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Harnessing Potential of Livestock Sector for Food Safety And Financial Security

Noone Sai Ram[1], Mayur Sudhirrao Nimgaonkar[2]

[1]M.V.Sc Scholar of Department Livestock Product Technology, Rajiv Gandhi Institute of Veterinary Education and Research.
[2]M.V.Sc Scholar of Department of Veterinary Anatomy, C.V.Sc & A.H., A.N.D.U.A.T., Kumarganj, Ayodhya.

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Introduction

India has been a predominantly an agrarian economy since time immemorial. The developmental efforts over the last few decades have been doubtlessly strengthened our industrial base. However, agriculture continues to be the mainstay of our economy even today. In India, keeping milch animals has been never a separate occupation from agriculture. Thus, rural economy is closely tied up with milch animals. Dairying plays a crucial role in the economy of our country. It helps in augmenting food supply, generating employment and raising nutritional level. It is a major source of income to the small and marginal farmers. The major advantage of dairy farming is its minimum land dependency and resource flexibility. Global consumption, production, and trade of livestock products have increased rapidly in the last two decades and are expected to continue. At the same time, safety concerns regarding human and animal disease associated with livestock products are increasing. Dairy is the single largest agricultural commodity contributing 5 per cent of the national economy and employing more than 8 crore farmers directly. India is ranked 1st in milk production contributing 23 per cent of global milk production. Milk production in the country has grown at a compound annual growth rate of about 6.2 per cent to reach 209.96 million tonnes in 2020-21 from 146.31 million tonnes in 2014-15. According to FAOSTAT production data (2020), India ranks 3rd in Egg Production and 8th in meat production in the world. Egg production in the country has increased from 78.48 billion in 2014-15 to 122.11 billion Nos. in 2020-21 (Provisional). The per capita availability of egg is at 91 eggs per annum in 2020-21

(Provisional). Meat production in the country has increased from 6.69 million tonnes in 2014-15 to 8.80 million tonnes in 2020-21 (Provisional).

Antimicrobial peptides as a feed additive alternative to animal production, food safety and public health implications

The increasing application of antibiotics and other growth promoters has revealed unfortunate "side effects": the appearance of AMR, multidrug resistant bacteria, and hazardous risks for human health. To tackle this broad-spectrum problem at different levels, AMP. have been proven to be efficient and promising, have shown biological activity and applicability against several microorganisms, mainly in the areas of animal production, as well as being suitable for food preservation. The multiple properties of AMP make them optimistic and powerful candidates to replace conventional drugs. Moreover, the development of new natural peptide-based antimicrobials for livestock, swine and poultry can help to reduce the antimicrobial problem without affecting either animal production or human health, nor leaving any pharmacological residues that generate environmental impact issues.

Drug residues

Drug residues happen when an animal is given drugs, and those drugs remain above safe tolerance levels in either the animal's milk before processing or tissues after slaughter. Because drug residues in milk and meat have important food safety considerations, the Food and Drug Administration (FDA) in the 1970s began setting tolerance levels for drugs based on safety data; some drugs have a zero-tolerance level. Any milk or meat with residues exceeding either the safe tolerance level or the zero-tolerance level will be discarded or condemned. So, Testing for drug residues should be routinely carried out.

Follow the five R's to prevent drug residues (given by university of Minnesota)

Relationships: Develop good relationships with people involved in the process

- Establish a good Veterinarian-Client-Patient Relationship (VCPR).
- Review veterinary recommendations with employees and family members who work on the farm.
- Provide employees and family members with regular training on the prevention of milk residues as well as farm protocols for handling animals that have been treated.

Responsible use: Use and handle veterinary drugs responsibly

- Minimize the use of veterinary drugs to times when they are medically necessary.
- Store veterinary drugs for lactating and non-lactating animals separately to prevent mix-ups.
- Store medicated feeds properly to prevent accidental use.
- Properly label and store over the counter, prescription, and extra-label drugs, including information with appropriate milk and meat withdrawal times.
- Develop animal treatment protocols with the help of the farm veterinarian.

Recordkeeping: Maintain good records to document treatments

- Use a good system to identify individual animals.
- Maintain a recordkeeping system to document all treatments given.
- Identify the animal before it is treated.
- Record the treatment before it is administered.
- Keep treatment records for at least 3 years.

Respect withdrawal times and usage limitations

- Use only veterinary drugs that are approved by the FDA for use in the species and animal class you are treating.
- Use the drug only as the FDA label specifies unless your veterinarian prescribes the drug for extra-label drug usage (ELDU).
- Follow withdrawal periods set by the drug manufacturers and your veterinarian (if using ELDU).

Remove doubt

- Test milk from treated, fresh and newly purchased cows for drug residues before commingling into the bulk tank.
- Test bulk tank prior to leaving farm, every day, every time.
- Review treatment records prior to selling an animal or her milk.

Monitoring supply chain for hygiene

Clean Milk Production Practices

There are several aspects of dairy development but one of important aspects is clean milk production. Raising adoption of clean milk production practices are of paramount importance for dairy farmer. This will open up new vistas and make possible for dairy farmers to achieve substantial gains in income. Raising the clean milk production is the fundamental problem. This problem needs to be carefully tackled for long run resolution of under developed animal husbandry.

Factors like surface cooling of the milk and sterilization of utensils to be of major importance. Through cooling, dry-handed milking and straining through a sterilized strainer, though less important, were nevertheless significant. Washing udders, rejection of foremilk, washing hands in hypochlorite solution, tit dipping screening for udder mastitis, proper drainage for disposal system of dung and urine, overall cleanliness in animal shed, milker`s and farmer`s house, a should be considered while handling the milk. Good milk storage system should be provided ideally milk should be cooled to 4c immediately after milked in villages ice may be used for this purpose this enables the arrest the bacterial multiplication and maintain the milk quality. Grazing land of the animals should be devoid of harmful pollutants, weeds, polluted water, slush and unsanitary conditions.

Farmers can be paid based on bulk milk somatic cell count (BMSCC) price decrease for milk with a greater BMSCC than by a price increase for milk with a lower BMSCC thus both hygienic production and financial security goes in hand in hand.

Hygienic meat production

Animal sources of foods, including meat, are a source of high-quality nutrients. However, meat composition makes it an ideal medium for the growth of a good number of microorganisms. Around 600 million foodborne illnesses and 420000 deaths occur each year due to poor food handling practice. Thus, probing into meat handling practice will be an insatiable input for the intervention. The primary purpose of good meat-hygiene practice is, of course, to prevent transmission of disease to man and to provide a safe, wholesome product for his consumption. Thus, meat hygiene is essentially a public health function. The secondary aims, lying rather in the economic sphere, include reduction of losses in meat and its by-products and prevention of disease transmission to other domestic animals. These are matters of concern chiefly to trade, food, and agricultural authorities. Since meat is a perishable commodity and its poor handling daily exacts a large public-health and economic toll, there can be no room for complacency over problems of meat hygiene, either in under-developed or in advanced countries. Nations can ill

afford the disruption of activities in the home and community caused by meat-borne diseases, not to mention the formidable economic wastage and nutritional losses to the population of two fundamental needs-protein and fat.

The effective operation of a meat-hygiene service must be based on close working relationships between the triad of medical, veterinary, and sanitary-engineering disciplines. Implementing the Good Hygiene Practice (GHP) and *Escherichia coli* in raw meat an indicator of the effectiveness of GHPs during production. HACCP can be implemented in processing plant for systemic approach that leads to the production of microbiologically safe food supply by analyzing hazards of raw materials those may appear throughout the processing and those may occur through consumer abuse. HACCP system places emphasis on the quality of all ingredients and all the processing steps on the premise that safe product will result if these are properly controlled. Apart from this it is necessary to provide professional training for meat handlers, particularly in Good Practice in Food Industry, thus enabling meat handlers to achieve more correct answers in Knowledge and Practice. facilitating the availability of sanitation facilities are important interventions to enhance their level of food safety practice. Improved communication between management and workers for basic hygiene practices as well as a need for more training in personal and general hygiene. Although basic personal and hygiene practices such as the wearing of overalls and gumboots, as well as the cleaning and disinfection of equipment are adhered to, they need to be optimized in order to be effective. It is therefore advisable for all the requirements pertaining to personal and general hygiene to be re-evaluated, implemented and monitored by management to ensure that contamination of the final product by the workers inside the deboning room is minimized. The development of evaluation criteria for the effectiveness of professional training is crucial to protect public health.

Economy

It is natural that person with a greater number of milking animals will have more possibility to earn money through the selling of more milk and finally more scope of socio-techno economic changes. Farmers with large size of land holdings tend to go for more intensive cultivation of crops. Large farm sized land holder comparatively has resource base and can afford to take risk leading to accept new innovations.

Monitoring production

Skip middleman in supply chain

The dairy farmers can earn some profit only if they market their produce themselves to the consumers and also make arrangements for selling milk products and its byproducts. But this is nearly impossible for most of the farmers due to their small-scale enterprises and given their limitations.

Efficient utilization of resources and byproducts

Efficient utilization of by-products has direct impact on the economy and environmental pollution of the country. Non-utilization or underutilization of by-products not only lead to loss of potential revenues but also lead to the added and increasing cost of disposal of these products. *A dairy by-product may be defined as a product of commercial value produced during the manufacture of a main product like whey, butter milk, skim milk, ghee residues etc. The aggregate of dairy by-products is enormous. For every pound of butter made there are 15-20 pounds of skim milk (from cream used for butter) and about 3 pounds of butter milk and for every pound of cheese nearly 9 pounds of whey. If not properly utilized, may create acute problem of environmental pollution. The high protein, fat, and sugar content in them give a substantial organic load and biochemical oxygen demand (BOD). Proper utilization of dairy byproducts leads to profit/economic return.* poor quality of raw milk, lack of organized manufacture of products, lack of adequate technology, high cost of new technologies, lack of in-house R & D, lack of proper infrastructure, lack of indigenous equipment and plants etc. have been the problems mainly associated with the production and utilization of dairy by-products in India. Non-utilization of animal by-products in a proper way may create major aesthetic and catastrophic health problems. Besides pollution and hazard aspects, in many cases meat, poultry and fish processing wastes have a potential for recycling raw materials or for conversion into useful products of higher value.

Educating farmers for hygiene production and money management

Studies revealed that famers have low knowledge level and negative attitudes towards respecting antibiotics treatment withdrawal periods, milk quality standards and food safety regulations. Farmers stated they had received low levels of training on milk quality and safety standards. The majority of farmers adopted animal health measures and hygienic measures such as hand washing and udder cleaning. However, unhygienic milking environments, the use of plastic containers, the use of untreated water, and lack of teat dipping compromised milk quality and safety. Currently, milk production, handling and consumption could expose actors along the dairy value chain to health risks. The adoption

of milk quality and food safety practices was influenced by farmers' knowledge, socioeconomic characteristics, and choice of marketing channel.

There is a need to improve farmers' knowledge and attitudes and implement hygienic control, disease control and antibiotic residue control practices in the milk production process to meet required milk quality and food safety standards. Awareness campaigns and training programmes for smallholder dairy farmers could foster behavioural change and lead to an improvement in milk quality

Recent Initiatives by the government in Animal Husbandry and Dairy Sector

National Animal Disease Control Programme

National Animal Disease Control Programme (NADCP), which is the largest ever vaccination programme carried out either for human or animal vaccination in the world, is being implemented with the aim to control and eventually eradicate the Foot & Mouth Disease (FMD) and Brucellosis by 2030. The vaccination under the NADCP was started from 31st January, 2020 onwards and got disrupted due to lockdown in the country. FMD vaccination was restarted in May 2020 and the first round of FMD vaccination has been completed in 11 States. During 2021-22, the second phase of the vaccination commenced from July, 2021 and so far 5 crore animals have been vaccinated against FMD and 27.8 lakh animals vaccinated against brucellosis till December, 2021. Further, advisories and guidelines on management of disease outbreak were sent to States/UTs.

Animal Husbandry Infrastructure Development Fund (AHIDF)

As part of the ANB stimulus package, the Animal Husbandry Infrastructure Development Fund (AHIDF) worth Rs 15,000 crore was launched in 2020. AHIDF facilitates investments in the establishment of infrastructure for dairy and meat processing and establishment of animal feed plants by the FPOs, individual entrepreneur, MSME, Section 8 companies and private Recent Initiatives in Animal Husbandry and Dairy Sector

Extension education

The efficient use of resources depends to a greater extent on how dairy farmer acquire and adopt new innovations in the sector of animal husbandry in effective manner to reach higher levels of economic performance through their adoption of milk production practices. Further, the resources are very much limited in India. Therefore, efficient use of resources depends to greater extent on how they acquire and adopt innovations in the sector of animal in effective manner to reach higher level of performance. For this, development of every dairy farmer is necessary. Raising adoption of clean milk

production practices are of paramount importance for dairy farmer.It is necessary to provide good literacy and regular extension education. First they should get familiarized with latest technology and its utility.

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