Sub-theme 1.1. Animal Production and Health

Rationale

Animal production and productivity is very low in Ethiopia. As a result, the country is not benefiting much from the huge animal population and genetic diversity it possesses. The low animal productivity is attributable to a number of constraints which include severe feed shortages (due to diminishing grazing land and plant biodiversity as well as recurrent drought), lack of appropriate breeds, lack of appropriate technologies that enhance animal productivity, unfavourable local and international market conditions, high disease burdens, poor management practices, lack of favourable policies for developing and utilising animal resources, etc.

Undernourishment has particularly become a serious problem posing huge challenges to animal production and productivity in the country. Furthermore, increase in disease incidence, emergence of new diseases, and increasing drug resistance. These problems require innovative solutions, which call for concerted efforts to discover new therapeutics and diagnostics as well as introducing improved service deliveries. Improvements in animal health rely partly on sustained availability of effective, rapid, accurate, reliable and economical diagnostic techniques and therapeutics as well as effective prevention and control measures.

Aim

The aim of this sub-theme is to enhance livelihoods of farmers/producers as well as increasing the economic benefits from animal production through improved animal health and feeding, etc.

Description

The sub-theme focuses on animal genetics (breed improvement), reproductive physiology and biotechnology, and management improvement, enhancing the quality and availability of

existing feed resources and/or seeking alternative economical feed resources, rangeland related potentials and problems, investigating meat and milk and value addition on products, and improvement in the marketing of livestock and livestock products.

The sub-theme also includes research directed towards identifying animal health problems, determining the temporal-spatial magnitude of diseases, disease prioritisation, modelling and risk factors analysis, development of improved methods of disease tracking and monitoring, and clinical/surgical research as a prelude to design appropriate animal disease management packages. The research sub-theme investigates the biopharmaceutical and pharmacological aspects of herbal and ethno-veterinary medicines, development of diagnostics and diagnostic technologies, therapeutics, vaccines and biologicals as well as examining ways to enhance the quality and efficiency of animal health care service delivery.

Potential Collaborators

National and overseas universities that are engaged in livestock research, education, and development, industries, schools and institutions, international, national, and regional agricultural research organisations, disease diagnostic laboratories, regional, zonal, and woreda bureaus of agriculture of East and West Hararghe, Dire Dawa administrative region, Harari region, pastoral and agro-pastoral development bureau of Somali region, and the livestock owning communities of the respective areas.

Expected Output

- Genetically improved animal breeds

- Conserved animal genetic resources and biodiversity

- Improved and diversified economical quality feed

- Appropriate housing technologies and management practices

- Appropriate technologies for milk, meat, and poultry product preservation and processing

- Better techniques for rangeland improvement, resource utilisation and conservation

- Improved animal health, production and productivity

- Improved animal disease management packages.

- Improved new diagnostics, therapeutics, vaccines & biologicals.

- Improved animal health care service delivery methods and approaches

- Identified, characterized, and evaluated herbal and ethno-veterinary medicines

- Improved meat and dairy products and technologies

- Increased income from animal breeds and products

Research Areas

1.1.1. Development and promotion of animal production and products

The research area includes improvement of breeds and adaptation research, development of feed resources and appropriate production. It shall also include research in animal products such as milk and dairy products, meat and meat by-products, fish products, honey, and animal by-products and waste utilisation. Moreover, the research includes ensuring food security, quality and safety such as protecting against development of antibiotics resistance, and prevention and control of food-borne diseases and injuries. This research area also focuses on topics meant for enhanced quality of hides and skins of animals such as better ways of flaying, processing, preservation, storage, value addition, manufacturing, marketing, etc and the technologies required for these purposes. The research area also addresses issues related to apiculture and effect of pesticides on bee colonies.

1.1.2. Animal disease epidemiology and development of animal disease management packages

The research area encompasses research that manipulates factors to maximize health or prevent animal diseases and also evaluates and suggests prevention and mitigation measures against animal disease. This also involves topics concerned with prevention and control of

emerging and re-emerging infectious diseases including zoonosis, trans-boundary animal disease, nutrient deficiency diseases of animals, preparedness and response to possible trans-boundary introduction of disease causing agents, and advances in veterinary medical sciences. It also deals with human-livestock-wild animal interface as well as improving animal health care service deliveries.

1.1.3. Improving pastoral and agro-pastoral animal productivity

This research area focuses on breed evaluation and selection for specific products, artificial insemination (AI) application by using semen from selected/superior reproductive males, oestrus synchronization, feed resource improvement, rangeland improvement and management, domestication, herd management, adaptation and evaluation of improved forage species. It also deals with development of animal health packages with special emphasis on camels and goats, and development of technologies and procedures for control of disease dissemination.

1.1.4. Animal genetic resources improvement, conservation, and management

This research area is aimed at the development of innovative methodologies for analysing the whole animal phenotype and basic-biology phenotype association in light of protein network and biological pathways. Research on *sacco*, *in situ* animal genetic resource conservation, developing procedure for wise utilisation of available animal genetic resources for economic growth. This research also deals with introducing, adapting, and the utilising of domestic animals from other countries for the purposes of acquiring traction power, beast of burden, amenity values etc. This research is also concerned with the application of biotechnology to improve productivity, consistency, and quality. This research area focuses on breeding, conservation, and adaptation of indigenous livestock, equines (donkeys, horses, mules, camels), poultry etc.

1.1.5. Development and evaluation of veterinary therapeutics, diagnostics and biologicals

Development and evaluation of vaccine formulations, assessment of protective immune responses, manipulation of relevant animal models for important vaccine-preventable diseases, development and evaluation of biologicals and diagnostic kits, drug development and evaluation ventures, investigation of ethno-botanicals and new treatment systems shall be included under this research area.

1.1.6. Animal feeding and nutrition

This research area includes animal feeds and feeding, evaluation of different feed resources including conventional and non-conventional feeds in terms of nutritional composition, digestibility, and nutrient availability or bioavailability. The research area also encompasses ration formulation for different groups of animals for maximum growth and economic benefits. *In vitro, in sacco* degradability of nutrients, near infrared spectrophotometer and related evaluations, feed poisoning of animals are also the focuses of this research area.

Beneficiary

Farmers, agro-pastorals, industries, scientific community, policy makers, and the wider community