

Meeting the sustainability challenge – 2050

The global livestock sector is characterized by differences in dynamics. In emerging economies, the livestock sector is evolving in response to rapidly increasing demand for animal protein. In mature economies, demand for animal protein is stagnating. Additionally, livestock production will increasingly be affected by external factors, not in the least by struggling supplies of feed raw materials. Competition for natural resources, climate change and trade barriers are important factors. Simultaneously, there is growing concern about food and its impact on health, the impact of production systems on animal welfare and the environment, and antimicrobial resistance. Optimization of productivity and efficiency within such constraints are important means to the end of global sustainable food security. It is important that the livestock sector contributes to the optimisation of profit for all stakeholders involved: society, nature and farmers.

The key words for the coming decade, to realize this, are *Innovation* and *Sustainability*.

Animal feed and nutrition are the essential link in the livestock value chain, as they interconnect crop cultivation and animal protein production and processing. New insights and developments indicate that further optimization of animal protein production through nutrition is possible. The genetic potential of farm animals is only partially utilized, on an average between 60 and 70%. There is room for improvement of the utilization of most nutrients and there is a huge variation in performance among farms and within farms, among animals.

Precision animal nutrition will play an important role in narrowing this gap between genetic potential and the performance on farm level. New technologies are the foundation of many application technologies for *precision animal nutrition*. For example, metabolomics can be used to understand the effect of nutrition and environment during early life on gene expression. Young animal feed and feeding level for calves, swine and poultry have a profound and long-lasting effect on performance. We call that *LifeStart sets Life Performance*.

In addition, there is a need for effective strategies to increase health status of the animals and reduce antibiotic use in animal nutrition due to the rapid development of antimicrobial resistance. Innovative nutritional solutions are required and available to control intestinal health in a sustainable way. Productivity and health responses can be obtained in animals similar to those reported for antimicrobial growth promoters by improving microbiological quality of drinking water and feed, stabilization of the intestinal microbiota and enforcement of the mucosal barrier of the host.

In conclusion, innovation in animal nutrition is crucial in sustainable livestock production. Innovations have the potential to meet the challenges and to result in resource efficiency, healthy livestock and people, responsible production systems and optimal profit throughout the value chain.