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Original article**Sustainable livestock farming: Veterinarians contribution to food security****Ranjana Sinha¹, Deep Narayan Singh², Manmohan Kumar¹, Anandita Srivastava³, Sanjeev Ranjan¹ and Suchit Kumar¹**¹Assistant Professor, Livestock Farm Complex, Bihar Veterinary College, BASU, Patna-14²Associate Professor, Livestock Farm Complex, Bihar Veterinary College, BASU, Patna-14³Assistant Professor, Department of Veterinary Physiology, Bihar Veterinary College, BASU, Patna*Corresponding Author: ndriranjana@gmail.com

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Livestock farmers today facing with lot of challenges. Stable output and a healthy revenue must be balance with demands for intensive production, greater animal welfare, and a smaller environmental effect, particularly in the form of greenhouse gas emissions. Livestock farmers have many obstacles, but they also have several chances to improve the resilience and financial success of their operations. In addition to lowering livestock emissions, building up and storing carbon in the soil, helping to alleviate the consequences of climate change, and producing high-quality feed for dairy cattle, sustainable pasture management can offer many other benefits. For instance, farmers can save money and resources by managing their livestock more efficiently with the use of digitization and decision support systems.

Sustainable Livestock Management

Sustainable livestock husbandry is the management of animals to meet current requirements without jeopardizing the ability of future generations to do the same. It prioritizes sustainable techniques, animal welfare, and financial feasibility. A healthy planet and balanced ecosystems depend on this strategy because it addresses food security, reduces greenhouse gas emissions, limits resource depletion, and promotes the humane treatment of animals.

To balance agricultural productivity and environmental effect, food production must rise while reducing environmental impact. Use of sustainable farming practices, such as crop rotation, precision farming, and low chemical use, is necessary to boost yields and protect natural resources. This balance must be achieve in order to meet the growing demand for food on a worldwide scale while simultaneously ensuring food security, protecting biodiversity, reducing pollution, and addressing climate change.

Sustainable Livestock Farming Practices

Sustainable livestock farming is a method of producing food from animals that puts an emphasis on social responsibility, environmental stewardship, and financial sustainability. It aims to protect the long-term health of ecosystems, communities, and animal welfare while meeting the current need for products made from animals. Sustainable livestock production entails methods that reduce adverse effects on the environment, encourage ethical care of animals, assist local communities, and preserve producers' financial success.

- The intended use of the animal, the climate, local resources, and market demands are all factors to take into account when selecting the best livestock breeds. Breeds with desired characteristics, such as high output, disease resistance, and resource efficiency, should be prioritized. Furthermore, these breeds need to be climate-adapted for the area. Regionally appropriate breed selection can boost production efficiency, promote sustainable agriculture, and provide food security while also improving cow health.
- Sustainable farming and the health of animals depend on efficient fodder management and animal feeding. It comprises providing an animal with a balanced diet, meeting its specific nutritional requirements, and taking into consideration the animal's age, breed, and intended use. Effective forage management includes the production, harvesting, and storage of high quality feed sources. These techniques reduce costs, promote productivity, enhance animal welfare, and mitigate the adverse environmental impacts of livestock farming.
- Effective waste management and resource use in agriculture depend on reducing waste output, recycling agricultural by-products, and reusing resources. This approach promotes sustainability, reduces environmental contamination, and protects valuable resources like water and nutrients. Precision irrigation, crop residue integration, and composting are techniques that improve soil health, maximize resource use, and lessen the ecological impact of farming, all of which contribute to the long-term sustainability of agriculture.
- Making sure that animals are handled with dignity and compassion is one aspect of ethical animal welfare issues in agriculture. This means not only lowering stress and discomfort but also providing appropriate housing, nourishment, and healthcare. Ethical practices aim to achieve a balance between human interests and animal welfare in order to promote humane treatment and responsible management of cattle.
- Agriculture must use less pesticides and antibiotics to combat antibiotic resistance and reduce environmental impacts. Integrated pest management, organic farming, and compassionate animal care are some ways to achieve this. By prioritizing these practices, we can safeguard human health, maintain ecosystems, and promote sustainable agricultural systems.

Benefits of Sustainable Livestock Farming

Sustainable livestock husbandry can improve the resilience of farming communities by diversifying sources of income. Sustainable farming practices can improve the quality of life in rural areas, promote equitable resource allocation, and strengthen interpersonal relationships.

1. **Environmental Conservation** :- Using sustainable practices reduces the negative environmental effects of cattle production, such as deforestation, soil erosion, and water pollution. This contributes to the preservation of ecosystems and biodiversity.
2. **Lower greenhouse gas emission** :- The goal of sustainable livestock farming is to lower the harmful methane emissions from animals and potent greenhouse gas. Climate change can be mitigate by putting policies like better feeding and waste management into place.
3. **Enhanced Resource efficiency** :- Sustainable livestock production methods minimize waste and inefficiency by making the best use of resources like feed and water.
4. **Healthier food products** :- Products made from animals may be safer and of higher quality since sustainably raised animals are healthier and less reliant on antibiotics and other toxins.
5. **Resilience in the economy** :- By diversifying revenue streams, sustainable livestock farming can increase farming communities' resilience.
6. **Improved Animal welfare** :- Gentle handling and ethical treatment of animals are key components of sustainable farming, as these practices improve animal welfare.
7. **Consumer demand** :- Customers' growing knowledge of sustainability issues has led to a growing demand for animal products produced sustainably, which has created marketing opportunities for farmers.
8. **Social Benefits** :- Sustainable agricultural methods can boost rural communities' standard of living, encourage fair resource distribution, and fortify their social bonds.

Veterinarians contribute to food security

According to the Food and Agriculture Organization, "food security is achieved when everyone, everywhere, has physical and financial access to enough safe, nourishing food to satisfy their dietary needs and food preferences for an active and healthy life."

Along with many other scientific, social, economic, and political fields, the veterinary profession faces the extremely complicated problem of food security. The American Veterinary Medical Association's (AVMA) One Health Initiative (AVMA, 2008), the World Health Organization's (WHO) 2002 "health for all" initiative, and the Food and Agriculture Organization's (FAO) 2011 World Livestock detailed analysis have all addressed many of the issues. The goal of our work to address the issue of food security by linking biodiversity preservation, food production, and environmental health to human and animal health. The aspects of these programs, however, are unavoidably much broader and cover issues like global population growth, urbanization, poverty, farming efficiency, water conservation, transportation and international trade, and food supply resilience due to the intricate relationships that exist between animals, humans, and the environment. The veterinary medical field must learn to work with specialists from a variety of other fields to provide comprehensive, One Health solutions, which will involve challenges that are far more complicated than any it has ever encountered.

The importance of production efficiency in terms of environmental sustainability can be elucidate by comparing the effects of milk yields per cow. Several nations have encouraged the

growth of their dairy industries in recognition of the significance of animal protein for the physical and mental development of children, with the aim of ensuring that every child in the country has access to a glass of milk every day. Determining how to accomplish the goal is the challenge facing the dairy industry and the veterinary profession in these countries.

1. Veterinarians promote animal health and welfare

Veterinarians promote the health and welfare of animals by preventing and treating disease, ensuring humane handling, and providing suitable nutrition. Veterinarians are responsible for the health and welfare of all animals, including pets, livestock, and wildlife. They diagnose and treat diseases in animals, do surgery, and provide immunizations and other preventive treatment. Veterinarians also work to improve animal welfare by advocating for moral pet ownership and compassionate animal care. Veterinarians provide advice on good personal hygiene, breeding, and nutrition. As a result, livestock health improves, increasing productivity.

2. Veterinarians concerned of public health

Veterinarians provide a substantial contribution to public health by preventing and treating zoonotic infections, which are diseases that can be transmitted from animals to humans. Veterinarians also work to promote food safety and reduce foodborne illness. Additionally, veterinarians support disaster response and preparedness by helping to guarantee the safety and wellbeing of both people and animals during natural disasters.

3. Environmental conservation and protection

Veterinarians assist with conservation and maintain the environment by preventing and controlling diseases that can affect wildlife. They also work to promote sustainable animal production practices and protect animals from environmental hazards. By working to conserve threatened species and restore damaged ecosystems, veterinarians also support conservation.

4. Prevent disease

Veterinarians monitor and cure animal ailments, but they also develop strategies to prevent disease outbreaks. This reduces the risk of acquiring foodborne illnesses. Disease prevention is the cornerstone of healthy animal health. It keeps drugs like antibiotics safe, stops diseases from spreading, and, most importantly, safeguards animal welfare.

5. Ensuring safe transportation

Veterinarians make sure imported animals are safe to eat and that healthy animals are transported securely. In addition to organizing and directing the procedure and administering first aid and other care, veterinarians make ensuring that safe transportation of animals.

6. Developing policies

Veterinarians contribute to the development of regulations pertaining to food safety and animal health inspections. As the world's population rises and more people can afford meat, veterinarians are essential to ensuring that food is safe to eat. Veterinarians collaborate with legislators to draft legislation that protects animals' health and well-being. They also work to prevent disease transmission and animal maltreatment.

7. Promote sustainable practices

Veterinarians promote sustainable and ecologically friendly practices in animal husbandry. They also encourage the use of alternatives to antibiotics.