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***Regional Agricultural Innovation System(RAIS):
Transferability of Korean Experiences to Uzbekistan***

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01 Agricultural Innovation System: Theoretical Overview

- Agricultural Innovation System (AIS) has a very diverse and complex structure.
- As shown in Figure <1>, technology innovation system which supports farmers as a driving force of agricultural production is directly and indirectly related to not only national policy but also farmer's union and market forces such as factor market and product market.

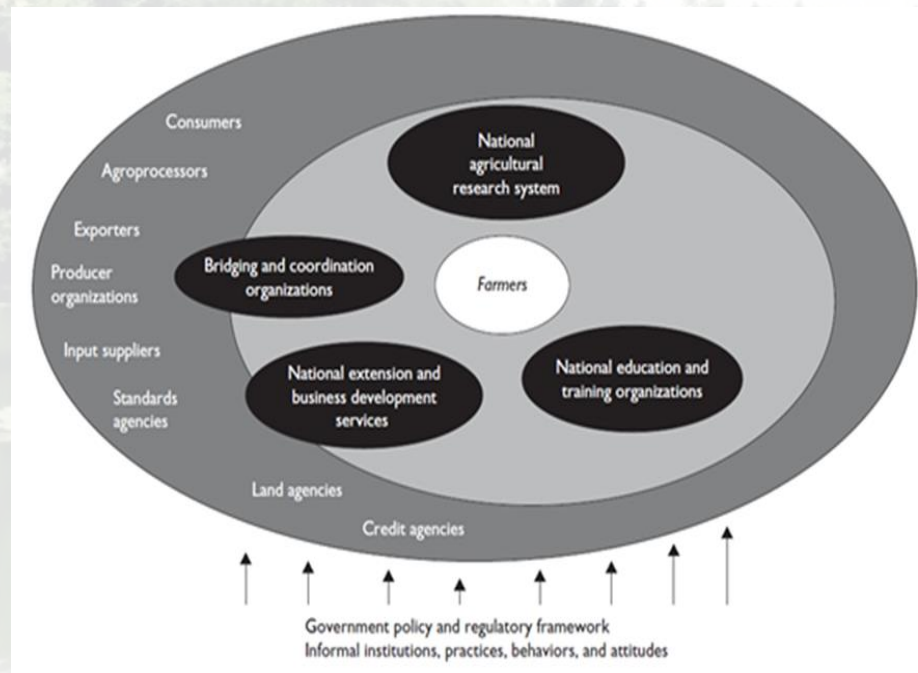


Figure 1. Agricultural Innovation System

Source : WorldBank, p4, 2012.

01 Agricultural Innovation System: Theoretical Overview

- But most of all, the main factors for development and innovation of agricultural technology are **research, extension service, and education/training**.
- Unfortunately, in developing countries these factors are insufficient or have many constraints in related institutions.
- Hence, it is very difficult for developing countries to achieve agricultural development based on technology innovation.

1. Need of RIC Establishment

- RIC is an **industry-academic cooperative program** to raise the innovation capability between university and corporation and to expand local growth potential.
- Some problems that agricultural industry in Samarkand face are summarized below.
 - First, there are inadequate amount of data about horticulture industry including technology, information, and statistics of labor and production.
 - Secondly, current situation lacks appropriate market analysis..
 - Thirdly, input elements for agricultural production are also insufficient.
 - Fourthly, Producers' union or association has not been organized in an efficient format to obtain business bargaining power, cultivation techniques, and management information.

1. Need of RIC Establishment

- In this respect, the **linkage effect between production and processing** is required to strengthen agricultural competence and increase farm income
- RIC in SAI is expected to encounter many challenges while operating since this has never been implemented in Uzbekistan.
- Thus, it would be difficult for SAI to operate the RIC alone, so guidelines for RIC organizational operation need to be established through cooperating with partner RIC and other relevant company or advanced countries where RIC is running actively.

Business Overview

Generally representative cooperation program of the Ministry of Trade

- Industry university cooperation project
- Company Accessibility : Expensive equipment, R&D , Commercialization Marketing, Innovative companies support of established
- Between the University and companies : Raising the growth potential of innovation capacity

History

Ministry of Trade

TIC

Ministry of Education

RRC

RIC(1995, 25/94 Centers)

03 Regional Innovation in KOREA

Functions

Utilization
equipment

R & D

Human
Resource

Support of
Start-up



Development of
Technology

Marketing

Network

Technology
Transfer

Development Strategy by Stage

	1 stage	2 stage	3 stage
Support Scale	4years 1 million us\$ / per year	3years 0.7 million us\$ / per year	3years 0.4 million us\$ / per year
Spending Expense Purpose	equipment + organization : 70% R&D + educations : 30%	equipment + organization : 40% S/D(R&D) S/W parallel	Management cost Education implementation marketing 9

03 Regional Innovation in KOREA

2. Kangwon University RIC

Center name

**Kangwon Well-being Bioproduct
Regional Innovation Center**

Business Period

2007. 07. 01. ~ 2017. 02. 28.

Budget

About 11.3 billion won
– Government and participating companies.

Participation in local government

Kangwon-do, Hoengseong, Inje, Yeongweol, Hwacheon, Yanggu

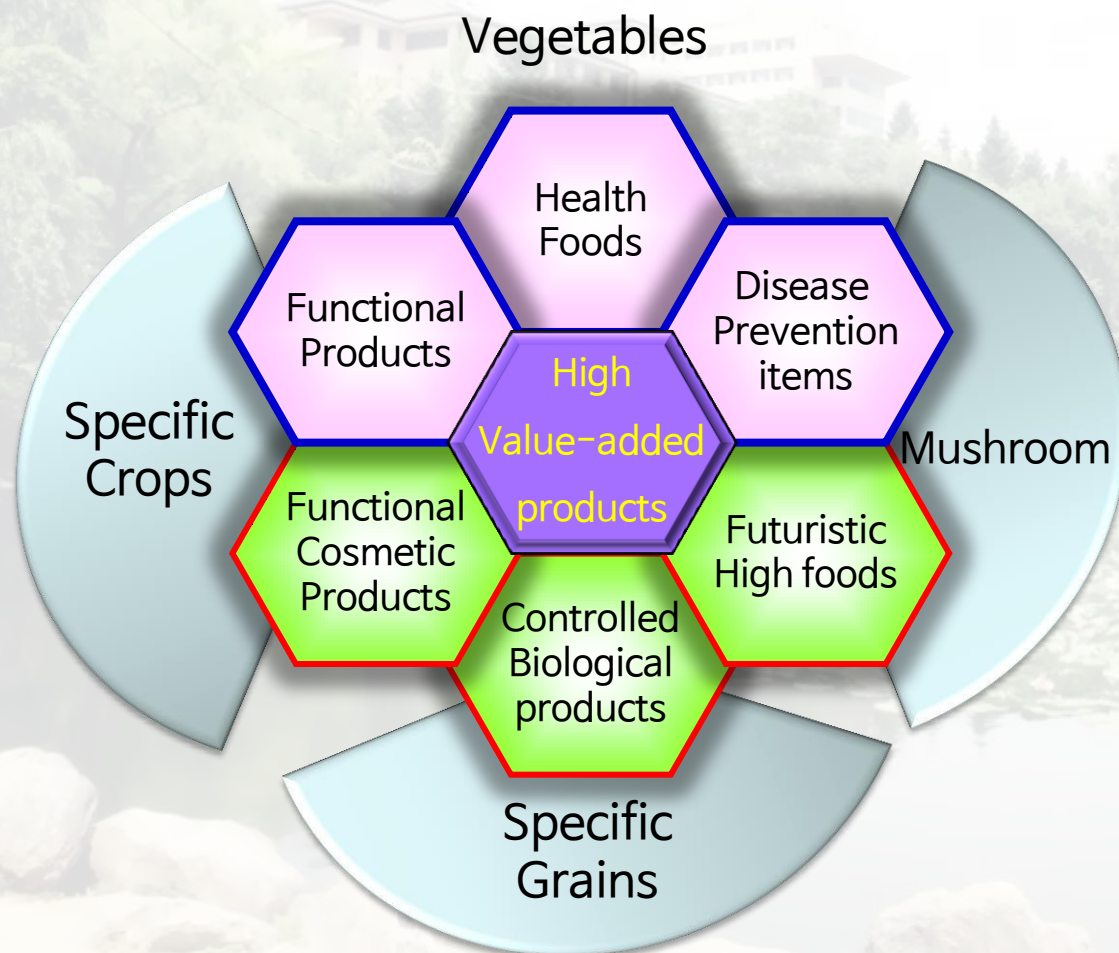
Partner Companies

Cheong-A Good Food Co.Ltd. etc (60 Companies)

03 Regional Innovation in KOREA

2. Kangwon University RIC

Business Overview – Business Purpose



Local Specialities

Cleanliness, Functionality,
Diversity

Develop New technology
for the world's best
Bioproducts R&D

Core for
Wellbeing-industries

03 Regional Innovation in KOREA

2. Kangwon University RIC

Technical Fields and Equipments

Extraction, Concentration

Supercritical E.
Decompression E.
Centrifugal thin C.

Separation, Isolation

High-speed Centrifuge
Sludge Release S.

Milling, Grinding

Air Flow type mill
Colloid Mill
Cutter Mill

Granules, Formulation

Fluidized bed G.
Reverse granulator
Tablet F.
Tablet coating M.
Capsule Filler
Fill making M.

Sterilization

Conical ribbon mixed
Sterilizer
Retort S.
Unheated liquid S.
M/W Powder S.

Drying

Freeze Dryer
Vacuum Dryer
Air Blast Dryer
Cold Air Dryer

Packaging

Tea-bag Machine
Pouch
Pillow packaging M.
Vacuum packing M.

others

Fermentation
Reaction Flavor
Blending
(Seasoning)
Analysis Tech.

Cold Processing & Differentiated Technology

03 Regional Innovation in KOREA

2. Kangwon University RIC

Analysis Equipments



03 Regional Innovation in KOREA

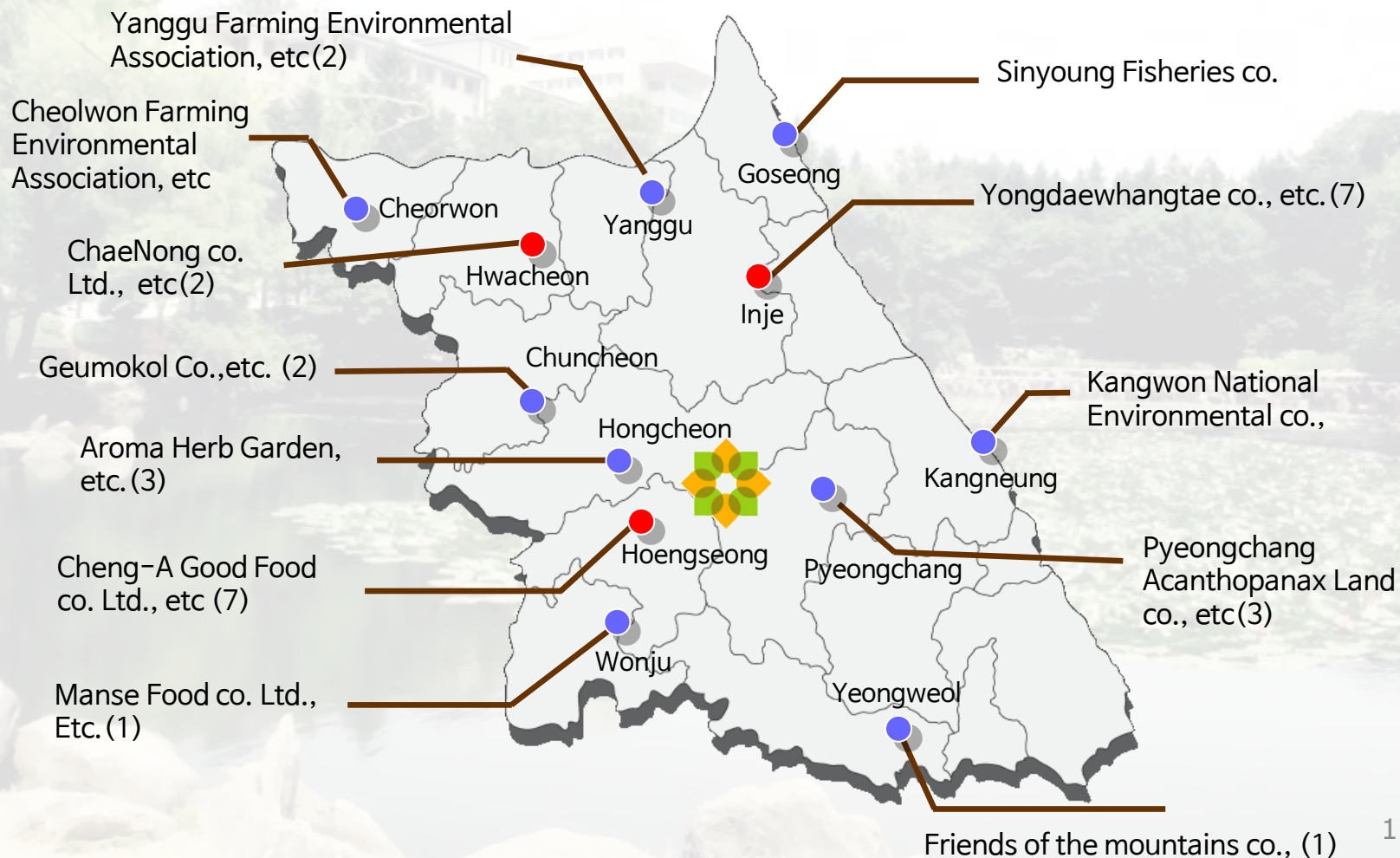
2. Kangwon University RIC



03 Regional Innovation in KOREA

2. Kangwon University RIC

Local Business Support Companies



03 Regional Innovation in KOREA

2. Kangwon University RIC

Industrial Results(1)

Fruit & Veg Jam (Paprika etc.)



Enzyme-treated Rice Bran



Enzyme-treated Brown rice



Blueberry vinegar



Fruit & Veg. tea (Raspberry etc.)



Cordyceps Fill



Deodeok latte(tea)



Granule tea (Herb tea)



03 Regional Innovation in KOREA

2. Kangwon University RIC

Industrial Results (2)

Mushrooms coated salts



Instant Vegetable F/D Block



Pumpkin Bread



Blueberry Jam



Rice wine



Super Eleven



Agriculture Specialty Pickles



Pine nut oil



04 Ways to establish RIC in Samarkand

1. Restructuring

Why Restructuring is Needed?

- RIC needs to play a role where the entire agricultural industry system can solve problems systematically and in order to do that various natural applied sciences and humanities and social sciences need to be integrated and converged together.
- To establish an effective RIC, we need talented people who have an ability to lead the field where natural applied sciences and humanities and social sciences are integrated and converged and university plays the most important role here.

In the past, the range of agriculture was limited to agricultural production which is primary industry.

04 Ways to establish RIC in Samarkand

1. Restructuring

Why Restructuring is Needed?

- However, current global trend of agriculture has been expanding to agribusiness integrated with secondary and tertiary industries including processing, agricultural materials, and distribution industries.
- It also has been developing from land-oriented labor-intensive family farming to capital-technology-intensive commercialized farming where high value agricultural products are produced.
- As the rate of production agriculture is rapidly dropping and agricultural industries including processing, agricultural materials, and distribution are expanding, colleges of agricultural sciences in Uzbekistan need to be appropriately reform their department formation and curriculum.

04 Ways to establish RIC in Samarkand

1. Restructuring

Environmental Change in Agricultural R&D (OECD countries including Korea)

	Past to Present	Present to Future
Budget Allocation for Agricultural R&D	Rather low compared to other areas	Gradually decreases
R&D Goals	Improve productivity	Sustainability
R&D Project Characteristics	Development of element technology	Balance of element technology (System innovation) + integrated with other studies
Research Derivation	Experts	Recipients of technique
Research Performance	Independent research	Combined team research beyond the school system

04 Ways to establish RIC in Samarkand

1. Restructuring

- It is also necessary to improve the competence of Uzbekistan agriculture while agricultural market opening is widely carried out as a result of globalization.
- As a method to improve agricultural competitiveness, technology innovation for improvement of farm products quality and price competitiveness is considered to be the most urgent and this includes improvement of farm structure, development of new species, quality improvement of farm products, and scientific farming technique.
- Education and research in agricultural college also need to be reformed in accordance with changing agricultural trends.
- It is necessary to reestablish the goal of agriculture education and reform the educational system to attract and retain excellent students.

04 Ways to establish RIC in Samarkand

1. Restructuring

Restructuring Model and Expected Outcomes

- University needs to be able to nurture competent students who comprehend the scene, ecology, consumers, and society of agriculture and applied sciences such as environmental ecology, consumer, and society are also need to be taught with primary agricultural subjects as a core area of education.
- Composition of undergraduate studies requires reformation considering academic subject or product, and similarity of essential techniques while maintaining its identity as a college of agricultural sciences.

Restructuring of University Organization

- Improvement in quality of education and research can be expected through restructuring current department formation into undergraduate studies or departments.
- Partially combining subdivided major curriculum will expand the range of basic major education in undergraduate course.
- If there are many academic fields in undergraduate studies or college, it creates competition among academic fields and professors resulting in quality improvement in education and research.

04 Ways to establish RIC in Samarkand

1. Restructuring

Effective Use of Human Resources and Budget

- By reorganizing into undergraduate studies or Departments, there will be less appointed professors and more human resources to focus on education and research, and manpower in administration and technical support will be used more effectively.
- This will maximize the use of education and research facilities.
- Likewise, when the number of department lowers by merging them, number of members in dean group and other committee in university decreases and this would allow them to have more practical and effective discussion.

04 Ways to establish RIC in Samarkand

1. Restructuring

Interaction Between Domains of Knowledge and Curriculum Reformation

- If it is reformed into undergraduate or university departments, there will be an active interaction between academic fields.
- This in turns will activate joint research enabling to work on a practical research which may be helpful for development of agriculture and increase the research quality.
- When small academic department system remains, it is inevitable to have department redundancy, making it difficult to reform curriculum due to struggling for leadership among academic fields.
- But if it is reformed into undergraduate or university departments, reformation of curriculum would become easier.
- In this case, we can prevent an academic field that needs to be handled in the field of agricultural science to be taken away to other universities.

04 Ways to establish RIC in Samarkand

1. Restructuring

Strengthening Basic Major Education and Wider Range of Major Selection

- We can strengthen the education of basic courses of major when combined into undergraduate studies or college department.
- After entering university, students can explore the academic field that suits their interests and select major, allowing them to have wider range for major selection.

Issue for Restructuring Departments

- In order to provide administrative support to education and research and utilize its facility more effectively, department organization should be unified by linking undergraduate and graduate courses.
- It is necessary for all universities to adopt the department system with flexible structure which is appropriate to develop the area that is more compatible with local agricultural and condition rather than handling entire academic field.
- Thus, SAI needs to specialize academic departments with horticultural industry as a core on the basis of regional characteristics.

04 Ways to establish RIC in Samarkand

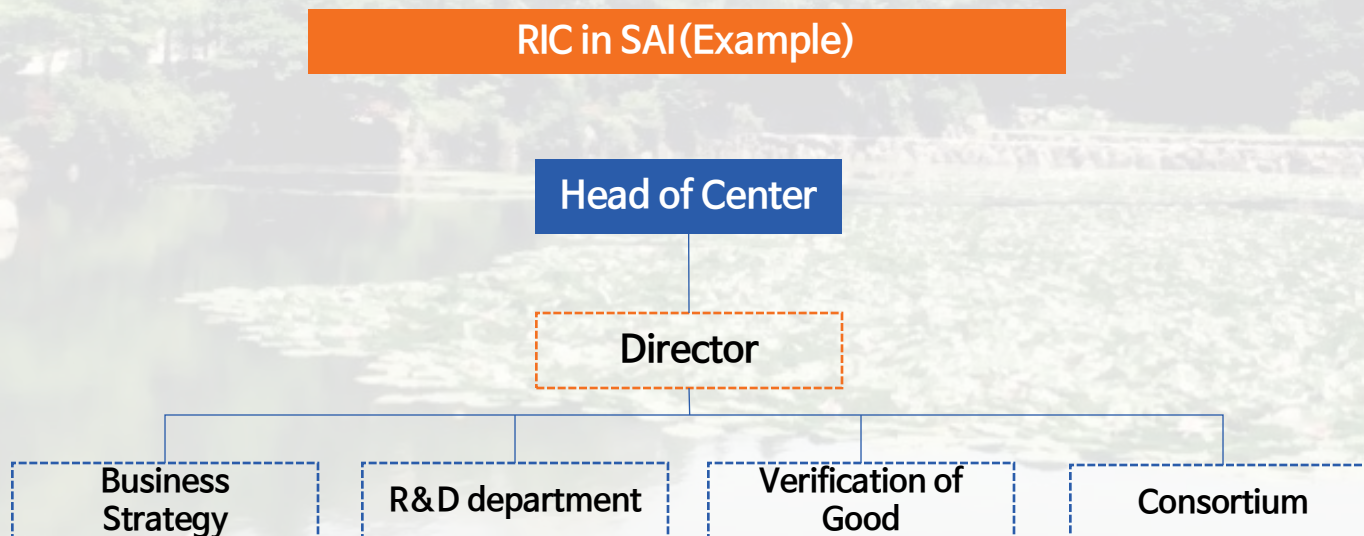
2. Faculty Capacity Building

- Thus, SAI needs to specialize academic departments with horticultural industry as a core on the basis of regional characteristics.
- Name of new undergraduate studies or departments should have an identity of agricultural academic field and it should gain commonality to be used not only in Uzbekistan but also internationally.
- When undergraduate curriculum is combined and restructured, it needs to be composed of academic fields that actually accompany curriculum reorganization rather than mere external link between academic fields.

04 Ways to establish RIC in Samarkand

3. RIC Establishment Plan

- In order to revitalize industries in Samarkand region, it requires not only support from the government but also strong cooperation of local universities and participating companies.
- Operating organization is needed to establish RIC.



04 Ways to establish RIC in Samarkand

3. RIC Establishment Plan

- A functional role of RIC will focus on development of high-tech processing technique through R&D using regional specialty products and developed products should be able to reflect the needs of customers and market.
 - They also need to promote with differentiated marketing strategy with scientific verification.
- Support is provided to field-based business in the region and professional training also needs to be practiced so that they become familiar with food processing and high-tech equipment.
 - We can also promote technical commercialization through transferring techniques to industries.
- We can commercialize revitalization of local industry and development techniques through joint research and development of universities and industries and regional innovation base in Samarkand.
- Stage 1 would focus on R&D and facility construction plan regarding horticultural production and stage 2 would focus on R&D and facility construction plan related to secondary processing.

THANK YOU