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Recent Advances and Science & Technology involved in the Indian Livestock Industry

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Abstract

The livestock sector's colourful and extremely dynamic qualities have created a potential milestone in response to its rapidly growing demand worldwide, especially in developing countries. Numerous production techniques are continuously increasing the sustainability and efficiency of livestock products, even while the demand for them in industrialized countries is seen to be stagnating. Through the provision of high-quality food, the amplification of crop output, and the distribution of enormously profitable commodities and services, livestock is quickly making a significant contribution to rural development. A noteworthy contribution to its prospective production has been identified with the current developments in animal health, nutrition, and breeding. Optimal Livestock Agriculture, wearable sensors, and biosensors as an application for managing animal health are all growing markets that are helping to increase the socioeconomic advantages of both animal husbandry and livestock management. Smartphone apps brought forward by the Digitalized India Scheme have raised awareness among Indian farmers.

Keywords: Livestock, Smartphone Apps, Digitalization, Animal farming, Sustainability

Introduction

In order to produce and manage livestock animals, including the production and handling of meat and other animal products, the program and solutions that are mainly focused on the administration and implementation of biological and chemical foundations are known as livestock management. Livestock management and production is the most comprehensive and dynamic system available. It encompasses a wide range of activities, including studies in nutritional sciences, food sciences, animal science education, biochemistry, and related fields of human and animal health and safety. Livestock contributes significantly to the diversity of overall agricultural productivity and has been shown to increase employment and year-round revenues (Rao, 1997). The sales of livestock products generate the money needed to buy crop inputs and support farming-related investments. The effective dominance of livestock is primarily responsible for the improvement of the farming system's sustainability and economic viability (Banhazi, 2012).

Precision Livestock Farming

Precision Livestock Farming is a smart farming technique which is an essential part of Livestock Revolution to increase the efficiency and productivity and meet the demands, while maintaining the welfare of animals (Simm, 1998). Smart Farming focuses on:

- Improving Living Conditions of Livestock
- Avoiding Illness of Farm Animals
- Improving Genetics and Reproductive Cycle
- Optimizing Feed Usage along the Supply Chain.

Essentials Of Smart Farming

- An approach to enhance and achieve economically, environmentally and socially sustainability in farming by observing and controlling group of animals and interpreting their behavior.
- It involves the exchange of accurate data as well as traceability.
- It aims at coordination between the expert farmers, engineers, biologists and economists to obtain best results.
- It focuses on every need and requirements of individual animals and tries to fix it on time.

Biosensors and Wearable Technologies

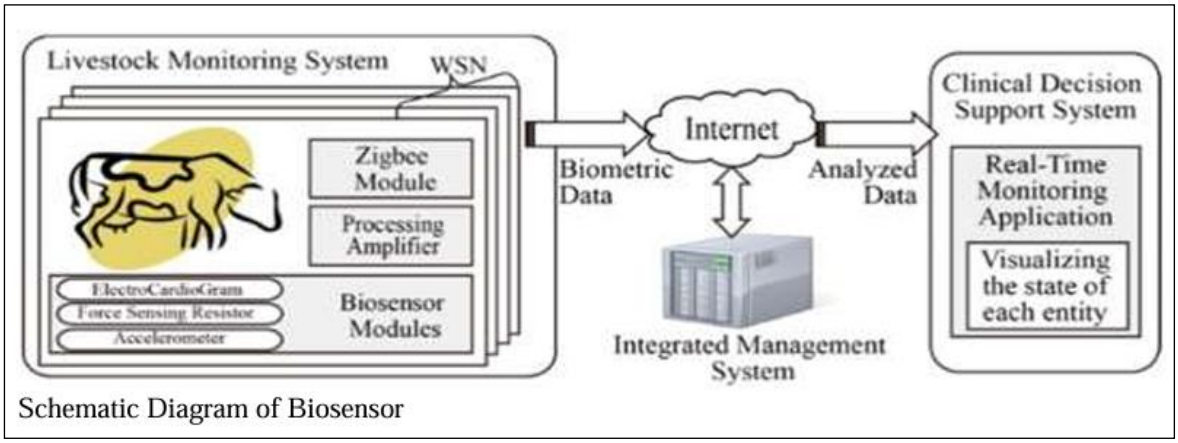
Biosensors, as an application for Animal Health Management has achieved a great rank in the emerging markets. These are the kind of devices that help persistently in diagnosis of diseases in animals on time (Nikhil *et al*., 2016). These find application in both poultry and dairy farms. The recently developed method aids in providing precise information about the animals' current physical status. Developing countries such as India have benefited greatly from the adoption of biosensors, which have increased cattle productivity and yield. New wearable technology is being developed to address the demands of animals. The wearable technologies are more efficient and possess multi functions, allowing the farmers to access the present condition of animals and doing more in less time (Leakey, 2009).

Functions of Biosensors:

- Helps in detecting sweat constituents
- Measure body temperature

- Analyze behavior and movement
- Detecting stress
- Analyzing sound
- Measuring pH
- Preventing diseases
- Detecting Pathogens
- Detecting Viruses

It plays a significant part in keeping animals healthy and averting their deaths. The wearable sensors can also be used for general farm monitoring. Cellphone biosensors are easier to use and more dependable. This reduces the effort required to manually record data by replacing manual systems (Steinfeld *et al*., 2006).



Schematic Diagram of Biosensor

Smartphone Apps

A number of apps have been developed related to awareness regarding health on smartphones and to monitor the basic fitness and well-being. Farmers can determine the health of their livestock with the help of this program. The goal of Digital India, which was introduced in India is to empower rural areas by increasing digital literacy. Since livestock support more than 58% of rural communities, digital agriculture apps have been developed to raise awareness of livestock management and to improve the health of farm animals. While helping to provide everyone with affordable and wholesome food and raising awareness of farm animals and illnesses, the adoption of Digital India Apps aided in the dissemination of localized information and services related to social, economic, and environmental sustainability. The government has effectively disseminated cutting-edge programs pertaining to livestock management and

agricultural development to farmers in rural India through smartphone apps. This has changed the game in India's livestock industry.

Some of the famous Agricultural and Livestock Development Apps leading to the Enhancement of Livestock Sector in India Includes:

- Kisan Suvidha
- IFFCO Kisan Agriculture
- RML Farmer-Krishi Mitr
- Pusa Krishi and Agri App
- Kheti Badi and Krishi Gyan
- Crop Insurance
- Agri market
- Whats App

Livestock Drone Technology

Drones play a significant role in the livestock industry, just as they do in the agriculture sector. Through drones, farmers can maintain a careful watch on their overall behaviour and health. Drones can provide information about the general state of farms and the activity of newborns. When combined with multi-spectrum high-definition cameras and infrared sensors, real-time images and videos of flocks and herds in every season can be seen.

ROBOTICS

Robotics is a cutting-edge technology that rapidly advances farmers' ability to better manage their farms by increasing productivity, lowering labour costs, and improving animal welfare. The Automated Milking Robots have made it possible for dairy cows to milk in accordance with their own biorhythms, enabling free cow traffic. The health, well-being, and milk output of the cows are all positively impacted by this. By determining not only the weight of the cow but also its milk quality, including its fat and protein content and rumination activity, robots assist in accessing vast amounts of data on its health.

Portable Device to Detect Adulteration

Central Electronics Engineering Research Institute (CEERI) Pilani has successfully invented a device that helps in the detection of adulterants like urea, salt, detergents, caustic soda and boric acid in just one minute. This portable meter can be used by domestic users, dairy

framers, and law enforcement to identify any form of adulteration. The cost of production is only 5000 Indian rupees. About 3 milliliters of milk and 10 milliliters of water are needed for testing. It is necessary to include a biochemical capsule into the solution. Do not disturb it for a minute. Next, plunge the meter's probe, hit the "Ok" button, and record the outcome. Any form of adulteration is detected by it.

Conclusion

Particularly in India, growing industrialization may result in problems like pollution and corruption. Climatic change that has already been impacted will be most affected. Efforts to reduce greenhouse gas emissions will surely result in higher costs. To succeed and lessen the poverty that still exists in the livestock industry, especially among Indian farmers, a clever and creative approach must be put into place. Only if effective strategy and method are alleviated can the growing demand for livestock lead to a reduction in poverty. As livestock handling becomes more industrialized, poor people face numerous challenges. Optimal Livestock Agriculture, wearable sensors, and biosensors as an application for managing animal health are all growing markets that are helping to increase the socioeconomic advantages of both animal husbandry and livestock management.

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