



Website:

<http://cfas.ksu.edu.sa/ar/plant-production>

Location:

King Saud University

Collage of Food and Agriculture Sciences

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Table of Contents

Subject	Page
Present status	3
The Business Plan 2010– 2015	8
A. Management, Operations & Infrastructure	8
B. Financial & Business Management	9
C. Enhance Education and Training in Plant Sciences	11
D. To Build and Promote Public Private Partnerships	13
F. Marketing & Communications	14
The Research Programs Plan	19
Stated Measures of Success	22



Section I: Present status

Overview

The Plant Production Department, College of Food and Agricultural Sciences was established in 1965 as the first of its kind in Saudi Arabia. It is concerned with teaching agricultural sciences of production, physiology and breeding of agronomy and horticultural crops and management and development of rangelands and forests. The department conducts applied research which aims to increase the production and improve the quality of field and horticultural crops and utilize natural resources on sustainable basis under the conditions of Saudi Arabia.

1. Our Vision

To be a leading academic department in the fields of crop science, horticulture and management of rangelands and forests through achievement of high standards of teaching and research.

2. Our Mission

To create and maintain extension, research and comprehensive teaching programs in plant science.

3. Our Values

- We believe in professional collaborative relationships with all scientists, partners and colleagues by operating in an environment of mutual respect, integrity, and support.
- We commit to produce the highest quality graduates and researchers (in Crop Science, Horticulture, and Range Science & Forestry) to meet our society needs by focusing on the usage of innovate teaching and research tools.
- We aim to conduct research (both basic and applied) covering crop improvement, range management and forestry, as well as studies in



plant physiology and biotechnology in agriculture, with emphasis on most recent trends in agricultural technologies.

4. Our Goals

The main strategic objective of the department is to support sustainable agriculture development and expand the research in the areas of plant production. This goal will be achieved through the integration of research and education activities carried out in the department and in close cooperation with leading scientists from all over the world.

The following are specific goals that will be pursued:

- To be a nationally and internationally recognized department for the quality of graduates (BSc, MSc, and PhD).
- To be a leading department in research and development in the fields of selected areas of research focus and endeavor.
- To Improve graduate student education in crop improvement, post harvest management, range and forest resources through the integration of research and educational activities.
- To focus on solving real life science problems related to our society in the fields of agriculture.
- To provide consultation services to governmental agencies and private sector.
- To Enhance collaboration and ties between the Department and international Institutes.

5. Our Human Resources

The department enjoys its highly diverse faculty staff both in terms of their academic and research interests. This gives us an opportunity and advantage to meet the rapidly-changing needs of the present and those of future generations. Currently, the Plant Production Department has 23 faculty members, 18 lecturers, 2 demonstrators, 9 researchers, technicians and secretary.



6. Our Facilities

- **Biotechnology Lab.** It is a modern well equipped lab. with the most advanced instruments for conducting the state of the art research in biotechnology and genetic engineering.
- **Plant Tissue Culture Lab.** It is a well equipped lab with facilities for cell and tissue culture including culture room and large growth room for plant micro-propagation .
- **Plant Physiology Lab.** Equipped with ordinary as well as computerized equipments for measurements of a wide range of physiological investigations.
- **Postharvest Lab.** This lab is equipped with instruments for fruit physiology and postharvest studies.
- **Horticulture Lab.** Work on this lab is concentrated on measurements horticulture crops.
- **Seed lab.** This lab is equipped with seed cleaning, seed counters and seed dryers.
- **Forest and Wood Technology Lab.** This lab is equipped for forest improvement and mechanical and physical research of woody plants.
- **Range Science Lab.** This lab is equipped for nutritional value analysis of range plants. A separate section of the lab is maintained for mycorrhizal studies.
- **Herbarium.** This herbarium has more than 300 classified specimens of important range plants and most common weeds in Saudi Arabia.
- **Cold Rooms:** There are four large cold rooms to preserve different kinds of seeds and fruits.
- **Growth Chambers and Greenhouses:** The department has 13 growth chambers and two greenhouses for conducting research and experiments requiring controlled environments.
- **Educational Farm.** The educational farm is allocated at campus and used as a demonstration farm for students and to conduct practical sessions for students.
- **Research and Experiment Station:** The department relies on the unique facilities provided by the Research and Experiment Station, which is located 50 Km southwest of Riyadh.



7. Our Educational program

The department is dedicated to offer a bachelor degree in plant production sciences and master degree in the following majors:

- Horticultural Science (Pomology, vegetables and Floriculture).
- Crop Science.
- Rangelands and forestry.

Also the department participate in the joint master program in biodiversity.

8. Our Research Focus

The department focuses on developing new agricultural technologies and to solve problems that affect the society and sustainable development in Saudi Arabia. Our research program fall into three key functional areas:

1. Crop improvement:

Cereal breeding

Legume breeding

Vegetable breeding

2. Crop management :

Field crop management

Fruit tree management

Ornamental plants management

Post harvest management

3. Range ad forest :

Ecology and management of rangelands

Ecology and management of forests

Wood technology

9. Community Outreach



Plant Production Sciences Strategic plan



- The department is fulfilling its community services through collaboration with other governmental agencies and the private sector for organizing many training courses, meetings and workshops in plant production.
- Providing consultation services in all fields of plant production to governmental agencies as well as private sector and individual citizens.
- Providing analytical services for plant samples.
- Participation in community activities related to plant production.
- Supervising graduate students from outside the university.

10. Our Competitive Profile and Position

The department is in a position to accelerate the development of the agricultural sector within the Kingdom. There are currently many initiatives being put in place to develop this and the department through its excellence in education and research and through focused endeavors can play an important role and become an essential partner in the agriculture community.

SWOT Analysis

Strengths	Weaknesses
Well established educational program Recognized excellence in research Access to excellent facilities Recognized and well diversified faculty members and researchers Access to unique biological resources within the Kingdom	Difficulty in recruiting well-known scientists Delay in purchasing equipments and reagents Lack of building/space Inadequate experience/training for technicians Low level of interest from agriculture sector in the Kingdom
Opportunities	Threats
The growing demand for advisory services External sources of funding Status and the importance of crop improvement Arid zone environment and biota and flora Commercialization of research IP Funding from licensing agreements of IP	Lack of continues funding Other departments may emerge predominant Downturn in government funding sources Lose of interest in agriculture due to governmental policy



Section II: The Business Plan 2010– 2015

A. Management, Operations & Infrastructure

Goals

- To ensure that the department operates efficiently in terms of research outcomes, human resources and successful development of infrastructure.
- To generate Intellectual Property (IP) and exploit this to the advantage of the university and to the society in general.
- To operate the department to international and national occupational safety standards and bio-safety processes in place for plant and animal bioethics.
- To insure that the department has in place well established internal processes for reporting to the collage.

Specific Strategic Objectives

- Put in place a plan for the department to become known hub of expertise and scientists in the region in plant production technologies.
- Protect the department IP through the use of Non-Disclosure Agreements.
- Ensure all faculty members, staff and students understand the basic elements of safety standard and bio-safety processes.
- Ensure all research projects conducted at the department meet stated goals and outputs in the time frames agreed to.

Actions to achieve objectives

- Develop a series of measures of success by which the department can be monitored
- Develop project management reporting systems to allow for research project monitoring
- Put in place Non-disclosure agreements for all faculty, staff and associates of the department
- Train all faculty, staff and students on the basic elements of safety standard and bio-safety processes.
- Review existing Occupational and Health procedures and update as required



Plant Production Sciences Strategic plan



- Review current regulatory compliance processes and update as required

Milestones and timeframes

- Measures of Success developed and implemented: Jan 2010
- Project Management reporting system in place: March 2010
- Non-disclosure agreements for all staff and associates in place: June 2010
- Occupational and Health procedures and updated: November 2010
- Regulatory compliance processes and updated: November 2011

B. Financial & Business Management

Goals

- To Ensure all financial operations of the department accord with current university and government regulations and accounting practices.
- To use the department resources to its best limits.
- To monitor and control over the financial aspects of the department.
- To provide the necessary funding for the scientific activities of the department.
- To market and finance scientific research projects.
- To improve the department income.

Specific Strategic Objectives

- Move to ensure that the department is not dependent on single or limited funding streams but rather those from diverse sources.
- Determine and review priorities of the spending process.
- Develop work procedures and mechanisms for follow up of the department.
- Adopt a policy objective to support research groups.
- Work to improve the work environment.
- Develop a program for marketing and financing of research outcomes .



Actions to Achieve Objectives

- Development of measurements of financial performance.
- Handling the structural imbalances in the budget of the department.
- Channeling public spending for the better.
- Setting priorities for spending on research projects.
- Development of methodology for the preparation of the budget.
- Reclassification of the budget.
- Bridging the gap between current performance and the performance required.
- Attract people with the competencies required improve productivity.
- Develop plan of action to increase productivity among department employees.

Milestones and timeframes

- Apply for external fund for department research activity: yearly
- Establish a manual for policy and procedures for the financial aspects in the Department: December 2010
- Establish services provided by the Department: September 2011
- Establish plan of action to increase productivity among department employees: December 2012

C. Enhance Education and Training in Plant Sciences

Goals

- To be a nationally and internationally recognized department for the quality of graduates .
- To develop M.Sc. and PhD. programs for professional development of Saudi scientists.
- To contribute to KSU Faculty professional development in plant sciences.
- To be a recognized provider of expert training courses for the technical workforce in support area for agriculture technologies.



Plant Production Sciences Strategic plan



Specific Strategic Objectives

- Through the action of certification of undergraduate and post-graduate programs the department aims to become a recognized entity which trains promotes and supports the growth and development of agriculture specialists in the region.
- Through the actions of certified training for professionals the department aims to become recognized as the preeminent training ground for agriculture training in the Kingdom.
- Through the organization of meetings and seminars the department aims to become a recognized hub of intellectual activity and expertise not only in the Kingdom but the in Gulf region and beyond.

Actions to Achieve Objectives

- Work for getting certification for all educational programs in the department (BSc, MSc, and PhD).
- Work with other academic departments to develop inter-departmental post-graduate programs (M.Sc. and PhD.) in life sciences.
- Develop certified training programs in crop science, Horticulture and Range and forest sciences.
- Organize agriculture-training courses in collaboration with international departments.
- Recruit and develop outstanding faculty with expertise in plant technologies.
- Organize workshops on specific research areas with invited national and international scientists.
- Establish summer programs to enhance scientific contacts for faculty members.
- Establish international summer training program for department staff and technicians.

Milestones and timeframes

- The department has established a regular scientific seminar series. These seminars are held every week.
- Obtain certification for all educational programs: November 2010
- Organize workshops for industry on specific research: every six months



Plant Production Sciences Strategic plan



- Develop a PhD. program in crop science, horticulture and range and forest sciences: November 2010
- Organize certified training courses in collaboration with international departments: yearly
- Establish summer programs to enhance scientific contacts for faculty members: yearly.
- Establish international summer training program for department staff and technicians : yearly.

D. To Build and Promote Public Private Partnerships

Goals

- To Provide support to the agriculture sector in Saudi Arabia.
- To establish a track record of successful university industry partnerships.
- Attract commercialization financial support from industry.
- Develop a track record of IP commercialization and establishment of commercialization models for this appropriate for the KSA and the region.

Specific Strategic Objectives

- Establish strong networks and linkages with industry sectors and the key individuals therein, relevant to the research activities of the department.
- Seek new research opportunities through engagement with agriculture sectors.
- Participate in the development of agriculture sector through technology and knowledge transfer, and industrial partnerships.
- Utilize research and science parks to facilitate regional agriculture development.
- Identify and utilize promising agriculture data with potential commercial value.

Actions to Achieve Objectives

- Provide support for agriculture in the areas of training personnel and provide technical support to the agriculture sector in KSA.



Plant Production Sciences Strategic plan



- Establish committees between the department and agriculture sector that remain updated and current on any significant changes that occur in either entity.
- Work with the agriculture sector and the government to decide on research areas of importance.
- Involve faculty who have the ability and the knowledge in both the technology and the commercialization of the particular technology.

Milestones and timeframes

- Invite agriculture sector to visit the department and participate in its activities: Jun 2010
- Establish a committee by the Department and the agriculture sector to follow up on implementation: December 2010
- Train faculty in the Department on commercialization: December 2010

F. Marketing & Communications

Goals

- To achieve a competitive advantage in the agriculture sector in Saudi Arabia and more broadly the Middle East region, and ensure that the department is recognized as a key provider of expert services and research outcomes.
- To be a recognized plant sciences department on the Global front in selected areas of research focus and endeavor.
- To promote our research successes and the other services we offer by actively targeting the department key commercial, academic and public sector entities with the aim of enhancing our business and scientific engagements with these.
- To increase the effectiveness of our internal communications processes such that the department operates in a transparent and efficient manner.
- To provide easy access for the general public to information on matters relating to agriculture, to enhance their understanding and appreciation of how this can positively contribute to their prosperity and wellbeing.
- To proactively market our services and activities to key current and potential new stakeholders and industry partners.



Plant Production Sciences Strategic plan



Specific Strategic Objectives

External Communications and Marketing

- Recruit a media and communications person.
- Use traditional media and communications tools in the department's strategy.
- Use New Media and Social Networking tools in the department's Strategy. The website will become the hub of all communications and overtime the primary sources of information for matters relating to the Department.
- Engage proactively with agriculture sector through this communications plan.
- Promote agriculture technology to both students and the general public.
- Use measure of success metrics to monitor the success of components of this plan.

Internal Communications and marketing

- An internal process for ensuring the department presents a consistent image.
- Enhancing internal Communications among department members.

Actions to Achieve Objectives

External Communications and Marketing

- Prepare and update all informational and department publications : All of this material should be cross-posted on the website.
- The print publications should be prepared professionally and printed to a high quality. Eventually over a period time the department will transition entirely to a web and electronic based information dissemination systems.
- All department publications (including business cards) will have the website domain published on them.
- The Department will develop an electronic newsletter that will be used to disseminate on a regular basis.
- The Department will also require engagement on a regular basis with the local and national media to promote its work and announce its successes.
- Website news feed: The website should feature a department news section with a built in RSS feed to rapid dissemination of published stories to other sites throughout the globe.



Plant Production Sciences Strategic plan



- Interaction within printed media: regular engagements with the media will be through actively seeking out journalists in the key national newspapers who might be interested in receiving press releases from the department for publication.
- Annual report: a concise annual report will be published regularly summarizing the annual works and successes of the department.
- Special networking events will be targeted at private sector. At least two such events will be organized per year.
- Seminars and workshops: The department has established a regular scientific seminar series. These seminars are held every week.
- Public lectures: The department will consider conducting public lectures on agriculture for the general public.

Internal Communications and marketing

- Hold monthly meeting of the key researchers to review progress in their research areas.
- Implement six month research-reporting program and ensure that all groups are circulated a copy of the reports.
- Hold a regular seminar series to which all Department groups are invited to attend.
- Create an internal news electronic newsletter so that all members of the staff understand what is happening.
- Encourage staff to send information and news for posting on website news section.

Milestones and timeframes:

External Communications and Marketing

- Prepared and updated all informational and Marketing Collateral: June 2010
- The Department has produced a new, redesigned, interactive and Web 2.0 compliant website: December 2010
- All marketing collateral (including business cards) have new website domain published on them: December 2010
- The Department will develop an electronic newsletter: December 2011
- The Department will engage with the local and national media to promote its work: December 2010



Plant Production Sciences Strategic plan



- Website news feed: The website is updated in a regular manner with news from the Department: Ongoing
- Interaction with the printed media and publication of key stories. Ongoing
- Radio and Television coverage of the Department. Occasionally
- Workshops and meetings networking events organized as per schedules to be determined. yearly
- Held two special events targeted at industry: Every six months
- The Department has established a regular scientific seminar series: weekly
- Assessed if there is a market for holding specialist-training workshops in agriculture technologies: yearly

Internal Communications and marketing

- Holding monthly meeting of the key researchers to review progress in their research groups: : Monthly.
- Implemented the 6 month research group reporting program: January and July
- Holding a weekly seminar series: weekly
- Created & implemented an internal news electronic newsletter: January, May, October
- Staff contributing information and news for posting on the website.



Section III: The Research Programs Plan

The department will focus on solving problems that affect the society and sustainable development in Saudi Arabia. Our Program fall into three key functional areas:

Key research activity areas

A. Crop improvement:

Cereal breeding

Legume breeding

Vegetable breeding

B. Crop management :

Field crop management

Fruit tree management

Ornamental plants management

Post harvest management

C. Range ad forest :

Ecology and management of rangelands

Ecology and management of forests

Wood technology

Scientific research objectives of these groups

A. Crop improvement:

The goal of crop improvement groups are to improve productivity, quality, sustainability, to drought, heat, salt tolerance and pathogen resistance of Saudi Arabian germplasm. Utilizing conventional and molecular markers for assisting breeding and mapping of Quantitative Trait Loci (QTL) for important traits and using proper statistical analysis tools to associate markers linked to candidate genes.

1. Cereal breeding group

The cereal breeding program is will established program emphasizing improvement of local lines of wheat and barley from all agricultural regions of the country. The



Plant Production Sciences Strategic plan



program is collaborating with international research organizations working in this area such as ICARDA and CIMMIYT. The program is also collaborating with regional centers such as ARC in Egypt to introduce and improve local cereal lines with improved heat and drought-tolerant. Potentially good exchanged lines as well commercially grown varieties in Saudi Arabia were bred to develop local improved lines. The program was further advocated to include research work on crop improvement for resistance of fungi and nematodes, the two major pests of wheat in Saudi Arabia. The program is utilizing molecular markers and double haploid systems in its effort improve breeding efficiency. The program will be further developed to utilize gene transformation.

Research Objectives:

Cereal crop improvement program is working to accomplish the following objectives:

- To improve local cereal crop lines for high yield, quality, pest resistance and drought and salinity stress tolerance
- To apply marker assisted selection.
- To develop mapping QTLs linked to stress genes.
- To utilize double haploid systems in the development of new lines.
- To establish gene transformation of candidate genes to adapted wheat and barely genotypes.

Actions to Achieve Objectives:

- Collect and preserve adapted lines of all cereal crops.
- Cooperate with international institutes and research centers for the exchange of information and genetic resources of cereal crops.
- Develop breeding populations for targeted traits.
- Established breeding program based on marker-assisted selection (MAS).
- Submit project proposals for funding from different funding sources.
- Disseminate research results through publications in peer review journals.
- Release new varieties with improved traits for the benefit of farmers and local communities in cooperation with public and private sectors.

Expected outcomes:

- Patents and/or publications covering the identified new genes.
- Publications of acquired results in peer review journals.
- New varieties with improved traits.
- Advanced breeding lines showing tolerance or resistance traits.
- Transgenic lines expressing novel genes.



Milestones and timeframes

- Apply for external fund for research activity: **yearly**
- Two to three publications of acquired results in peer review journals: **yearly**
- Patents and/or publications covering the new identified genes: **2012**
- Release new varieties with improved traits: **2013-2015**

2. Legume breeding group

3. Vegetable breeding group

B. Crop management :

1. Field crop management
2. Date Palm improvement group
3. Ornamental plants management
4. Post harvest management

C: Range and forest ecology and rehabilitation:

1. Ecology and management of rangelands
2. Ecology and management of forests
3. Wood technology



Section IV: Stated Measures of Success

Business Year: 2010

- Develop and update the department strategic plan.
- Prepare and implement a business and marketing plan for the department.
- Develop PhD program in crop science, horticulture and reangenand forest sciences.
- Refocus the research groups of the department.
- Achieve identified goals for research programs.
- Establish international collaboration.
- Engage with the private sector for research need.
- Plan and implement the first workshop on key research area in collaboration with international scientists.

Business Year: 2011

- Implementation of the center strategic plan.
- Implementation of the business and marketing plan.
- Establish links with the agricultural sector.
- Achieve certification of educational programs.
- Achieve identified goals for research programs.
- Publish in international impact factor journals.

Business Year: 2012

- Implementation of the center strategic plan.
- Implementation of the business and marketing plan.
- Engage with industry in research collabration.
- Publish in international high impact factor journals and register patents.



Plant Production Sciences Strategic plan



- Achieve identified goals for research programs.

Business Year: 2013

- Implementation of the center strategic plan.
- Implementation of the business and marketing plan.
- Publish in international high impact factor journals.
- Engage with industry to develop products.
- Achieve identified goals for research programs.

Business Year: 2015

- Implementation of the center strategic plan.
- Implementation of the business and marketing plan.
- Engage with industry to develop products.
- Publish in international high impact factor journals and register patents.
- Achieve identified goals for research programs.
- To achieve partial financial self-support through providing services, alternative funding resources and commercial arrangements.
- To seek new sources of funding for the department to support those from the university.
- To establish track record of commercializing Intellectual property.