Sustainable Agricultural and Rural Development in Thailand
The Role of Science, Technology, and Innovation at Kasetsart University

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Outlines

- About Kasetsart University
- Challenges
- Innovative curriculum development and academic activities
- Lessons learned
About Kasetsart University

• Established in 1943 as a combination of agricultural primary school teaching center & experimental station

• Great success of coordination between research, experiment, and education

• Vision: to provide “Knowledge of the Land” to promote sustainable development in order to be internationally recognized.

• KU Motto: Knowledge of the Land: The three strands of sciences including the late King Bhumibol knowledge in sufficiency economy, community knowledge, and international knowledge.

• Mission: To be a university in the leading research group of the world (Global and Frontier Research), to carry out various international academic/research activities while reinventing the university system in the following ways
FACTS ABOUT KU, 2020

QS World Universities Ranking in Agriculture and Forestry, 2021: 11th in Asia; 1st in Thailand

- **Thai programs**
  - 82 Bachelor’s
  - 203 Master’s
  - 94 Ph.D.

- **International programs**
  - 15 Bachelor’s
  - 13 Master’s
  - 14 Ph.D.

- And non-degree, short course, professional trainings
- All majors in agriculture, forestry, fishery, veterinary, extension, agroindustry, agricultural economics, environmental science, agricultural engineering, and related sciences plus other social sciences.

**Total students:** 68,099
- 60,158 Bachelor’s
- 13 Graduate diploma
- 6,670 Master’s
- 1,258 Ph.D.

**Total staff:** 9,870
- 3,530 Academic
- 6,340 Supporting

Institutional agreements with more than 600 universities and international organizations worldwide.

Source: KU Planning Division, 2020
Challenges

Thailand 20-year National Strategy (2018-2037), 1st national long-term strategy

- The vision of becoming “a developed country with **security, prosperity and sustainability** in accordance with the Sufficiency Economy Philosophy (SEP)” with the ultimate goal of happiness and well-being of Thai people.

- **Sufficiency Economy:** The late King Bhumibol’s Philosophy of development based on three principles: *moderation, reasonableness, and self-immunity*, + 2 conditions: knowledge and integrity.

**Thailand 4.0 policy,** national agenda to drive the Thai economy in line with the sustainable development goals (SDGs) through innovation-driven economy.

2019 Establishment of Ministry of Higher Education, Science, Research and Innovation (MHESI)

HEIs have the main roles to **support human capital development**, **generate knowledge**, **conduct research**, and **generate innovation** in line with national development goals to improve efficiency and competency of the nation, **build national competitiveness and promote economic growth.**
Challenges

• Declining number of interested students in agriculture
• To develop human capacity in line with national sustainable development goals
• By means of teaching, research, outreach programs
• Integrate science, technology, and innovation (STI)
Innovative Curriculum Development

- **Challenges:**
- College students are not much interested in agriculture
- Changing population structure towards aging society
- Skills needed: Some older generations need to **reskill, upskill**
- Need linkages from knowledge to innovation and from theory to practice
- **SDGs**
- No one single science can solve the problem
Example: Integrated Curriculum in Knowledge of the Land for Sustainable Development

requires students to plan and design projects with the communities to develop innovations that meet community’s needs.

employs a Subjects-Integrated-Synchronization (SIS) model: integration of Knowledge of the Land with active and problem-based learning experience where students’ performance is evaluated from the outcome of assignments.

Objectives:

1. To be a short course, module plan that integrate many sciences and disciplines to be a complete curriculum that serve professions.

2. Promote life-long learning experience. Students at any ages can learn from 5 baskets of courses

3. Promote knowledge and skills in entrepreneurship and smart farming; emphasize on practice. Students can start start-up business or be entrepreneurial farmers

4. Promote knowledge creation and innovation

5. Promote learning experience with community and/or business companies by learning by doing
PRINCIPLES OF CURRICULUM DESIGN

Drive Thailand 4.0
- Enhancement of human value
- Equal Education

20-Year National Strategy
- Human potentials development and empowerment
- Disruptive education reform

National Education Plan
- Development for people of all ages and creation of learning society
- Learners have fundamental skills and characteristics necessary in 21st century

The 12th National Economic and Social Development Plan
- Human potentials development and empowerment
- Thai people of all ages have quality education that meets international standards and can continue learning on their own

Higher Education Reform Plan
- Creating quality citizens to strengthen competitiveness
- Information technology systems for education

Diverse learners of all ages
- Farmers/general public
- Entrepreneurs
- University students
- Communities
- M.6 students
- Source of Funds

Teaching approach consists of module with emphasis on practicality
- Innovation and learning skills
- Work and life skills

Teaching approach is project-based/active learning
- EduFarm
- MOOC

Availability of quality educational media accessible anytime and anywhere

Utilize information technology systems and applications in teaching and evaluation
- Smart Agriculture
KEY PROCESS SIS MODEL

1. Adjustment of Professor’s Teaching Responsibility Assignment
   - Course-based allocation
   - Combine all course contents first

2. Determine learning outcomes in SLO semester

3. Collaborate to design final integrative examination (project works) for every course

4. Co-create lesson plans of the semester for every course

5. Appoint a team of instructors and lecturers for each topic and activity (Course/Integrate/Develop skill and competence of learners)

6. Distribute score and evaluation methods (Each course content + SIS model project work)

7. All professors and lecturers participate in team to proctor midterm and final examinations./Feedback
Lesson Learned: Innovative Curriculum Development

- Set a clear model of graduates with specific characteristics so that necessary knowledge and skills.
- The objective of curriculum development should be in line with the vision and mission of the university.
- A system analysis and holistic approach is efficient in addressing complex issues and problems such as sustainable development.
- Multidisciplinary programs are practical and increasingly gain more interests from students.
Lesson Learned: Innovative Curriculum Development

- Inputs from graduates, employers, and potential students help in identifying knowledge and skills needed.
- Curriculum should be continually updated.
- Bring students to real world classroom: internship that trains students to conduct field research, cooperative education
Participatory and Cooperative Approach: Collaborative Program at National Corn and Sorghum Research Center

Corn silage production with
- **BAAC** for access to soft loan
- **Agricultural Marketing Cooperative of BAAC Customers** for corn silage collection and sales
- **DOAE** for farmers’ network
- Technology Transfer to corn seed SMEs
- Providing germplasm material: Material Transfer Agreement
- Annual cooperative public & private hybrids corn yield trials since 1987

Source: http://iicrd.ku.ac.th/
Center for Agricultural Biotechnology:
Proven science to technology transfer

A core center of research university network in agricultural sciences and biotechnology

- Bring out expertise from experts from various institutes and work as a team

Equipped with state-of-the-art equipment, high quality researchers, and sizeable research budget

- Able to identify problems, provide precision measurement and create appropriate technology specific to local problems.

**Nutrient management and planting space for yield increase in Jasmine rice.**

**Results:**

- Higher yield (from 2 tons/ha to max 3.8 tons/ha)
- 800,000 views on youtube in a year
- Increase farm revenue 200,000 THB/household
Strengthening local communities by transferring non-degree trainings with specific knowledge needed for their practice can provide good alternative to degree programs that require more time and commitment.

Understanding the local needs and provide them with evidenced-based programs to improve farmers’ observability of relative advantage and enhance triability experience will increase the adoption of innovation.

Use efficient knowledge transfer tools/techniques for the right
Short courses/integrate research and teaching with community learning

- Glutinous rice seed production project at Sakon Nakhon campus

PR, Open for interested farmers ➔ Explaining the project ➔ Creating farmers’ network

Seed production ➔ Providing foundation seeds ➔ Knowledge transfer

Quality Assurance
KU Radio Plus

- 5 stations nationwide
- Local content/local wisdom
- On-air cooperative training courses
Thank you

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