

Call text – Agriculture and machinery 2022

The overall objective is to support the development of profitable and environmentally sustainable agriculture. Ongoing climate changes and a turbulent world situation emphasize the need for a well-functioning agriculture sector encompassing both crop and animal production. The Foundation's specific priorities for autumn 2022 are described below.

We see favorably that applicants contact us to discuss possibilities to use Lantmännen's feeds, seeds, experimental facilities and other resources in projects being planned. For example Lantmännen has extensive research activities in feed and plant breeding where various ideas can be studied cost efficiently with excellent data quality.

To learn more on how we can cooperate to promote sustainable agriculture via research, innovation and practical on-farm measures please read the reports; Farming of the Future: Crop Cultivation and Farming of the Future: Beef and Dairy.

<https://www.lantmannen.com/farming-of-the-future/farming-of-the-future-the-report/>

Sustainable intensification of crop production



We wish to develop resilient cultivation systems which can maintain high productivity under varying weather and climate conditions. A major aim is to increase production while minimizing the burden on ecosystems. Different cultivation measures need to be assessed in regards to climate impact and other aspects of sustainability. Certain measures can drastically increase yield but also result in new problems. For example, crop production dominated by fall seeding gives high productivity but also new weed and pesticide problems which we must learn to manage.

Some vital focus areas:

- Precision agriculture and digitalization. These have great potentials to improve yield and quality as well as contributing to sustainability for all crops. The topic includes even data driven management support systems.
- The carbon balance and nitrous oxide emissions in cultivated lands are issues which need further research with focus on Nordic conditions.
- Robust crop rotation schemes are aided by grassland cultivation by providing a perennial break crop. New markets for forages would hasten development of robust schemes and increase profitability over the entire cropping system.
- There is a great demand for biological products or other methods which can supplement or replace chemical products.
- Genetic markers and advanced imaging can contribute to great success in plant breeding. New goals for breeding such as heat tolerance and susceptibility to ice scorch may demand development of new methods.
- Seed production requires rapid and precise evaluation methods for e.g. germination, health and purity.

Right quality of grains and other plant based commodities



A prerequisite for profitable production and processing of grains and other plant based commodities is that the quality specifications demanded are met. Different customers and different application areas impose different quality standards on these commodities.

Some vital focus areas:

- Cultivation should have focus on right protein content and quality, starch content, falling number, and kernel size for feed and food. For example malting barley should have high vitality and minimal husk damage and oats should have a pale color. Specific quality criteria exist even for specialty crops such as peas, lentils and beans.
- Knowledge pertaining to specific factors in grains and other crops regarding improved yields and returns in animal feeds and in various industrial processes is needed. One example is the gluten yield in wheat where grain lots with similar analytical values can have very different results in gluten yield and thereby the economy. We need to investigate cultivation measures which can increase the yield and returns.
- Cultivation and management has to be conducted with the goal of minimizing the content of undesirable substances such as cadmium and mycotoxins.
- Effective surveillance systems are needed to detect negative processes in grain stores.
- Knowledge in avoiding steps in grain processing that generate acrylamide and other toxic substances.
- We need new, precise and cost-effective analytical techniques, both quantitative and qualitative, for grains and other vegetable crops.

Profitable and sustainable livestock production



Our objective is that livestock production and equestrian enterprises shall be able to grow and become more profitable. Well-functioning animal production is an intricate and important part of a sustainable food supply chain both nationally and internationally. Developments in digital techniques combined with increasingly more detailed knowledge about both the animals' nutritional requirements as well as internal physiological processes generate both demands and possibilities for new solutions and approaches.

Some vital focus areas:

- Technical and digital developments are advancing quickly and there is a need for both research and development of practical applications. This focus area even includes data driven management support systems.
- The life span of productive livestock is an important factor for sustainable and climate-smart animal production. There is great room for improvement and a need for research in all animal categories.
- For the horse sector there is a need for basic research regarding horse feeding and digestion, as well as nutritional physiologically studies foremost for top performing horses but even for horses in breeding and horses with metabolic disorders.
- Knowledge is needed concerning feed evaluation of grain products, side streams from industrial processes and other commodities which can be converted to food via animal production. Interesting parameters are energy evaluation, fiber quality, protein quality, amino acid profile, mineral and trace elements supply.
- Good gut health is essential for good animal welfare and production, for all animal categories. Future rations will increasingly be composed of more byproducts and side streams materials. More knowledge is needed on how these influence the gut microbiome and the microbiome's influence on various processes in the body.
- Development of processing techniques is needed both for minimizing energy costs and for increasing the use of domestic alternative feed commodities and byproducts.
- There is a great need for practical feeding trials using pigs and poultry of modern genetics. More knowledge is needed about nutrient requirements in regards to production levels and their related effects on sustainability and resource efficiency with the goal to minimize negative environmental impacts.