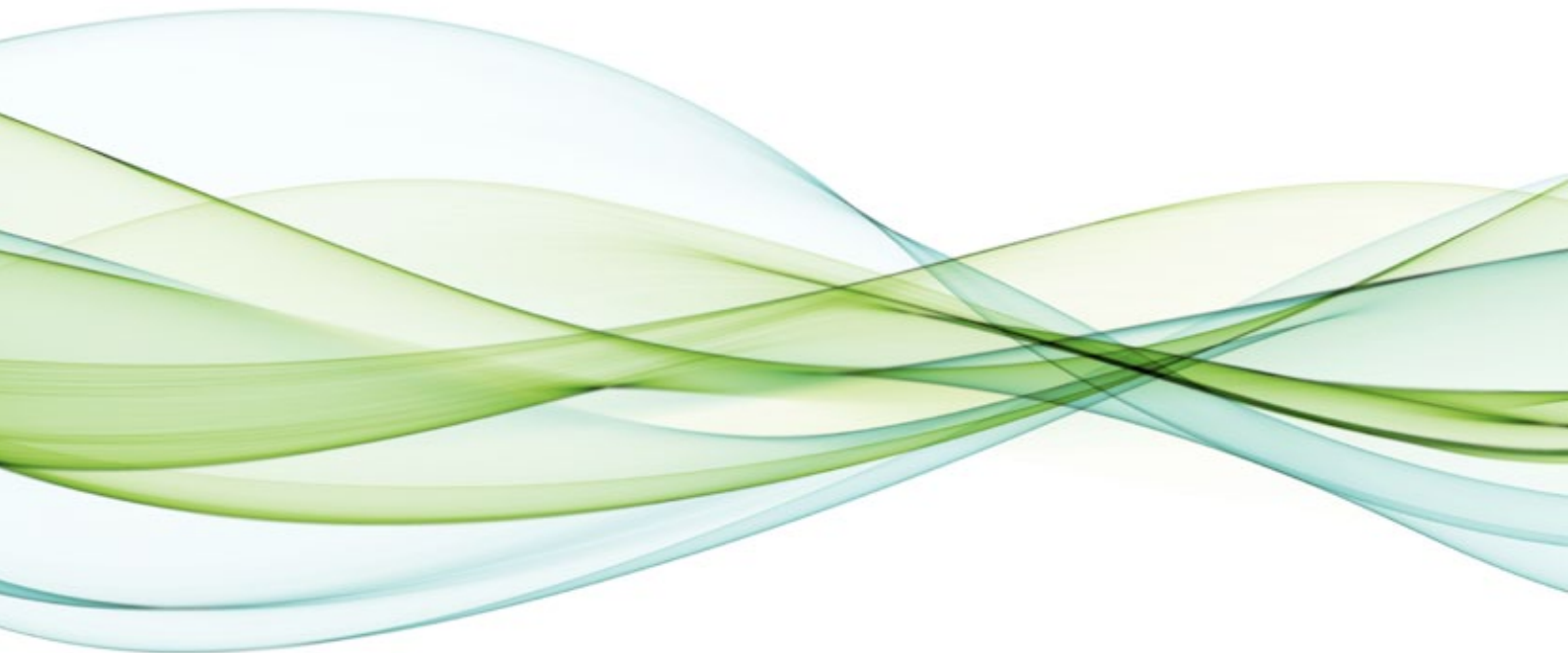




Sveriges lantbruksuniversitet
Swedish University of Agricultural Sciences

FUTURE CHALLENGES

SLU's strategy 2013–2016




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FUTURE CHALLENGES

SLU's strategy 2013–2016

A black and white portrait of Lisa Sennerby Forsse, Vice-Chancellor of SLU. She is a middle-aged woman with short, wavy, light-colored hair. She is wearing a dark, textured jacket over a light-colored top with a circular pattern. Her arms are crossed, and she is looking directly at the camera with a neutral expression. The background is plain white.

>> We develop the understanding
and sustainable use and management
of biological natural resources. <<

LISA SENNERBY FORSSE

Vice-Chancellor



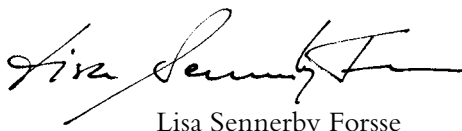
A strong university with a clear research profile

SLU is a university with a unique profile, performing high quality work in fields of strategic importance to society and the green sector, nationally and internationally. SLU is engaged in research, education and environmental monitoring and assessment to meet the Government's vision of "using the resources without using them up".

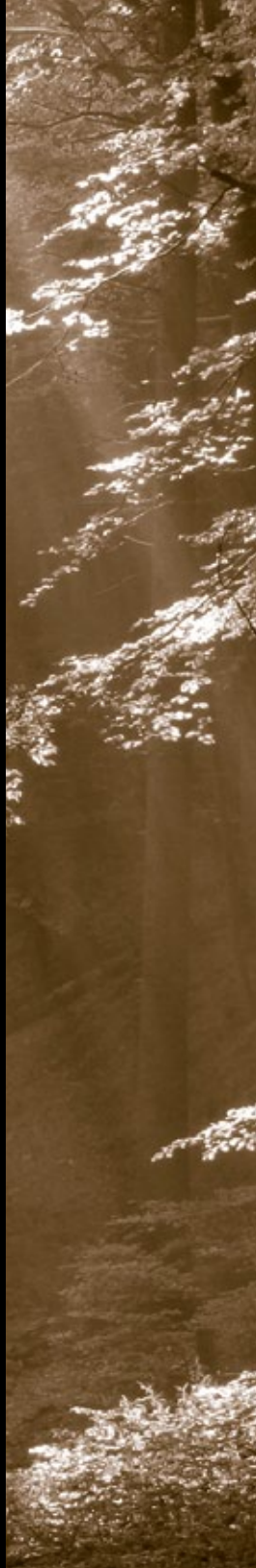
SLU is one of Sweden's most research-intensive universities, charged with the task of developing sustainable management and use of biological natural resources. Education and research at the university spans a spectrum from genes and molecules to biodiversity, animal health, sustainable forestry, food supply, societal planning and sustainable urban and rural development, as well as global phenomena such as climate change and its effects.

The strategy now adopted by the University Board applies for the period 2013–2016, and should be seen as a guiding document for the university as a whole. Formulation of the current strategy has been guided by the strategic objectives for research, education, environmental monitoring and assessment, and also the vision adopted by the University Board in 2009, as set out in the document. The strategy also forms the basis for the contribution made by SLU to the forthcoming Research Bill 2012 as part of the process of formulating Sweden's research and educational policy.

This strategy also marks the start of a process in which faculties, departments and the university administration are involved in concretising the content and breaking down visions into objectives and action plans. The main aim is to improve the quality and impact of our work. This involves constant development, evaluation, internationalisation and continuing close collaboration with other higher education institutions, the private sector and society at large, both in Sweden and internationally.



Lisa Sennerby Forsse
Vice-Chancellor



PAGE	CONTENTS
9	Summary: A UNIQUE PROFILE
13	1. Introduction: FRAMEWORK FOR PLANNING
13	1.1 Purpose
13	1.2 SLU's operational concept, vision and strategic objectives
17	2. SLU's PROFILE AND FUTURE ROLE
17	2.1 Key challenges
19	2.2 SLU's areas of strength
23	2.3 SLU's role as a sectoral university
25	2.4 SLU's role in the national and international university arena
27	3. STRATEGIES FOR 2013–2016
27	3.1 Current situation
28	3.2 Priority areas
34	3.3 Research and third-cycle education
38	3.4 First- and second-cycle education
40	3.5 Environmental monitoring and assessment
41	3.6 Staff and students
45	3.7 Global development
46	3.8 Extension, collaboration and innovation
50	3.9 SLU's brand and communication strategy



>> SLU's strength is its combination of solid curiosity-driven research and well-developed operations relating to the need for knowledge, competence supply and innovations. <<



PHOTO: JENNY SVENNÄS-GILLNER

SUMMARY:

A UNIQUE PROFILE

SLU has what is for Sweden a unique profile focusing on research, education and environmental monitoring and assessment in fields of great strategic importance to society in a national as well as a global perspective. The work is of central importance to several of the major challenges we face for the future, i.e. the efficient and sustainable use of biological resources to supply the world's growing population with food, animal feed, fibres, energy and materials. This increase in biological production must be achieved while adapting to and mitigating climate change.

SLU's strength is its combination of solid curiosity-driven research and well-developed operations relating to the need for knowledge, competence supply and innovations in the fields of agriculture and forestry, animal husbandry, animal health, aquaculture, fisheries, landscape architecture, rural development, etc. SLU's expertise spans entire value chains and includes basic scientific fields, as well as production, quality and environmental dimensions. During the period 2013–2016 SLU will be focusing on the general topics *A bio-based economy* and *Environment, health and wellbeing*.

An extensive evaluation has shown that SLU's research and environmental monitoring and assessment are of a high international standard, and that stakeholders consider it to be of great benefit to society. Holders of PhDs and other SLU graduates are generally in demand and valued in the labour market. To realise the vision of becoming a world-class university in its sector, SLU will continue its efforts to raise quality throughout its operations.

In research, efforts will be made to recruit top researchers and support young researchers. Development of, and access to, advanced infrastructure have high priority. Research in the social sciences, as well as interdisciplinarity and multidisciplinary and the capacity to deliver high-quality syntheses and other material as a basis for decision-making, will be strengthened. Further development of the graduate schools is a key issue in third-cycle education.

Environmental monitoring and assessment will concentrate more on in-depth analyses, syntheses and projections. Another priority issue is improving data gathering and availability.

Continuing expansion of SLU's first- and second-cycle education programmes is essential. Efforts will be made to review the range of programmes on offer, to focus the content on SLU's profile areas and strengthen links to research. The range of contract education programmes will be expanded to meet the needs of external stakeholders.

Greater internationalisation of research, environmental monitoring and assessment and education is essential. Ways of achieving this include participation in university networks, international joint projects and infrastructure initiatives, the introduction of joint degrees and encouraging increased student and teacher exchange. The new "SLU Global" initiative will enable SLU to collaborate with selected universities, mainly in Africa, to contribute to long-term capacity building in agriculture, food safety and sustainable livelihoods in low-income countries.

SLU will also be striving to develop its role as a committed partner in extension with stakeholders outside the academic sphere. This will include new forms of extension, training in communication of research findings, and initiatives to establish new interfaces for meetings with the public and the schools system. The company SLU Holding AB will be used to improve the efficacy of innovation support for employees and students to facilitate swift commercialisation of research results and stimulate entrepreneurship.



PHOTO: JULIO GONZALEZ

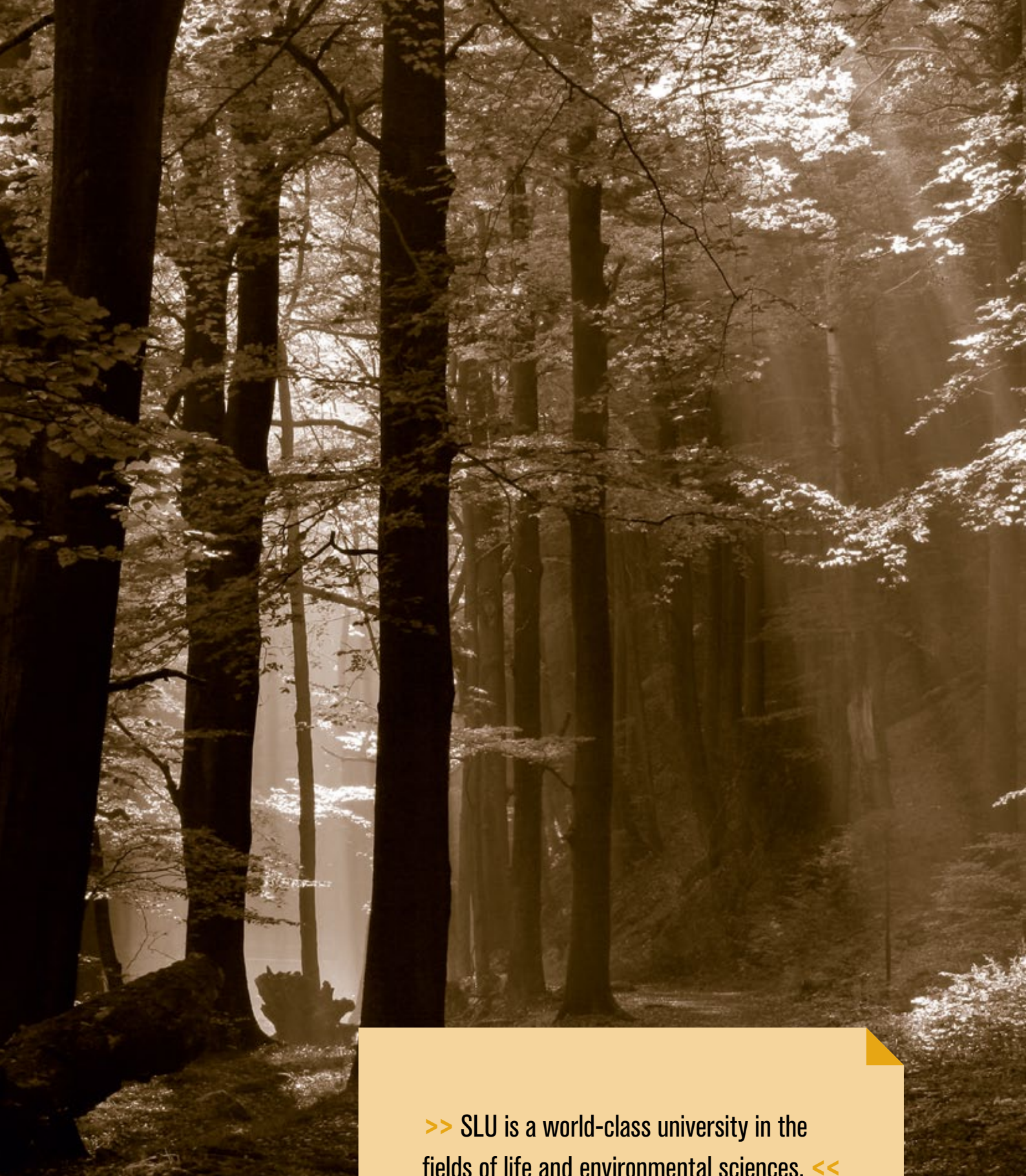
>> SLU will also be striving to develop its role as a committed partner in extension with stakeholders outside the academic sphere. <<



PHOTO: MATT LOW

>> SLU shall collaborate with selected universities, mainly in Africa, to contribute to long-term capacity building in agriculture, food safety and sustainable livelihoods in low-income countries. <<





>> SLU is a world-class university in the fields of life and environmental sciences. <<



1. Introduction

FRAMEWORK FOR PLANNING

1.1 Purpose

The purpose of this strategy is to create a framework to serve as a basis for strategic and operational planning at SLU over the next four years. The strategy should be reflected in faculty strategies, action plans and other governing documents produced by various SLU bodies. The strategy should be seen as statement of direction and guidance for decisions on the form of future operations.

The strategy is also intended to serve as a frame of reference for SLU when it communicates its activities to the outside world, by making clear SLU's long-term aims and objectives, as well as its current strengths.

1.2 SLU's mission, vision and overall strategic objectives

SLU's mission statement, vision and objectives were adopted by the Board in 2009.

Mission statement

SLU develops the understanding and sustainable use and management of biological natural resources¹.

This is achieved by education, research and environmental monitoring and assessment in collaboration with the surrounding community.

Vision

SLU is a world-class university in the fields of life and environmental sciences.

¹ **Biological resources** include "genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems with actual or potential use or value for humanity." [Source: Convention on Biological Diversity, Article 2]

Strategic objectives

SLU's overall objectives are

- for operations to be of the highest international class, characterised by strong links between education and research
- for research, education and environmental monitoring and assessment to be pursued in collaboration with selected higher-education institutions, sectors and the wider society
- for research findings to be known and used in society
- to have a strong international dimension, e.g. by strategic collaboration with universities and research institutes abroad
- to strengthen Sweden's position as a knowledge nation and contribute to the development of sustainable use and management of natural resources
- for students and staff to have a work environment and working conditions that are among the most attractive
- for the organisation to work well, with distinct leadership and efficient use of resources
- for gender equality and diversity perspectives to have a strong position throughout operations
- for staff and students to be our best ambassadors



PHOTO: JENNY SVENNÁS-GILLNER

>> A strong international dimension, e.g. by strategic collaboration with universities and research institutes abroad. <<



PHOTO: JULIO GONZALEZ

>> The operations are of the highest international class, characterised by strong links between education and research. <<





>> It is evident that far-reaching and rapid changes are needed in the way biological natural resources are managed. <<



2. SLU'S PROFILE AND FUTURE ROLE

SLU has its origins in institutions founded to help address the greatest strategic societal question of their day: reform of forestry and agriculture to meet defence needs and assure food security. In the early days of the industrial era, it was obvious that Sweden's future depended on both forestry and agriculture changing with the help of new know-how and new technology. In the modern era, it is once again evident that far-reaching and rapid changes are needed in the way biological natural resources are managed, and that this is a central strategic societal issue.

By 2050 the world's population is expected to exceed nine billion. This will make very challenging demands of forest, soil and photosynthetic organisms and their ability to convert soil, sunlight, air and water into food, animal feed, fibres, energy and materials for at least another two billion people. The crucial issue of our time is how to achieve this without having any new land to use, without unsustainable ecological consequences, at the same time as we restore and recreate lost natural values – all during on-going climate change. SLU considers that this can only be achieved with the help of greater scientific knowledge about soil and forest, animals and nature – about the fundamental conditions for life – and by translating that knowledge into action.

2.1 Key challenges

SLU's fields are central to several of the major challenges facing society. Increasing emphasis is being placed on the "Grand Challenges" in the EU and in other contexts². These, and other key challenges of relevance to SLU's activities, are listed below:

- food supply for a growing global population
- long-term productivity development in forestry and agriculture
- competition for land (food, fibres, fuel, animal feed, habitations, social values)

² The Lund Declaration, EU 2009

- impoverishment of genetic resources
- water shortages and water quality
- pandemics and zoonoses
- adaptation to climate change
- greenhouse gas emissions
- eutrophication and impoverishment of aquatic resources
- finite reserves of fossil raw materials
- increased urbanisation and changing conditions in rural areas
- lifestyle changes and changes in patterns of consumption

Challenges facing Swedish agriculture, forestry and fisheries also include the following:

- increased competition in a global market, with price fluctuations and profitability problems
- the need for new (niche) products, using quality and high value to compete
- a growing need for raw materials from forests while meeting environmental and climate requirements as well as social needs
- a growing demand for closed cycles in the face of an increasing quantity of hazardous substances
- the need for sustainable use of fishery resources and ecosystem-based management
- doubts about new technology and new forms of production among the general public
- stringent animal welfare and health requirements, for livestock, poultry as well as sporting animals and pets

Today, SLU's research, education and environmental monitoring and assessment contribute to increased knowledge, competence building and development of new solutions to the problems involved in the challenges; there is great potential for further developing this role.

SLU has a clear comparative advantage by virtue of its broad expertise in agriculture and forestry, animal husbandry, animal health, wildlife, aquaculture, fisheries, landscape architecture, rural development, etc. This expertise spans entire value chains and includes fundamental fields such as chemistry, molecular biology and ecology, as well as production and environmental issues, characteristics and use of raw materials, health dimensions and economics. In fields where SLU itself lacks expertise, e.g. certain areas within the social sciences, law and technology, SLU will be seeking to collaborate with other scientific environments.



>> SLU has a clear comparative advantage by virtue of its broad expertise in agriculture and forestry, animal husbandry, animal health, wildlife, aquaculture, fisheries, landscape architecture, rural development, etc. <<





PHOTO: ISTOCKPHOTO.COM

2.2 SLU's areas of strength

The SLU of today is a modern university, conducting high quality work in fields of great relevance to society from both a national and a global perspective.

According to the government's directive, SLU's sectors are agriculture, horticulture, landscape planning, food production, nature conservation, forestry and forest products, fisheries and aquaculture, veterinary medicine and livestock husbandry. In addition, SLU has been delegated responsibility for conducting environmental monitoring and assessment³. The whole that is created by the combination of basic research, education and societal activities makes up SLU's unique strength.

Specific strengths in various areas of SLU operations are described below.

Research

In 2009 SLU conducted a comprehensive evaluation of the quality and impact of its research with the help of international experts and stakeholders (Quality and Impact, KoN 09). The evaluation showed that SLU has world-leading research teams in forest vegetation ecology, forest mycology and pathology, animal genetics, wood science and wood fibre technology, remote sensing, chemical ecology and soil-plant interactions. By far the strongest field is plant science, where, on average, articles produced at SLU are cited twice as often as the global average⁴. SLU also has internationally pre-eminent research with good development potential in the fields of basic bioscience and food science, for example.

SLU's share of Sweden's publication in scientific journals has increased sharply since 2007. Analyses show that average citation of articles is 21 per cent over the global average, which places SLU joint second in Sweden^{5 6}. About 60 per cent of SLU's international scientific publication takes place in agricultural sciences, plant & animal science and ecology/environment. These fields are also those in which Swedish research is rated most highly in international terms, measured in degree of citation. A bibliometric ranking of all universities publishing in these three fields placed SLU 15th in the world (4th in Europe) in terms of production

³ Ordinance for SLU, 1993:221

⁴ Incites 2011, based on data from *Web of Science*

⁵ Field-normalised average citation ("crown indicator"), Nordforsk 2011

⁶ Leiden ranking 2011/2012



and quality⁷. No other Swedish university is ranked so highly when compared with other higher education institutions in their respective university categories.

Evaluations have also shown that SLU successfully combines curiosity-based research with needs-driven research. SLU has initiated a number of broad research programmes in collaboration with stakeholders and/or other higher education institutions, with extensive external funding, which have been given top marks in international surveys, e.g. the Berzelii Centre for Forest Biotechnology at Umeå Plant Science Centre.

The new initiative for inter-faculty “Future” platforms has enabled SLU to create structures to address complex issues holistically. Under the Future Forests, Future Agriculture, Future Animal Health and Welfare and Future Urban Sustainable Environment platforms, scientists, social scientists, humanists and design scientists are working with sector representatives to identify research needs, and to make interdisciplinary analyses and syntheses.

Education

SLU has a good number of vocational programmes that are unique in Sweden (agricultural science, forestry, landscape architecture, veterinary medicine, agricultural and rural management, forest management, veterinary nursing and others), of which several are among the most sought-after university programmes in Sweden, with more than 10 first-choice applicants per place. The skills acquired by SLU students are in demand among employers and the labour market is very favourable, particularly for graduates from programmes leading to a professional qualification.

SLU’s education programmes are characterised by high teacher-student ratios and close links with research and the labour market. These factors help to make SLU one of the top three higher education institutions in the national rankings⁸ published in recent years. According to regular

>> Making positive changes to the global food crisis
by redesigning agricultural food policy. <<

TESFAVE BERHANU

Student, Agricultural Food and Environmental Policy Analysis

⁷ Higher Education, Evaluation and Accreditation Council of Taiwan (HEEACT), 2011

⁸ Urank and Chamber of Commerce and Industry of Southern Sweden



questionnaires on the students' study environment and social situation, they are generally satisfied and have a positive perception of the study environment, with a broad network of contacts and a close relationship with teaching staff.

SLU has a well-developed system of thematic graduate schools to which the majority of PhD students belong. Most of them are satisfied or very satisfied with their education, and a high proportion (90 per cent) of those with PhDs from SLU obtain relevant work.

Most teaching at second-cycle level is in English and SLU has a higher proportion of incoming exchange students than other Swedish universities (14 per cent compared with the average of 9 per cent⁹). SLU also participates in a number of Erasmus Mundus schemes, including five joint master's programmes, two PhD programmes and two regional exchange programmes. There is a high level of involvement in minor field study (MFS) projects¹⁰ (1 per cent of students take part, compared with the national average of 0.2 per cent). There is a large international element in postgraduate education, where one-third of students have a foreign first degree.

Environmental monitoring and assessment

SLU has been appointed by the government to conduct environmental monitoring and assessment. This entails monitoring the country's forests, agricultural landscapes, mountains, seas, lakes, rivers and streams, as well as species. It also involves continuous analysis of environmental developments and resources.

Environmental monitoring and assessment gives SLU access to unique data series, some of them with very long time series, e.g. forest, soil, water and fish. This material represents a highly valuable resource in the efforts being made by government agencies to achieve the parliamentary environmental quality objectives, meet various international commitments, and to achieve society's overall goal of sustainable development. The long data series also represent a valuable resource for research, both within and outside SLU.

SLU has another key area of strength in development and application of models, with whose help environmental monitoring and assessment data

⁹ HSV Report 2011

¹⁰ Minor Field Study; projects in development assistance countries funded by the Swedish International Development Cooperation Agency, Sida

can be used for scenario analysis and projections, among other things. Model results are also used for international reporting, e.g. on air and water quality.

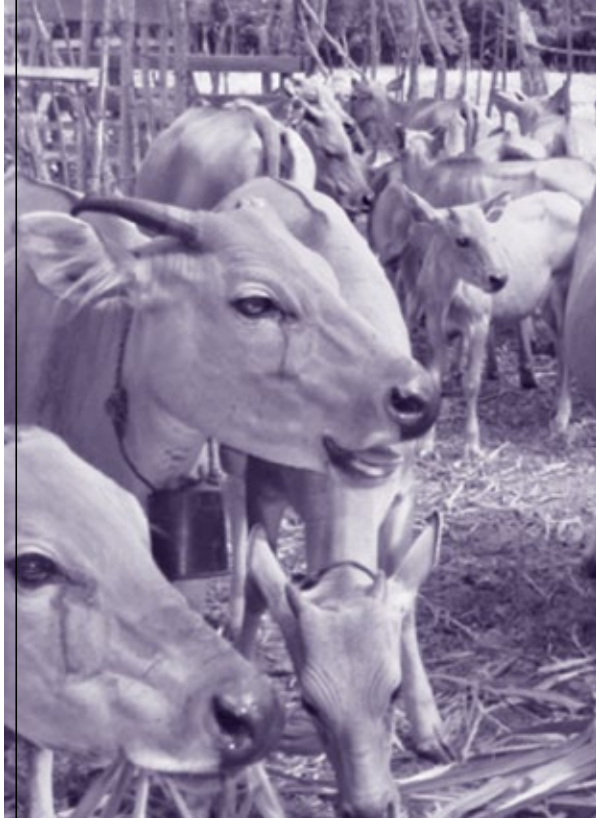
The KoN 09 evaluation underlined that SLU is one of the leading organisations in the world in the field of forest inventories, an area that has long been of importance to Sweden as a forest nation. Another world-class SLU speciality is the Swedish Species Information Centre, which assesses the status of endangered and vulnerable plants, fungi and animals, and proposes action to conserve biodiversity.

Extension for knowledge-based development

At SLU there is a strong tradition in which extension and dialogue with the surrounding community play an accepted and natural part, creating mutual benefit. SLU has a large number of pre-eminent collaborative centres, programmes, etc., whose purpose is to develop collaboration and dialogue with the university's target groups. The introduction of Assistant Professors, Extension Specialists, who will be combining their own research with responsibility for coordinating extension in the surrounding community, has met with great interest among stakeholders and the higher education sector. SLU also has an established and effective system for supporting and developing innovations. The company SLU Holding AB gives researchers and students access to a wide range of resources, support and services for developing business and operational concepts and commercialisation.

SLU has a very strong tradition in development cooperation and is the first Swedish university to have developed a strategy for global development, which is being implemented under a programme entitled Agricultural Sciences for Global Development. The programme is intended to coordinate SLU's competence and constitute a scientific base to support development of the agricultural sector in low-income countries.

SLU has a unique research infrastructure throughout the country in the form of numerous experimental stations, long-term field trials and experimental facilities for plant and fisheries research, a newly-built livestock research centre, and a biobank for animal tissue and DNA. Another unique asset is the University Animal Hospital (UDS), which is one of the largest in Europe. These resources open up new potential for developing collaboration, both with stakeholders and with other actors in research, education and environmental monitoring and assessment.



>> The programme Agricultural Sciences for Global Development is intended to coordinate SLU's competence and constitute a scientific base to support development of the agricultural sector in low-income countries. <<





PHOTO: ANDI BASO LOMPENGENG ISHAK

2.3 SLU's role as a sectoral university

SLU's sectors comprise agriculture (including animal husbandry), horticulture, forestry, wildlife management, aquaculture and fisheries, as well as veterinary medicine, natural resources and environment, rural development and landscape architecture.

As a sectoral university, SLU has a well-defined profile and in several areas is the only actor in the country. This profile has been further strengthened by incorporation of the National Board of Fisheries' R&D operations; since 1 July 2011 SLU's sphere of responsibility includes marine natural resources.

SLU's stakeholders include society at large, i.e. producers, processing industries, government agencies and other public bodies, as well as non-profit organisations, and individual citizens.

Our role as a sectoral university involves being both an independent knowledge-seeking actor and having expertise and an interest in continuous dialogue with the surrounding community. SLU's strength is substantial curiosity-driven research combined with well-developed operations relating to the needs of the relevant sectors, operations of a kind that in other countries are normally conducted by sectoral research institutes. Examples of these operations include experimental and developmental activities, support to government agencies, transfer of knowledge in the form of products and services, and information activities aimed at sectors or the general public. SLU has a national responsibility for several unique education programmes leading to a professional qualification, that meet a major need in the sectors concerned. Our special role in the field of environmental monitoring and assessment adds to SLU's unique profile. SLU also occupies a unique position by virtue of its regional structure, which facilitates effective collaboration, both with private enterprise and with higher education institutions in the regions.

SLU's role as a sectoral university has a pronounced international dimension. SLU is responsible for developing knowledge, not only of Swedish natural resources, but also global ones. Participation in joint European efforts to create access to data and analytical tools for information on biological resources (Life Watch) is one example. Another key task for SLU is to continue to contribute to capacity building in low-income countries in various parts of the world. Here, international research networks including CGIAR¹¹ institutions and strong universities, as well as alumni, are important tools.

¹¹ Consultative Group on International Agricultural Research



SLU believes it should continue to play a strong role as an integrated, national sectoral university. Collaboration with the Forestry Research Institute of Sweden (Skogforsk) and the National Veterinary Institute (SVA), as well as the Swedish Institute of Agricultural and Environmental Engineering (JTI) and the Swedish Institute for Food and Biotechnology (SIK), enables us to link together complementary activities in the fields of research and development across the entire value chain, making it easier to meet the needs of the various sectors. SLU therefore considers stronger and closer collaboration with these institutions to be essential. By formulating problems jointly, identifying knowledge needs, carrying out projects and collating knowledge, we can couple the R&D process with innovation, in the sense of using results.

SLU has an expanded sectoral role in those sectors lacking a research institute. This includes planning and development of urban environments, where SLU offers sectoral institute functions via the MOVIUM collaborative centre, and also the horticultural sector.



PHOTO: VIKTOR WRANGE

>> Our aim is to further broaden and deepen collaboration with other leading universities, in Sweden and abroad. <<



2.4 SLU's role in the national and international university arena

Much emphasis is placed on research at SLU, with about 70 per cent of the budget allocated to research and third-cycle education. SLU already collaborates extensively with other Swedish and foreign higher education institutions, which may be seen, among other things, in a very high proportion of joint publication (55 per cent)¹². Our aim is to further broaden and deepen collaboration with other leading universities, in Sweden and abroad.

SLU has operations at its campuses in Uppsala, Umeå, Alnarp and Skara, and also has field and experimental facilities at a further twenty locations throughout the country. In collaboration with national higher education institutions, SLU derives great benefit from its presence in several different regions. There is particularly extensive collaboration with the universities of Uppsala, Lund and Umeå, in the form of joint strategic research fields and other strong research environments, graduate schools, collaborative centres, as well as collaboration within education programmes.

SLU is also seeking to systematically develop its collaboration with leading international higher education institutions (see 3.3.1). High quality is a key factor when choosing partners. Collaboration with prominent foreign universities will strengthen the international dimension in research, education and environmental monitoring and assessment. Collaboration with universities in low-income countries will yield an exchange of experience and perspectives.

SLU also intends to continue its active participation in university networks in the Nordic region and Europe, principally the Nordic Forestry, Veterinary and Agricultural University Network (NOVA), the Nordic Association of Architectural Research (NAF) and Euroleague for Life Sciences (ELLS), and also the European Council for Landscape Architect Schools (ECLAS).

¹² Higher Education, Evaluation and Accreditation Council of Taiwan (HEEACT), 2011



>> Excellent research also requires advanced infrastructure. <<



3. STRATEGIES FOR 2013–2016

3.1 Current situation

SLU has a focused profile, unique in Sweden, conducting research, education and environmental monitoring and assessment in fields of great relevance to society. This applies both from a national and a global viewpoint. The Quality and Impact Evaluation made in 2009 (KoN 2009) provided a valuable basis for deciding priorities in relation to research, environmental monitoring and assessment, and extension. Measures implemented by SLU or initiated during 2009–2011 are described in an appendix to this strategy.

Notwithstanding our current favourable position, SLU faces a number of challenges that must be met if we are to realise our vision of becoming a world-class university. If SLU is to gain access and contribute to international scientific developments, we must continue to be an attractive partner. A growing political focus on natural resources and food supply means that competition from other universities is increasing. In the international arena, universities in “tiger” economies, such as China, are developing very rapidly indeed. If SLU is to further strengthen its position, it is essential that research, both in basic fields and in more sectoral areas, maintains the highest standards, and that SLU manages to recruit and keep top researchers. Excellent research also requires advanced infrastructure, which involves a growing need for external funding.

SLU must make good use of its broad competence in research as well as resource and environmental analysis, so as to be able to offer high-quality synthesis capacity. The complexity of central aspects of land use and sustainability, for example, necessitates multidisciplinary and interdisciplinary platforms. Research in the social sciences needs to be strengthened and to focus more on areas of importance to SLU’s mission. At the same time, “large-scale system biology”, which includes pre-eminent basic biological research, is the fundament of the university’s activities.

The growing demands society makes of new PhDs means that expert knowledge of specific subjects must be combined with the ability to

PHOTO: JENNY SVENNÄS-GILLNER

analyse and communicate research findings, as well as the ability to evaluate and adopt a position on ethical aspects of research. This must be taken into account so that third-cycle education at SLU continues to maintain high quality.

As regards first-cycle education at SLU, continued expansion and greater internationalisation are essential. First-cycle and second-cycle education programmes must be continuously developed so that they continue to be in demand and give students a high level of competence and employability.

SLU must remain at the international forefront of environmental monitoring and assessment in order to contribute to solutions within the framework of international conventions and EU working parties. Data gathering in all areas requires long-term planning and responsible management so that this valuable information bank is readily available to various users. SLU's new role in the monitoring of aquatic resources should be integrated in a properly thought-out way with related activities that are already in progress.

In addition, SLU should take advantage of its current favourable position to develop its role as a committed actor in extension, entrepreneurship and innovation in its sector.

3.2 Priority areas

Chapters 3.2.1 and 3.2.2 describe areas in which SLU conducts research, education and environmental monitoring and assessment that are expected to contribute to solutions to central societal problems in the form of new knowledge, innovations based on research findings and enhanced competence. These areas have been gathered under two main headings: *A bio-based economy* and *Environment, health and quality of life*. These areas also give an idea of SLU's unique scientific profile compared with other higher education institutions in Sweden.

Initiatives in these problem-oriented areas must be based on strong basic biological research. SLU therefore considers basic bioscience, systems biology and chemistry to be a very high priority. This research increases our fundamental knowledge about plants, animals and micro-organisms, from molecular to organism and population level. A deeper understanding of the factors governing various functions and characteristics will create the necessary conditions to use the potential of genetic resources and manage biological systems in an effective and sustainable manner.



PHOTO: JENNY SVENNÄS-GILLNER

>> The areas: A bio-based economy and Environment, health and quality of life, give an idea of SLU's unique scientific profile compared with other higher education institutions in Sweden. <<



3.2.1 A bio-based economy

Bio-based economy is an umbrella term addressing several of the challenges described in chapter 2.1. A bio-based economy includes all industry and all economic sectors in which biological resources are produced, managed or otherwise used.

The EU has highlighted the concept of a bio-based economy as being of central importance¹³, one that will also be a priority in the forthcoming framework programme for research, development and innovation¹⁴. Several European countries have started national initiatives, and the Swedish government has ordered the preparation of a national strategy for development of a bio-based economy for sustainable development.

The commitment to transition to a bio-based economy is founded on the realisation that increased use of biological raw materials and production systems is one of the keys to reducing dependence on fossil raw materials and reducing emissions of carbon dioxide and other greenhouse gases. Greater and innovative use and processing of renewable biomass from agriculture and forestry, and also aquatic organisms, will also stimulate growth, improve the profitability and competitiveness of bio-based industries, and fuel development of rural and coastal areas.

¹³ The EU's growth strategy "EU 2020"

¹⁴ Horizon 2020, for the period 2014–2020

Sweden has good potential for developing a bio-based economy thanks to a ready supply of land and water, high biomass production and a high level of scientific expertise in the field. With a mission focusing on development and sustainable use of biological natural resources, SLU occupies a unique position among Swedish universities. This offers plentiful scope for contributing to a bio-based economy in a national as well as international arena.

SLU's contribution to knowledge development for a bio-based economy comprises research, education and environmental monitoring and assessment in the following sub-areas, described below in no particular order.

Innovative use of biological raw materials to replace fossil raw materials

SLU is developing innovative solutions capable of helping to increase product value in value chains in the bio-based sector, e.g., biorefineries, where the components in the biomass are separated off and used for various purposes. Biofuel processes, modification of fibre properties, use of residual products and plant-based production of technical oils, starch, plastics and green chemicals, are some current areas of research.

Efficient and sustainable production systems in agriculture, forestry and fisheries

SLU contributes knowledge of how productivity and the supply of raw materials can be sustainably increased, taking account of economic capacity and demands for reduced impact on soil, water and biodiversity, as well as greenhouse gas emissions. Action to minimise nutrient leaching, the feeding and management of large herds of animals and on fish farms, and also methods to reduce the need for pesticides are some important topics. Research also supports adaptation of forestry and agriculture, animal husbandry and aquaculture to climate change.

The food chain

SLU's work concerns the entire food chain – from water and soil to the table, which includes the effect of production systems on product quality and nutritional content, the positive health effects of foodstuffs, food safety and risk assessment. Ethical aspects of food production and consumption, and consumers' attitudes and behaviour in relation to food and biotechnology are other current issues. The aim is to contribute to knowledge-based, sustainable food production that offers consumers safe and healthy food.



PHOTO: ROGER JANSSON

>> Since 2011 SLU has been playing a greater part in efforts to achieve sustainable management of fish and shellfish populations in fresh water and seas. <<



Aquatic resources

Since 2011 SLU has been playing a greater part in efforts to achieve sustainable management of fish and shellfish populations in fresh water and seas. SLU is contributing new knowledge on behavioural ecology and genetics, and with analyses of aquatic ecosystems and the temporal and geographical effects of various measures, such as catch methods, no-fish zones and fish release. Other important areas of knowledge are population structure and use, interaction between fisheries and marine mammals and birds, and other anthropogenic impacts.

Goal conflicts concerning natural resources

SLU is endeavouring to contribute knowledge on which to base an approach to the goal conflicts arising due to limited access to land and other natural resources. Growing production intensity and degree of utilisation come up against values such as impact on climate and the environment, conservation values and recreational opportunities. SLU is developing knowledge on the effects of various strategies on the use of land and water, as well as models for ecosystem-based, adaptive management of wildlife and fish populations. Providing decision support and expert advice for weighing up priorities in relation to resources and environmental status in agricultural landscapes, forests, fresh waters and seas are other important tasks.

Social and economic development in rural areas

Achieving sustainable management of natural resources will also require knowledge of social development in rural areas. SLU contributes research into the historical and cultural contexts in which rural communities develop, the effects of rural policy, social and political relationships and the interaction between urban and rural areas. This field spans developments both in the Nordic region and Europe and in low-income countries.

Cycles between urban and rural areas

In a resource-efficient economy, society must take the opportunity to make use of organic waste and by-products much more than at present. SLU is active in this field, developing data and methods for more efficient bioenergy production from waste and other by-products, as well as systems and processes for recycling of nutrients to agriculture. SLU also contributes general flow studies of energy, materials, etc.





PHOTO: ISTOCKPHOTO.COM

3.2.2 Environment, health and quality of life

Biological resources are of great importance to society in more ways than are described in chapter 3.2.1. Our very existence is dependent on ecosystem functions and the state of the environment. Nature and animals affect human health and wellbeing, directly and indirectly. SLU's operational concept concerns biological resources and their interaction with humankind. SLU thus has an important part to play in improving knowledge and understanding of the interrelationships and processes involved in this interaction.

SLU develops knowledge on environment, health and quality of life in the following fields¹⁵ (in no particular order):

Ecosystems, environment and climate

SLU is a leading national actor in efforts to achieve the Swedish environmental quality objectives and plays an active part in development of, and reporting under, various EU directives and international conventions. The expertise and extensive work being done in the field of terrestrial and aquatic ecosystems at SLU adds to understanding of basic ecosystem functions, and the impact of environmental changes, e.g. climate, on ecosystem services.

>> Increasing attention is being paid to the positive effects of animals and nature on the physical and mental health of humans. <<

¹⁵ Note: Some of the aspects addressed in this chapter overlap with bio-based economy (2.3.1) in that they also have a pure economic value: e.g., the equine industry is the fifth largest source of income in Swedish agriculture

Urban environments and landscape architecture

More than half the world's population now live in urban areas. Sweden has one of the highest per capita proportions of paved surfaces and other infrastructure in Europe. SLU's research into how increasing urbanisation affects social sustainability, aesthetic qualities, etc. provides a basis for innovative planning solutions, whereby urban environments can be sustainably developed while also taking account of climate change, demographic changes and the transition to a post-industrial economy.

Animal health and animal welfare

For many people, animals have acquired a new value – one that is not primarily associated with food production. Yet owners of animals do not always know enough about animal husbandry to live up to the requirements of Swedish animal protection laws. SLU has an important part to play in developing methods of measuring animal welfare and developing a basis for better diagnosis, treatment and measures to prevent injury and disease among sporting animals and pets, as well as livestock, poultry and fish.

Collaboration between veterinary medicine and human medicine

Animals – wild as well as domestic – and humans are to a large extent susceptible to the same harmful micro-organisms. Under the theme “One World – One Health” SLU is working to produce knowledge for improved human and animal health in a broad, global perspective, in collaboration with human medicine. Issues addressed are infection biology, diagnosis, the spread and combat of zoonoses, and also responsible use of antibiotics. SLU's research in comparative medicine, in which animals serve as models in fields such as physiology, medicine and nutrition, provides important knowledge of both animals and humans. One example is that our sport animals and pets are increasingly afflicted by lifestyle diseases having direct corollaries among humans.

The significance of animals and nature for human health and wellbeing

Increasing attention is being paid to the positive effects of animals and nature on the physical and mental health of humans. Nature-based care and rehabilitation has developed into a successful treatment method for conditions such as chronic fatigue syndrome, and animals are increasingly used in health care and therapeutic contexts. Research into the importance of outdoor environments for the health and wellbeing of children and adults contributes to better design of habitations and activities in school and care systems, etc. SLU is driving developments in this field in collaboration with experts on behavioural science and human medicine so as to increase our understanding of cause and effect.

3.3 Research including third-cycle education

3.3.1 Research

SLU's objectives for research are

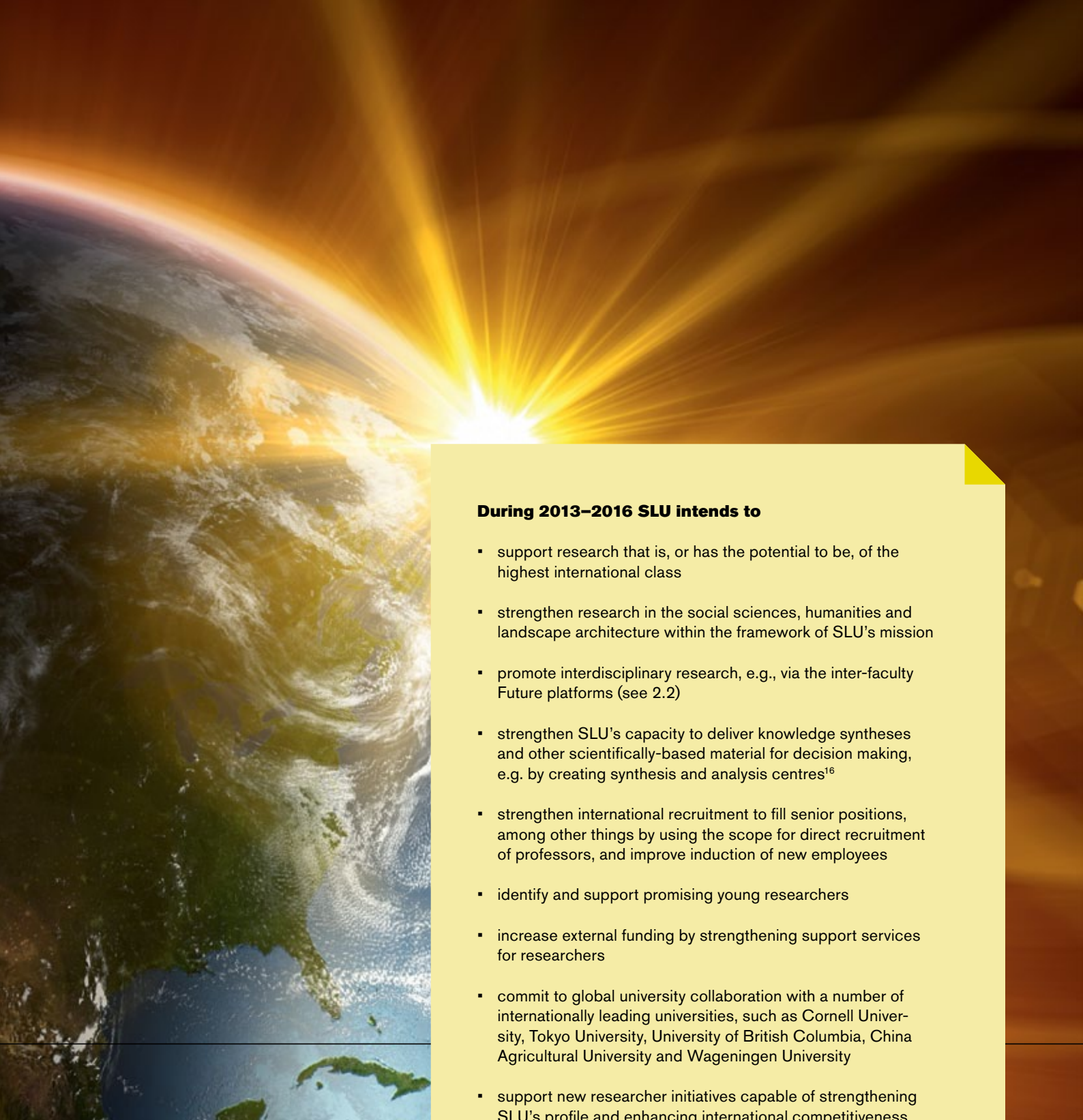
- to focus on areas of strategic importance to SLU's mission statement and educational mission
- to pursue research of the highest quality and international excellence in these strategic areas
- to provide environments that promote and stimulate innovative excellence in research

The overall strategy is to continue to develop excellent, competitive research of benefit to society within the framework of the priority areas (see 3.2). The operational emphasis adopted on the basis of the results of the KoN 09 evaluation will continue to apply, which means that SLU will base its operations on developing areas of existing strength and reward excellent research. Less developed research fields of importance to SLU's education programmes and interaction with stakeholders will also be supported. The efficacy of measures taken will be assessed in a new evaluation of research quality and impact in 2014 (KoN II).

According to the international experts engaged in KoN 09, research at SLU is generally of a high quality and relevance to society. However, the level must be raised further so that more research teams reach the "world-leading" level. The scientific publication rate has grown strongly, and is continuing to do so. If this trend is to continue, initiatives will be needed to further raise quality and increase external funding. SLU's international presence should also be strengthened.

>> The scientific publication rate has grown strongly,
and is continuing to do so. <<

PHOTO: ISTOCKPHOTO.COM



During 2013–2016 SLU intends to

- support research that is, or has the potential to be, of the highest international class
- strengthen research in the social sciences, humanities and landscape architecture within the framework of SLU's mission
- promote interdisciplinary research, e.g., via the inter-faculty Future platforms (see 2.2)
- strengthen SLU's capacity to deliver knowledge syntheses and other scientifically-based material for decision making, e.g. by creating synthesis and analysis centres¹⁶
- strengthen international recruitment to fill senior positions, among other things by using the scope for direct recruitment of professors, and improve induction of new employees
- identify and support promising young researchers
- increase external funding by strengthening support services for researchers
- commit to global university collaboration with a number of internationally leading universities, such as Cornell University, Tokyo University, University of British Columbia, China Agricultural University and Wageningen University
- support new researcher initiatives capable of strengthening SLU's profile and enhancing international competitiveness

¹⁶ A centre where researchers are gathered for a limited period to analyse complex issues by using and linking existing concepts and theories, often of an interdisciplinary nature.

3.3.2 Third-cycle education

SLU's objectives for third-cycle education are that

- holders of PhDs from SLU are in demand for their excellence, nationally and internationally
- the scope of the education is dimensioned to provide both research and the job market with research-trained associates
- the best postgraduate students are recruited, and a higher proportion of students are employed during their studies
- a major share of the education is pursued within the framework of graduate schools in collaboration with the business community, the public sector and international partners

SLU's third-cycle education is considered to work well, and postgraduate students meet a favourable labour market. The quality of third-cycle education can be further improved by planning and monitoring achievement of learning objectives, and by further development of supervisors' teaching skills. Although only a small number of postgraduate students are financed by doctoral grants, the use of such grants must be further diminished in order to achieve the goal that a higher proportion of students are employed during their studies. The graduate schools initiative should be further developed, and the schools should encourage an interdisciplinary approach. SLU's third-cycle education has a strong international dimension, but there is unexploited potential for joint programmes with international higher education institutions, leading to joint or double degrees.

During 2013–2016 SLU intends to:

- continue developing graduate schools in collaboration with stakeholders and other higher education institutions
- quality assure third-cycle education using central SLU guidelines for planning and follow-up
- include third-cycle collaboration as a key element of research collaboration with other higher education institutions, e.g., in the form of joint degrees
- strive for abolishment of doctoral grants

The Soil-Water-Environment Centre, SLU Uppsala. The centre contains a research cluster with the departments for Energy and Technology, Soil and Environment, and Aquatic Sciences and Assessment. It covers an area of 11 500 m² and houses approximately 300 people.





3.3.3 Infrastructure

One of SLU's research objectives (see 3.3.1) is to offer environments that promote and encourage innovative, excellent research. To achieve this, SLU has in recent years made great efforts to build up and further develop infrastructure of various kinds.

A major initiative is currently under way to group operations in sizeable clusters in new purpose-built facilities, where new, and in several cases unique, opportunities are created for research, education and environmental monitoring and assessment. A modern livestock research centre has recently been established. As a result of KoN, SLU has decided to establish a common intellectual infrastructure (databases, operational support for statistics, modelling, publication support, etc.). Establishment of an effective open archive for publications, together with an e-archive for research data, is essential, both scientifically speaking and for the extension process.

SLU also participates in nationally prioritised infrastructure initiatives, e.g., by playing a leading role in the LifeWatch network project, and through its involvement in ICOS¹⁷ and the establishment of MAX IV. In order to promote bioscience research, SLU has assumed an active role in Science for Life Laboratory, contributing with initiatives on bioinformatics, biobanks for animals, plants and micro-organisms, and also metabolomics.

Further efforts will be needed to realise the full potential of these initiatives. A special effort is needed to develop infrastructure that promotes high quality field-based research.

During 2013–2016 SLU intends to

- market the new environments as a resource nationally and internationally
- further develop common intellectual infrastructure (databases, operational support, publication support, etc.)
- become involved in a national initiative on infrastructure for field-based research
- press to ensure national availability of marine research vessels

¹⁷ *Integrated Carbon Observation System*

3.4 First- and second-cycle education

3.4.1 First- and second-cycle

SLU's objectives for first-cycle and second-cycle education are that

- its education meet rigorous demands in terms of science and teaching as well as the needs of society regarding competence in the fields in which SLU is active
- its courses and programmes are attractive and competitive both from a national and an international perspective
- the volume of education is greater than in 2009, with a large proportion of students at the advanced level

A continuing increase in student numbers is essential for several reasons. SLU's expertise covers issues of importance to society and will be central to most of the future challenges faced by Sweden and the rest of the world. There is a great demand for SLU graduates from both the private and the public sector, and many SLU programmes attract large numbers of applicants. Education is also a key component of the university's inner life, a component that creates a dynamic environment and a basis for the researchers of the future. Moreover, a sufficiently large education volume is needed to generate resources for common support functions for students and teaching staff. The majority of SLU study programmes have relatively few students and high infrastructure

>> I want to increase understanding
of misunderstood animals. <<

SABINA AHLGREN

Bsc in Ethology and Animal Welfare



costs. The range of programmes offered must therefore be coordinated to achieve more efficient use of resources.

In order to compete for the best students, all education must be of a high quality, with content that is relevant to students, society and employers. Education at SLU has close links with research and a pronounced international dimension, but these aspects must be further developed and integrated even more strongly in study programmes.

>> Develop the ways that education is linked with research and forms of the scientific approach throughout all education. <<

During 2013–2016 SLU intends to

- create scope for long-term expansion of the education volume by working for an increased education appropriation
- increase the proportion of second-cycle education and focus the content on SLU's profile areas
- develop the ways that education is linked with research and forms of the scientific approach throughout all education
- develop the range of study programmes offered for greater quality and resource efficiency, among other things by more internal and external collaboration and a greater element of flexible learning
- strengthen the internationalisation of education, among other things by developing course content, promoting student and teacher exchange, increased international collaboration and recruitment to master's programmes

3.4.2 Lifelong learning

SLU's objective for continuing, further and contract education is to

- provide attractive programmes in lifelong learning through academic-level training in SLU sectors

There is a great need for skills development among professionals working in SLU's sectors. SLU has so far not made full use of this potential.

During 2013–2016 SLU intends to

- increase its range of contract education courses to meet the needs of external stakeholders
- increase recruitment of professionals in second-cycle education

3.5 Environmental monitoring and assessment

SLU's objectives for environmental monitoring and assessment are that

- there is a strong link between environmental monitoring and assessment and other operational areas at SLU
- operations take the lead in Europe and actively contribute to international development of science-based environmental monitoring and assessment
- analyses are provided for decision-making purposes that allow resource use and environmental consequences to be weighed against each other

SLU is a leading player in national environmental monitoring and assessment and also has potential for development from a European and global viewpoint. Stakeholders increasingly require material that weighs up resource use considerations against environmental impacts. If the unique data series that exist are to be put to even greater use, SLU will have to be better at providing information about the data available, and also facilitate access to the data. This is a key element in further improving the quality of data management. The absence of long-term funding for these activities is a major problem.

During 2013–2016 SLU intends to

- work to assure long-term funding of these activities
- place greater operational emphasis on in-depth analyses, syntheses and projections
- play an active part in collaborating with national and international partners to develop environmental monitoring and assessment to meet the needs arising due to rapid developments in the field
- rationalise data gathering and improve the quality of data management and supply



>> I want to improve the monitoring of wildlife in forests and agricultural landscapes. <<

LARS EDENIUS

Assistant Coordinator for the Forest programmes

3.6 Staff and students

SLU's overall objectives (see 1.2) emphasise the importance of the following

- students and staff have a working environment and working conditions that are among the most attractive
- the organisation works effectively, with clear leadership and efficient use of resources
- the gender equality and diversity perspectives are central to all our operations
- staff and students are our best ambassadors

3.6.1 Leadership development

SLU's commitment to leadership development is founded on the realisation that strong leadership at different levels of the organisation is crucial to achieve our strategic operational goals, and to realise the vision of becoming a world-class university in the life and environmental sciences. The Sustainable Academic Leadership project, which began in 2010 with the aim of strengthening academic leadership at SLU, also emphasises the important part played by all SLU staff, and that effective interplay between leaders and staff is essential for success.



PHOTO: JENNY SVENNÄS-GILLNER

During 2013–2016 SLU will be implementing the integrated leadership development programme SLU Leadership, the components of which include:

- a leadership concept governing SLU, expressing the characteristics expected of leaders at SLU
- a staff concept governing SLU, expressing the characteristics expected of members of SLU staff
- leadership courses and support for academic leaders, experienced as well as those of the future, serving as a complement to existing, more administration-oriented management courses
- formulating a common SLU value system based on leadership and staff concepts

3.6.2 Competence supply and career development

SLU seeks to ensure good employment conditions and career opportunities for its entire staff. Following amendments to the Higher Education Ordinance, a new career system for academic staff must be developed. SLU has a number of unique features that make particular demands on the design of such a system. For instance, there is a much higher proportion of researchers than at other universities, and a relatively small proportion of first-cycle education programmes. The many vocational programmes require close links with working life and the professions. The proportion of staff engaged in SLU's third area of operations – environmental monitoring and assessment – has risen substantially since responsibility was assumed for the National Board of Fisheries' R&D operations.

2010 saw the start of work on developing a new career system adapted to SLU's three main missions and offering clear incentives for productivity and long-term development of the individual as well as operations. One important principle is the announcement of appointments and selection of applicants to enable strategic governance and assure high quality in research, education and environmental monitoring and assessment. A clear career system is expected to facilitate staff recruitment and make SLU an attractive employer.

During 2013–2016 SLU intends to

- introduce a new career system offering ample scope for career development in all operational areas
- develop the forms of co-opting lecturers, senior lecturers and professors, and also appointment of guest teachers

3.6.3 Equal opportunities

One of SLU's objectives is that equal opportunities and the diversity dimension should occupy a central position throughout our operations (see 1.2). These issues are dealt with under equal opportunities, governing our approach to students and employees alike. Overall, numbers of male and female students and staff are fairly even (within the range 40–60 per cent), but the distribution in study programmes and according to employment category reveals a different picture. Men are in the majority on programmes at the Faculty of Forest Sciences, whereas

>> One of SLU's objectives is that equal opportunities and the diversity dimension should occupy a central position throughout our operations. <<

PROFES

CAREE



PHOTO: JULIO GONZALEZ

there is a huge preponderance of women on animal-related programmes. Women are somewhat overrepresented among administrative staff and greatly underrepresented among professors (22 per cent in 2010). The distribution of men and women also varies between recruited and promoted professors: the proportion of women among recruited professors is considerably higher than that among their promoted counterparts.

A study has been carried out at SLU to survey gender and equality activities conducted at the university and plan for development of those activities¹⁸. Measures have been proposed throughout our operations; initiatives taken so far have mainly concerned organisation, student recruitment, teacher training and leadership development. A training course for future academic leaders is intended to offer good academic career opportunities post-doctorate, and in particular to encourage and enable more women to seek promotion.

SLU will continue to work for greater equality between the sexes.

During 2013–2016 SLU intends to

- regularly monitor equality developments by means of key figures and questionnaires distributed to students and staff
- support young researchers, particularly women, at the start of their academic career by training, mentorship, etc.
- pursue a long-term strategy to broaden recruitment and promote gender-aware teaching

3.6.4 Students

Student influence is an important and natural component in SLU's commitment to quality, and student participation is essential if SLU is to achieve its educational objectives. SLU has active student unions and a long tradition of supporting them, financially and in the form of activities to promote study monitoring (e.g. annual education days).

SLU supplies resources of various kinds for students: IT support, student web portal, study and career guidance, support for the disabled, crisis management, student health care, etcetera Guidance is intended to give

¹⁸ Report, "På väg mot ett genusintegrerat SLU" (Stina Powell, 2008)

students and prospective students enough information to independently make informed study and career choices, and also to give them support as they prepare to begin working life. On SLU campuses there are “LRCs” (Learning Resource Centres) close to the libraries. These centres offer facilities including adaptive technology, group workrooms and places to practise general skills.

A university-wide questionnaire covering social and academic aspects of life at SLU is sent out regularly to first-cycle and second-cycle students. This is part of SLU’s systematic approach to quality. The aim is to survey the social environment and study situation at SLU and obtain material to serve as a basis for improvements. A similar questionnaire is used for those on third-cycle programmes, and an ombudsman for PhD students is funded by SLU to support individual doctoral students.

SLU will give its students the right conditions to succeed in their studies and enjoy their time at the university.

During 2013–2016 SLU intends to

- continue to foster and strengthen its cooperation with student organisations
- work to ensure that all students at SLU are well aware of their rights as students and know where to turn with questions about equal opportunities and concerns about their studies and/or social situation
- supply resources for high-quality learning for students at all levels, wherever they study
- continue surveys of the study environment and social situation of all students, follow up results and remedy any shortcomings
- extend career guidance at SLU to include international students and PhD students



PHOTO: ERIK KARLTUN

>> Further development will necessitate a carefully thought-out strategy for long-term collaboration in research and capacity building with selected partners. <<

3.7 Global development

One of SLU's overall objectives is to

- strengthen Sweden's position as a knowledge nation and contribute to the development of the sustainable use and management of natural resources

SLU's expertise can make important contributions to improved productivity in agriculture, food safety and sustainable livelihoods in low-income countries. As a result of the establishment of the Agricultural Sciences for Global Development (SLU Global) programme¹⁹, with a supporting programme office, SLU has strengthened its position in the development field. Further development will necessitate a carefully thought-out strategy for long-term collaboration in research and capacity building with selected partners.

During 2013–2016 SLU intends to

- establish SLU Global as a national node for global development issues within the university's sphere of responsibility
- develop cooperation on long-term capacity building with selected universities, mainly in Africa
- create a professional network of SLU's international alumni

¹⁹ The programme covers agricultural sciences in a broad sense, i.e. agriculture, forestry, veterinary medicine, rural development, etc.

3.8 Extension, collaboration and innovation

Extension and innovation are involved in three of SLU's overall objectives, whereby

- research, education and environmental monitoring and assessment are conducted in collaboration with selected higher education institutions, the sectors and society at large
- research findings are known and used in society
- we strengthen Sweden's position as a knowledge nation and contribute to the development of the sustainable use of and management of natural resources

3.8.1 Extension and expert support

In the fields of both research and environmental monitoring and assessment SLU has long engaged in very extensive collaboration with the agricultural, forestry and fisheries sectors, private enterprise, government agencies and organisations, regionally, nationally and internationally. According to the KoN evaluation, these activities are appreciated by stakeholders, who also underlined the potential for increased impact by developing forms of extension.

SLU intends to further cement its strong position. Recruitment of around 20 Assistant Professors, Extension Specialists will enable the university to strengthen its existing extension structure and create new opportunities. The initiative is intended to benefit knowledge development among SLU's stakeholders and in society at large, and ultimately contribute to improved funding of operations. SLU also needs to strengthen extension by way of systematic dialogue with the public, with schools and with its alumni.

During 2013–2016 SLU intends to

- expand SLU's extension activities with the help of the senior extension lecturers
- focus on extension in the fields of food, bioenergy, infection biology and societal planning and management, so as to meet important national and global challenges
- build up a cross-faculty extension forum on water quality, to serve as a clear portal for stakeholders, along the lines of the "SLUfood" model
- systematically build up interfaces for meetings with the public and the schools system
- create a professional network of SLU's national alumni

>> I want to contribute to the knowledge and development of how access to safer foods can secure a growing population. <<

SOFIA BOQVIST

Assistant Professor, Extension Specialist
in Food Safety and Risk Analysis



3.8.2 Innovation support

Demand to increase the benefits to society, trade and industry derived from university-generated knowledge is expected to grow over the next few years. SLU's "knowledge triangle" initiatives, designed to meet this demand, are described separately in section 3.8.3. One particular challenge is to encourage more researchers, teachers and students to play an active part in increasing the flow of innovations. SLU had delegated responsibility for innovation support at the university to its company SLU Holding AB.

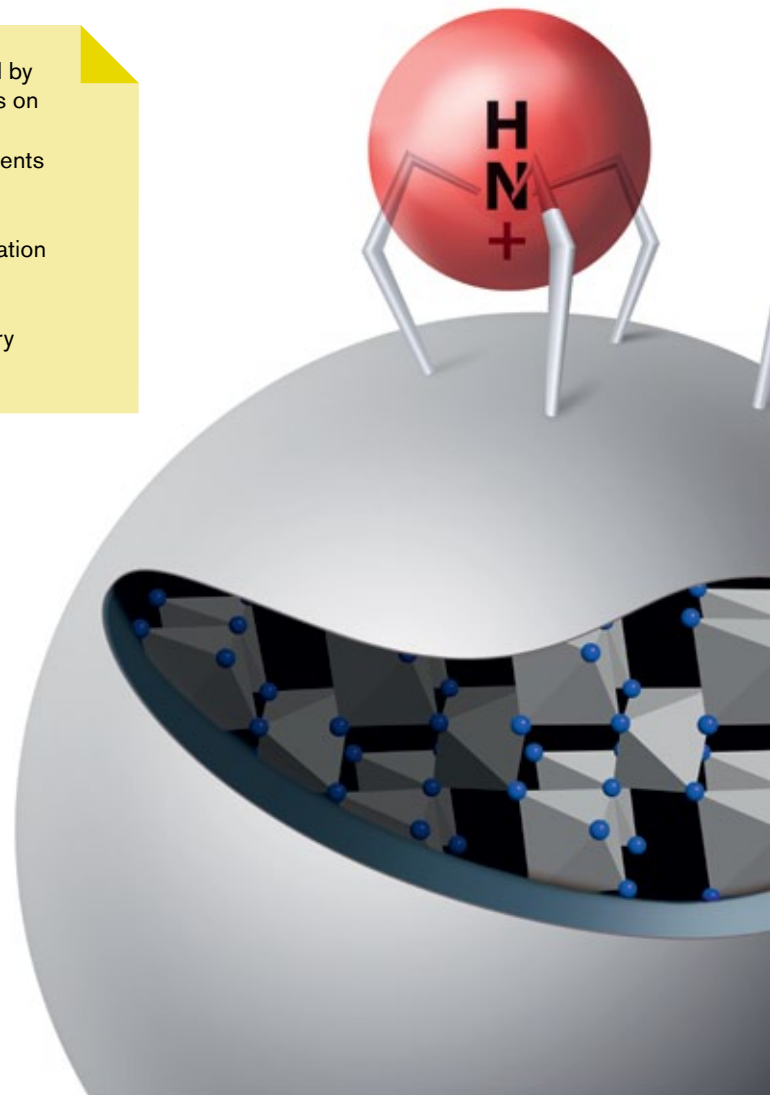
SLU Holding AB's operational concept is to create economic growth and increased societal development by commercialising SLU innovations, products and services. Despite its limited resources, SLU Holding has developed and established effective and extensive innovation support since 2007. One challenge is to make more researchers aware of potential benefits and the scope for commercialisation, as well as the support available. A shortage of available venture capital puts a serious constraint on SLU Holding's ability to support sound business concepts, and SLU intends to make efforts to ensure that the company receives more capital.

Over the next few years, and in line with the strategy adopted by the board of the company in 2011, SLU Holding AB will focus on

- rationalising innovation support provided to staff and students to facilitate rapid commercialisation of research results
- increasing its financial investment capacity for early innovation projects and companies
- increasing its contacts with the outside world, and industry in particular

SLU researchers Vadim Kessler, Gulaim Seisenbaeva, Sebastian Håkansson and Maria Unell, did something that other researchers said was impossible. They discovered that metal oxide nanoparticles can be directly transmitted from an organic to a water-based environment. This sets the foundation for a new sort of thin capsulation. The researchers have received support from SLU Holding to commercialise their discovery.

>> One challenge is to make more researchers aware of potential benefits and the scope for commercialisation <<



3.8.3 The “knowledge triangle”²⁰

SLU’s mission statement stresses that deriving benefit from the knowledge and expertise developed at the university, i.e. innovation in a broad sense²¹, is of central importance to SLU. SLU has a strong culture of extension, collaboration and dialogue with the surrounding community as an accepted and natural feature of its operations, yielding benefits both for the university and for stakeholders. SLU Holding AB’s operations help to create understanding for entrepreneurship among staff and students, and increase knowledge of ways of effectively developing innovative products and services.

SLU’s recent initiative to recruit senior extension lecturers is intended to strengthen the knowledge triangle. Their task is to engage in research, education and extension with the surrounding community. Another new initiative is the stakeholder network LEARN (Livestock Extension and Research Network), involving activities such as knowledge exchange, research collaboration, continuing professional development, conferences, etc. SLU Holding is the instigator behind a “student pool”, where PhD and other students are engaged to carry out market surveys, pre-studies etc., thereby becoming involved in the innovation system.

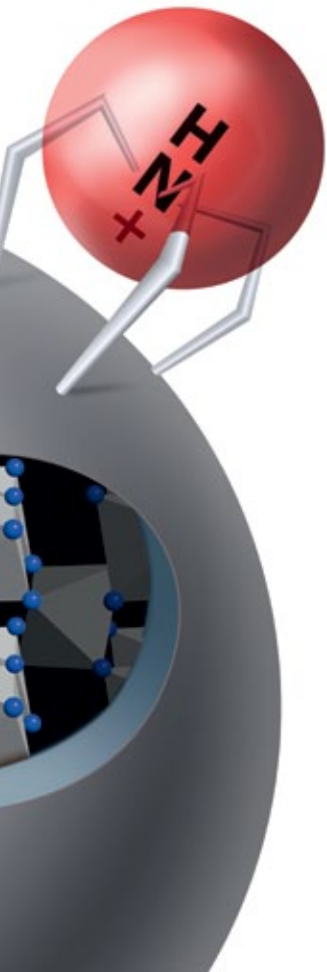
During 2013–2016 SLU intends to

- striving for high quality and creativity in all operations
- increasing the number of co-opted teaching staff at lecturer, senior lecturer and professorial level
- playing an active part in the Foodbest project, the objective of which is an EU application for a “KIC”²² in the field of food

²⁰ The interaction between education, research and innovation. In the EU this is regarded as an important means of improving competition in the private sector and contributing to social, cultural and economic development

²¹ Vinnova (the Swedish Governmental Agency for Innovation Systems), Report to the Swedish government, May 2011

²² Knowledge and Innovation Community; collaboration between universities and the private and public sectors in a European region to integrate education, research and innovation





3.9 SLU's brand and communication strategy

One of SLU's overall goals is that research findings should be known and used in society (see chapter 1.2). SLU strives to be an open university that creates and disseminates knowledge in collaboration with the surrounding community. Our communication activities are intended to make SLU more competitive nationally and internationally, and help to ensure continued successful recruitment of students, researchers and access to research funding. SLU should be known as the alternative of choice for those seeking expert knowledge within the university's sphere of operations. Staff, students and alumni should be seen as SLU's main ambassadors.

SLU education programmes have a high degree of national and global relevance. Communication activities aimed at prospective students and schools are therefore particularly important. Our target groups include private enterprise, funding sources, government agencies, universities and our international partners, and also the media.

As a public body, SLU should be characterised by transparency and openness, and be an active participant in the public dialogue. Educational initiatives to strengthen researchers' communication abilities are to be given priority, and internal communication initiatives will strengthen the sense of belonging to SLU as a single entity.

>> Staff, students and alumni should be seen as SLU's main ambassadors. <<

During 2013–2016 SLU intends to

- offer training in research communication for PhD students and researchers
- intensify recruitment initiatives and school contact nationally and internationally
- continue to develop its website as the most important communication channel

