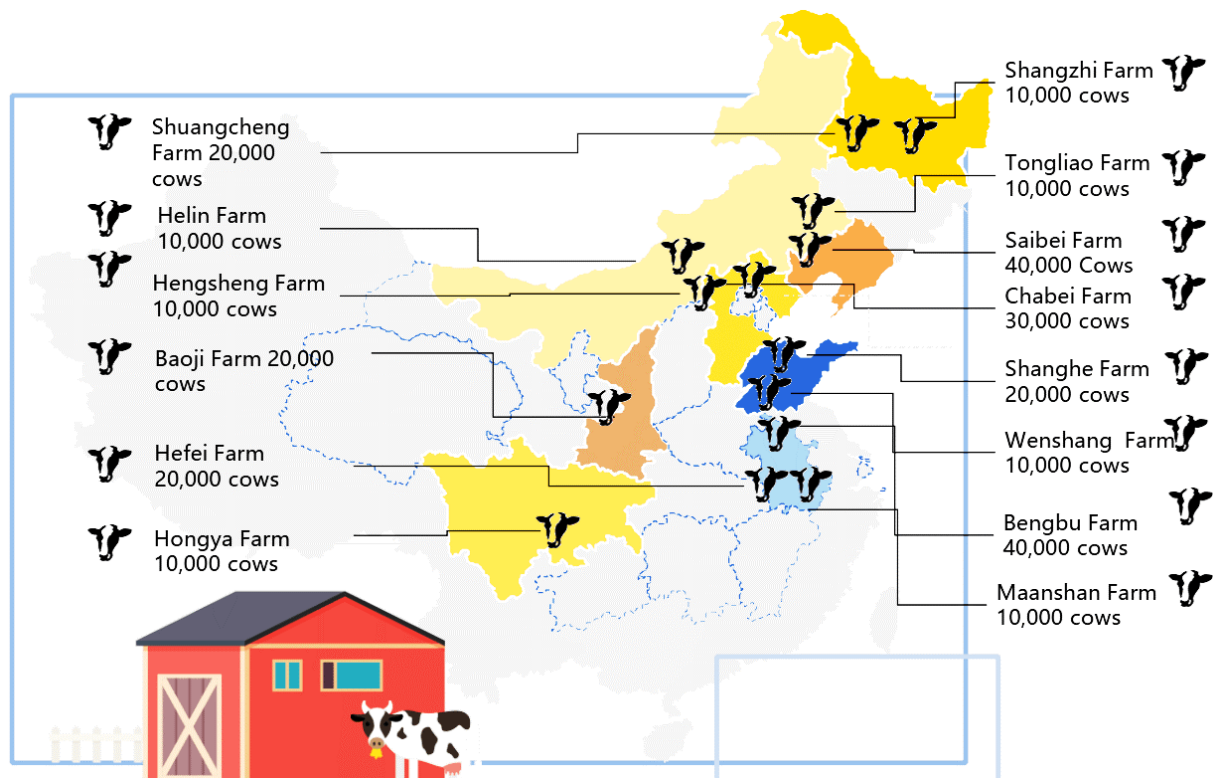


Fig.2 Emergence of Mega Farms

3. The Emergence of Mega Farms:

In 2019, China produced a staggering 32 billion kg of milk annually. According to 'China Dairy Industry Statistics 2020,' the top 25 milk farming companies accounted for 29% of this total, maintaining 1.7 million dairy cattle. Noteworthy among these

companies are Mudanjiang City Mega Farm in Heilongjiang, Modern Dairy in Anhui, and several others. These farms, housing up to 100,000 cows each, exemplify China's



commitment to modernized agriculture. Moreover, the AustAsia conglomerate, spanning seven locations, boasted an impressive average milk yield of 12,600 kg per cow annually.

3.1 Shifting Consumption Patterns:

China's economic progress empowered a burgeoning middle class with greater purchasing power. Health-conscious choices led to a quadrupling of milk consumption in a decade, reaching 20.3 kilograms per person in 2017. This dietary transformation necessitated local farm expansions.

3.2 Mudanjiang Dairy Farm: A Monument to Innovation:

One standout exemplar of China's progress is the Mudanjiang Dairy Farm – an expanse equivalent to Portugal's size. Launched in 2015 through collaboration between

Zhongding Dairy Farming and Russia's Severny Bur company, this monumental endeavor spans 22.5 million acres and houses 100,000 cows, annually yielding around 800 million liters of milk.

4. Modern Dairy Farm: Pioneering Excellence:

Ranking as the world's second-largest dairy farm, Modern Dairy Farm houses 38,000 cows across 26 spacious barns. Established in 2005, this remarkable enterprise continuously evolves, harnessing technology for optimal efficiency. Adjacent to the farm sprawls a 6667-hectare alfalfa pasture, ensuring high-quality feed for the animals.



Fig.3 Illustration of Chinese using strategic framework for livestock management

5. Strategies for Enhanced Yield:

China's dairy farms employ a diverse range of techniques to boost production. These methods merge modern and traditional practices, resulting in remarkable outcomes.

- Age-Specific Barns: Categorizing cows by age allows tailored care, maximizing yields by addressing varied nutritional needs.
- Calf Care Emphasis: Calves receive special attention, ensuring their health and development. Outdoor huts maintain hygiene and exposure to fresh air, promoting optimal growth.
- Organic Nutrition: Organic feed, customized by age and condition, contributes to robust health and high yields.
- Comfort-Centric Environment: Ample ventilation, cooling mechanisms, and spacious, sunlight-flooded barns keep cows content, promoting healthy milk production.
- Smart Health Monitoring: Sensors track vital signs, detecting diseases early and ensuring prompt treatment. Foot and Mouth disease, a common threat, is vigilantly managed.
- Automated Milking: Rotating milking parlors ensure a stress-free process, prioritizing cow comfort and milk quality.
- Genetic Diversity: Importing diverse cattle breeds enhances local stocks and encourages adaptability through crossbreeding.



Fig. 4 wearable smart sensors for monitoring health of the animals



6. China's Mega Farms: A Glimpse of the Future:

China's journey from traditional farming to cutting-edge mega farms is a testament to visionary leadership and technological prowess. These farms stand as beacons of innovation, ensuring food security, supporting economic growth, and exemplifying China's commitment to sustainable agricultural practices.

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