

# The Significance of Animal Welfare in Food Production

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## Introduction

Animal welfare has become a focal point in the discourse surrounding modern livestock production systems. Traditionally, the primary goal of animal agriculture was to maximize productivity and economic efficiency. However, growing scientific evidence, societal awareness, and ethical debates have highlighted the multidimensional importance of animal welfare. Defined broadly, animal welfare refers to the physical and psychological well-being of animals under human care, including their health, comfort, freedom of movement, and ability to express natural behaviors. In the context of food production, animal welfare is not only an ethical obligation but also a determinant of food quality, safety, environmental sustainability, and public health. This article critically examines why improving animal welfare is essential for the future of responsible and sustainable food production.

### 1. Concept and Scientific Basis of Animal Welfare

The scientific framework for assessing animal welfare is grounded in both behavioral and physiological parameters. The "Five Freedoms," proposed by the UK Farm Animal Welfare Council, serve as an internationally accepted baseline for good welfare:

1. Freedom from hunger and thirst
2. Freedom from discomfort
3. Freedom from pain, injury
4. Freedom to express normal behavior
5. Freedom from fear and distress

Researchers assess animal welfare using indicators such as cortisol levels (a stress hormone), behavioral patterns (e.g., aggression, withdrawal), body condition scores, and disease prevalence. Advances in ethology (animal behavior) and precision livestock farming (PLF) technologies such as wearable sensors, automated health monitoring, and video surveillance have made it possible to monitor and improve welfare in real time.

### 2. Relationship Between Animal Welfare and Product Quality

There is a direct and well-established link between animal welfare and the quality of animal-derived products such as meat, milk, and eggs. Poor handling, transportation stress, and inadequate housing contribute to pre-slaughter stress, which negatively affects meat quality by depleting glycogen reserves and resulting in conditions such as PSE (Pale, Soft, Exudative) meat in pigs, DFD (Dark, Firm, Dry) meat in cattle.

In dairy animals, welfare-related issues such as lameness, mastitis, and heat stress reduce milk yield and alter its composition, including protein and fat content. Similarly, laying hens exposed to high stocking densities and lack of enrichment show decreased egg quality in terms of shell strength and albumen height. Thus, welfare is not just a moral or legal issue. It has measurable impacts on food safety, nutrient profile, taste, and shelf life.

### 3. Public Health Implications

Suboptimal welfare conditions create environments conducive to the emergence and spread of zoonotic diseases. High-density livestock farming, particularly when animals are stressed or immunocompromised, increases the risk of infections such as: Avian influenza (H5N1), Swine flu (H1N1), Salmonellosis and Campylobacteriosis.

Moreover, intensive systems often rely on routine or prophylactic antibiotic use to control disease outbreaks. This has contributed significantly to the global crisis of antimicrobial resistance (AMR), making common infections in humans harder to treat. According to the World Health Organization (WHO), AMR could cause 10 million deaths annually by 2050 if current trends continue. Improved animal welfare reduces the need for such interventions by lowering disease incidence and strengthening animal immunity.

### 4. Economic and Consumer Dimensions

Contrary to the perception that welfare improvements are economically burdensome, numerous studies have shown that farms adopting welfare-friendly practices often experience better productivity, reduced mortality rates, and enhanced reproductive performance. For instance: Comfortable housing and bedding reduce lameness and improve milk yield in dairy cows. Enriched environments reduce cannibalism and improve feed conversion in poultry.

From a consumer standpoint, there is a growing demand for transparency in food sourcing. Labels like "free-range," "grass-fed," "organic," and "certified humane" reflect consumer preference for ethically produced food. Market research indicates that consumers are willing to pay higher prices for products that align with their values regarding animal welfare, food safety, and environmental sustainability.

### 5. Animal Welfare and Environmental Sustainability

Sustainable agriculture seeks to balance productivity with ecological responsibility. Animal welfare and

sustainability are not mutually exclusive-in fact, they are often complementary. Welfare-oriented systems such as rotational grazing, silvopasture, and mixed farming contribute to:

- Lower greenhouse gas emissions per unit of product
- Improved soil fertility
- Reduced water and land degradation

Furthermore, healthy, stress-free animals exhibit better feed efficiency, reducing waste and resource use. Thus, incorporating welfare considerations into livestock management is essential for meeting both ethical and environmental goals of modern agriculture.

### 6. Policy and Global Perspectives

Many countries have enacted legislation and guidelines to safeguard animal welfare. The European Union (EU) has been at the forefront, with bans on battery cages for hens, sow stalls, and veal crates. In India, the Prevention of Cruelty to Animals Act (1960) and guidelines by the Animal Welfare Board of India provide legal frameworks, although

implementation remains inconsistent. Global organizations such as the Food and Agriculture Organization (FAO), OIE (WOAH), and World Bank have also recognized animal welfare as integral to sustainable development goals (SDGs), particularly those related to health (SDG 3), responsible consumption (SDG 12), and climate action (SDG 13).

### Conclusion

Animal welfare in food production is a multifaceted issue that intersects with ethics, science, economics, and sustainability. As the global population grows and consumer awareness increases, the demand for humane, safe, and high-quality animal products will only rise. Improving animal welfare is not only a moral obligation but a strategic necessity for building resilient food systems. Integrating welfare science into livestock management, policymaking, and education will be crucial for achieving long-term goals in public health, food security, and environmental protection.

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