SNU Pioneers GHAN for Advanced Climate-Smart Agriculture

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Speaker Introduction

Education

Seoul National University, Korea (1986 - 1990) B.S. in Horticulture

Seoul National University, Korea (1990 - 1992) M.S. in Plant Molecular

Seoul National University, Korea (1994 - 1999) Ph.D. in Plant Molecular Genetics

Cornell University, USA (1999-2005) Postdoctoral Researcher, Department of Plant Breeding and Genetics

Professional Experience

2006.03. ~ Present Professor, Department of Plant Science, College of Agriculture and Life Sciences, SNU

2010.02. ~ Present Director, Vegetable Breeding Research Center, SNU

2019.09. ~ Present Member, Review Panel, National Research Foundation of Korea

2022.12. ~ Present CTO, Farmyirehse

2023.01 .~ 2025.01 Vice President for Research Affairs, SNU

2023.01. ~ 2025.01 Associate Head of R&DB Foundation, SNU

2024.03. ~ Present Outside Director, NH Nongwoo Bio Co., Ltd

2025.07. ~ Present Dean, College of Agriculture and Life Sciences, SNU

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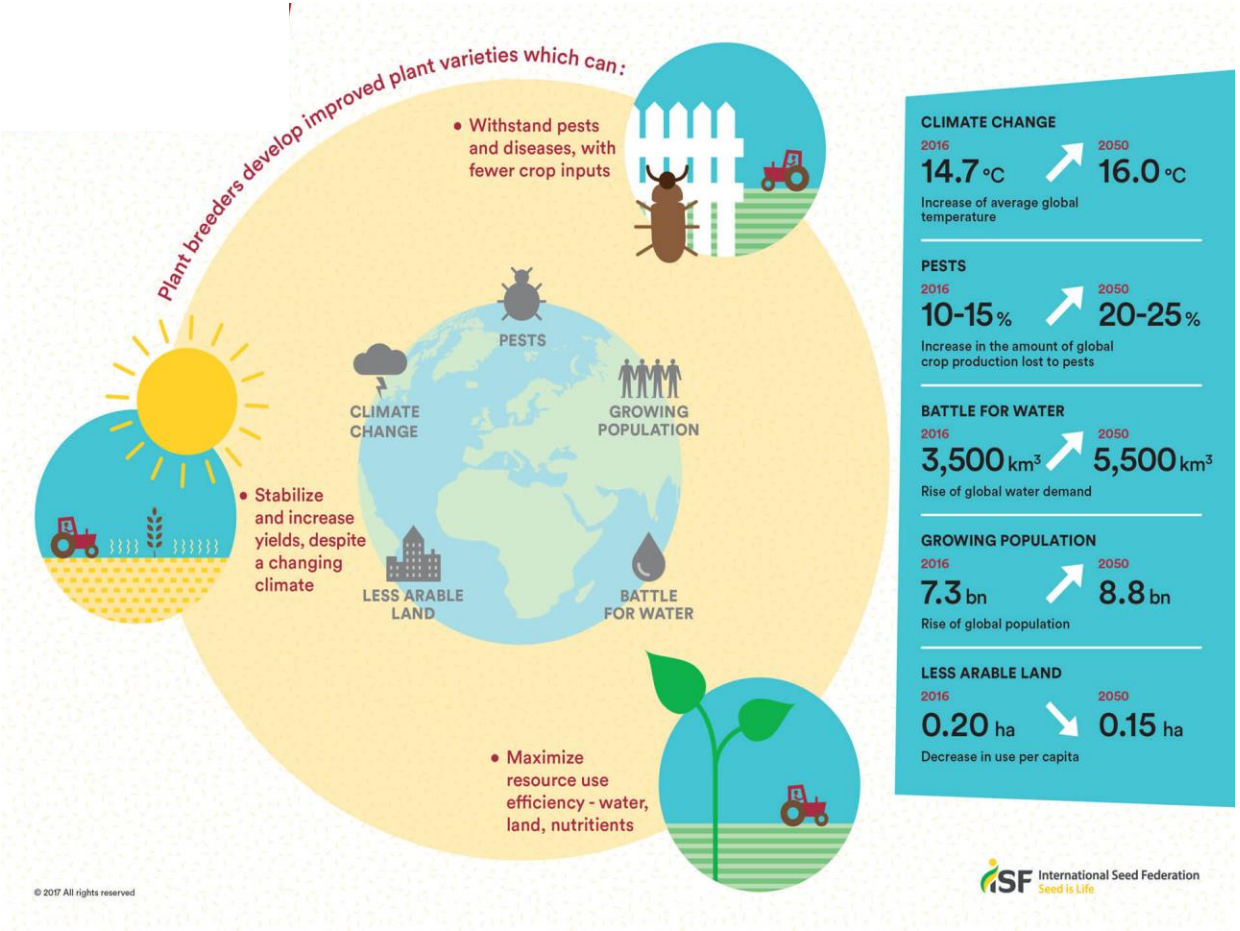
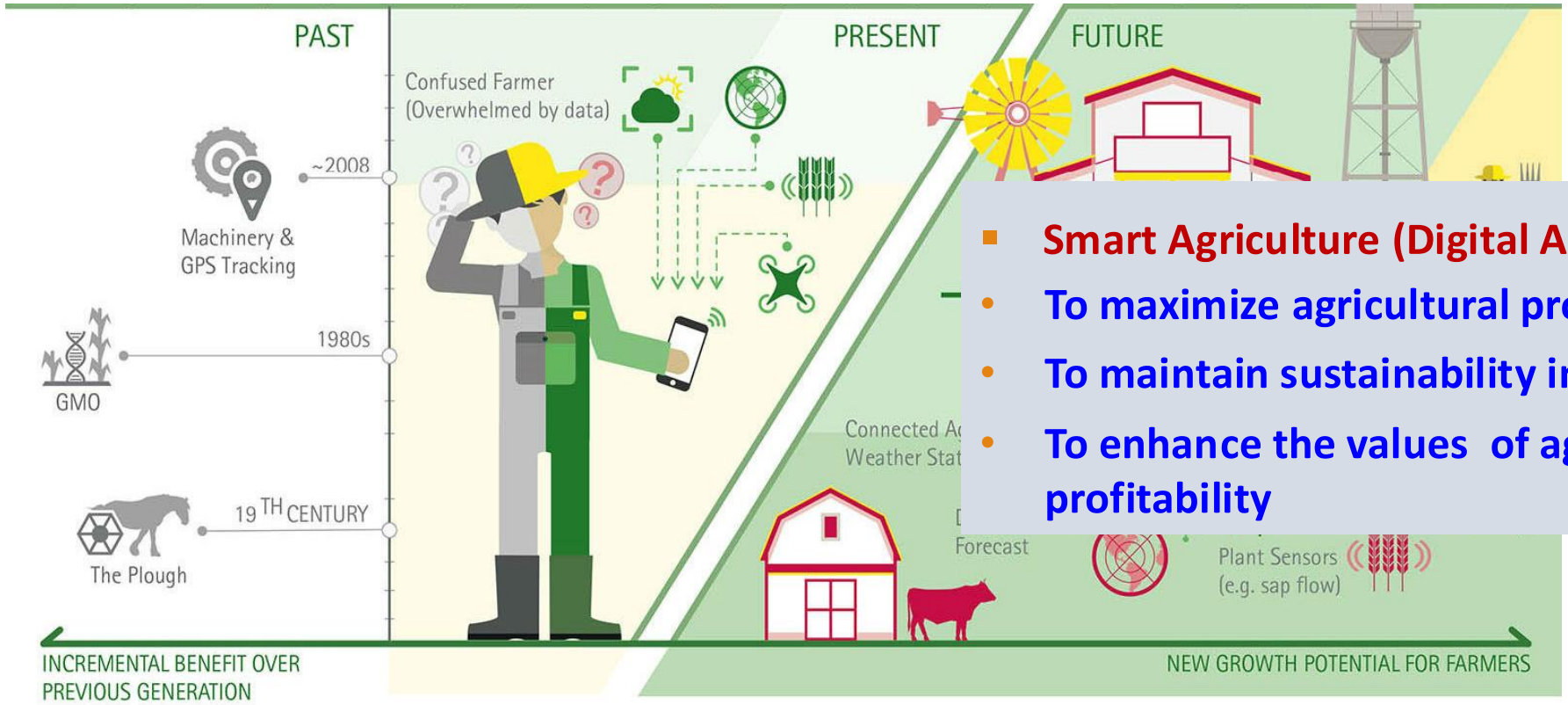
I . Background

1 Global Challenges



- **Megatrend issues such as global population growth, rapid aging of farmers, water scarcity, climate change, environmental degradation, and skills gaps**
- **How to achieve another quantum leap in agricultural productivity by 2050?**
- **Traditional approach ➡ Knowledge-intensive agriculture**
  - Transforming higher education in innovative agriculture for the ‘digital generation’

I . Background



- **Smart Agriculture (Digital Agriculture)**
- **To maximize agricultural productivity**
- **To maintain sustainability in agricultural environments**
- **To enhance the values of agricultural economy for profitability**

- **Past: Green Revolution, Agricultural Mechanization**
- **Present: Collection of Various Types of Georeferenced Digital Data (weather, soil, and crop)**
- **Future: Precision Soil and Crop Management based on Data Insight**

2 Need for Revamping Ag Higher Education

- **Modern agriculture requires high-tech skills and innovation**
- **Traditional agricultural education system fails to attract young talents**
  - Younger generations seek more tertiary education in DMCs
- **Agricultural universities in DMCs lack capacity and resources to transfer cutting-edge technologies**
- **Need for a new paradigm to train 'agropreneurs' with practical skills in a well-designed program**
  - Strengthen academic-industry partnership across AVC

3 Proposal for the establishment of GHAN

- Ensure sustainable agricultural development by training future leaders of high-tech agriculture, promoting agricultural innovation and transforming production systems
- Utilize the best scientific knowledge and technological pathways, disseminate revolutionary technologies and techniques, and strengthen industrial and academic operation across the agricultural value chain
- Enhance application skills through practical experience in the field

4 Korea's Economic Miracle

Miracle on the Han River, 70 Years Later

Gross National Income (GNI) Per Capita

Source: Maddison Historical Statistics Project, U.S. Global Investors

5 Rationale for Establishing a Global Hub in Korea

▪ Compressed growth of Korean economy and agriculture

- **Korea has achieved rapid and extraordinary improvement in agricultural productivity in about 70 years while it took several centuries for advanced countries**

  ・ The success of the **Green Revolution**, which dramatically increased yields through the introduction of new agricultural technologies, such as improved varieties and the use of irrigation, fertilizers, and pesticides

  ・ The success of the **White Revolution** through the spread of facility farming technology using the plastic greenhouse method.

  ・ Achieved improvement in land and labor productivity in the shortest period of time

- **Key to compressed growth of South Korea's agriculture**
  - Expansion of the government-led EER system as a key factor:
    - Since 1962, the operation of the 'EER system' consisting of agricultural research (R) technology extension (E), and farmer education (E) centered on Rural Development Administration (RDA)
    - Promoted rapid innovation during the 1970s and 1980s through the government-led agricultural growth strategy

- **Strong in ICT and high technology**
  - Well-earned reputation as a global ICT leader

- **Well-established agricultural higher education base**
  - Established global and smart campus/field training facilities
  - Maintaining excellence in education and practices from low to high technology (including appropriate technology)

0 Legacy of Global Collaboration: The Minnesota Project (1954–1962)

The Minnesota Project by ICA and the University of Minnesota modernized **SNU's College of Agriculture through curriculum reform, faculty training, and major infrastructure support**

Major Infrastructure Construction

- **1957 (USD 450,000)**
  - Expansion of the main building and library
  - Construction of 6 new facilities (dormitories, dining halls, student support buildings)

- **1958 (USD 650,000)**
  - Construction of 5 academic buildings (Education Hall, Culture Center, auxiliary facilities)
  - New farm research facilities
  - Reconstruction of the Gwangyang office of the Southern Experimental Forest

About CALS

Faculty	**121 Faculty Members (2025)**
Student	**2,098 Students (2025)**
Divisions	**CALS consists of seven undergraduate divisions, seventeen majors, And one department, encompassing a broad spectrum of academic fields**

Rankings

- QS World University Rankings by Subject (2025) (Agriculture & Forestry) **39th**
- QS World University Rankings by Subject (2019) (Agriculture & Forestry) **29th**

Total Research Expenditures

- **KRW 5.76 billion** in total research funding (2024 CALS Faculty)
- **422 research projects** across cutting-edge fields in agriculture, biotechnology, environment, and life sciences (2024)

Scholarly Publications

- **644 peer-reviewed journal articles** published in leading international and domestic journals (2024)

Intellectual Property

- **134 patent applications** filed, strengthening CALS's innovation pipeline and technology transfer capacity (2024)

7 Why SNU Should Be the GHAN Global Hub?

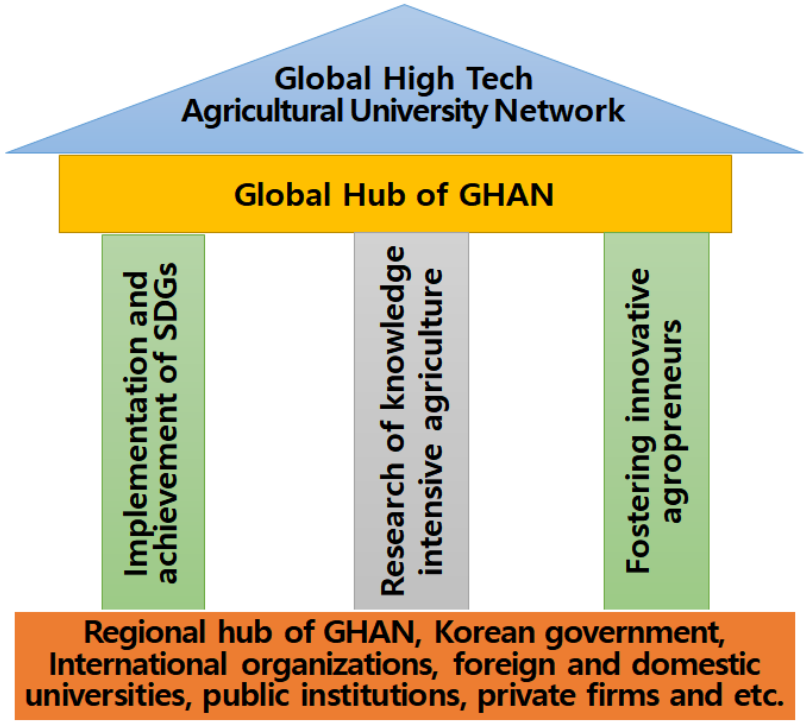
- **Three Core Rationales**

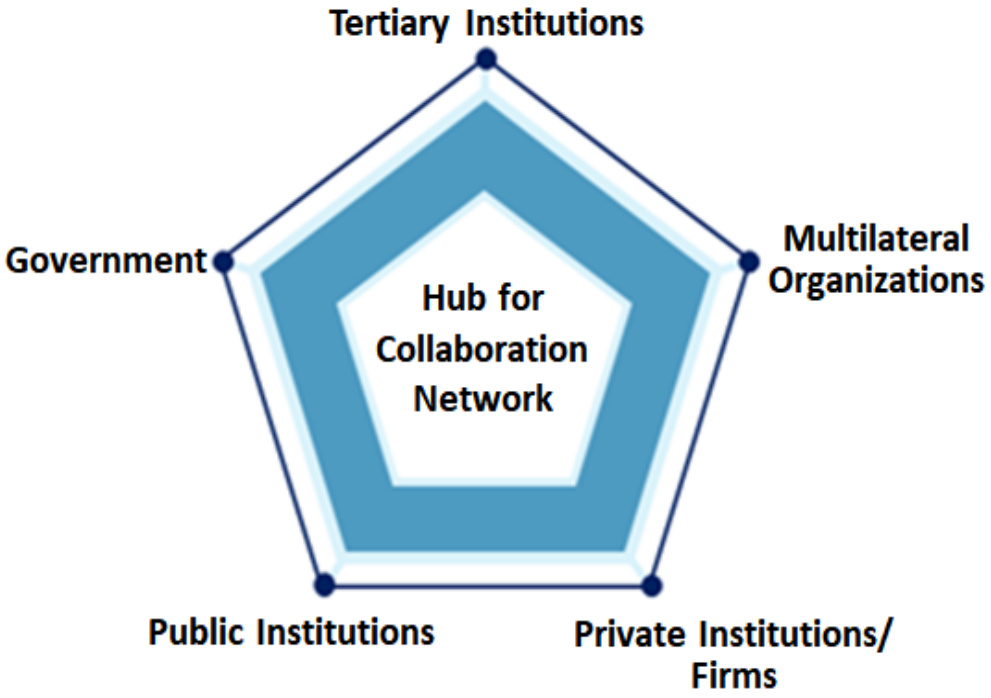
1. Technological Capabilities
   - Leading research capabilities in Smart Farming and Climate-Smart Agriculture
   - World-class research in Plant Health and Molecular Breeding
   - Advanced technologies in Ecological Sensing, Carbon Monitoring, and Remote Sensing
2. Global Collaboration Network
3. Education and Training Infrastructure

⇒ These three outstanding strengths of SNU form the foundation for GHAN's advanced education programs and the diffusion of cutting-edge agricultural technologies.

1 Concept of GHAN

A network that provides a framework for or requires cooperation among, groups or organizations involved in the promotion of human resources for capacity building in the agricultural sectors of DMCs





Mission and Vision of GHAN

Vision

Build a global ecosystem for high-tech, knowledge-intensive, and sustainable agriculture

Mission

- Train next-generation leaders and agropreneurs
- Strengthen academia-industry partnerships
- Disseminate innovative technologies
- Foster regional and global cooperation for food security

Key Features of GHAN

Core Governance Units

Global Advisory Council, Steering Committee, Technical Committee, and Secretariat

Partnerships

ADB, AfDB, KOICA, EXIMbank, Private investors, leading universities

GHAN

Global Hub

Coordinates training, innovation, technology development, policy and network outreach

Regional Hubs

Deliver regional training, localize high-tech solutions, and support business incubation

2 Principles for the GHAN

- Facilitate collaboration across disciplines
- Engage diverse stakeholders in partnership
- Accelerate the pace of technology adaptation
- Result-based management : development effectiveness
- Goal-oriented
- Transparency : essential tool for international leadership

3 The Governance Structure of the GHAN

Core Governance Units

- Global Advisory Council/Steering Committee/Technical Committee/Secretariat:

  Policy Network/University Network/Enterprise Network/ Technical Innovation Network

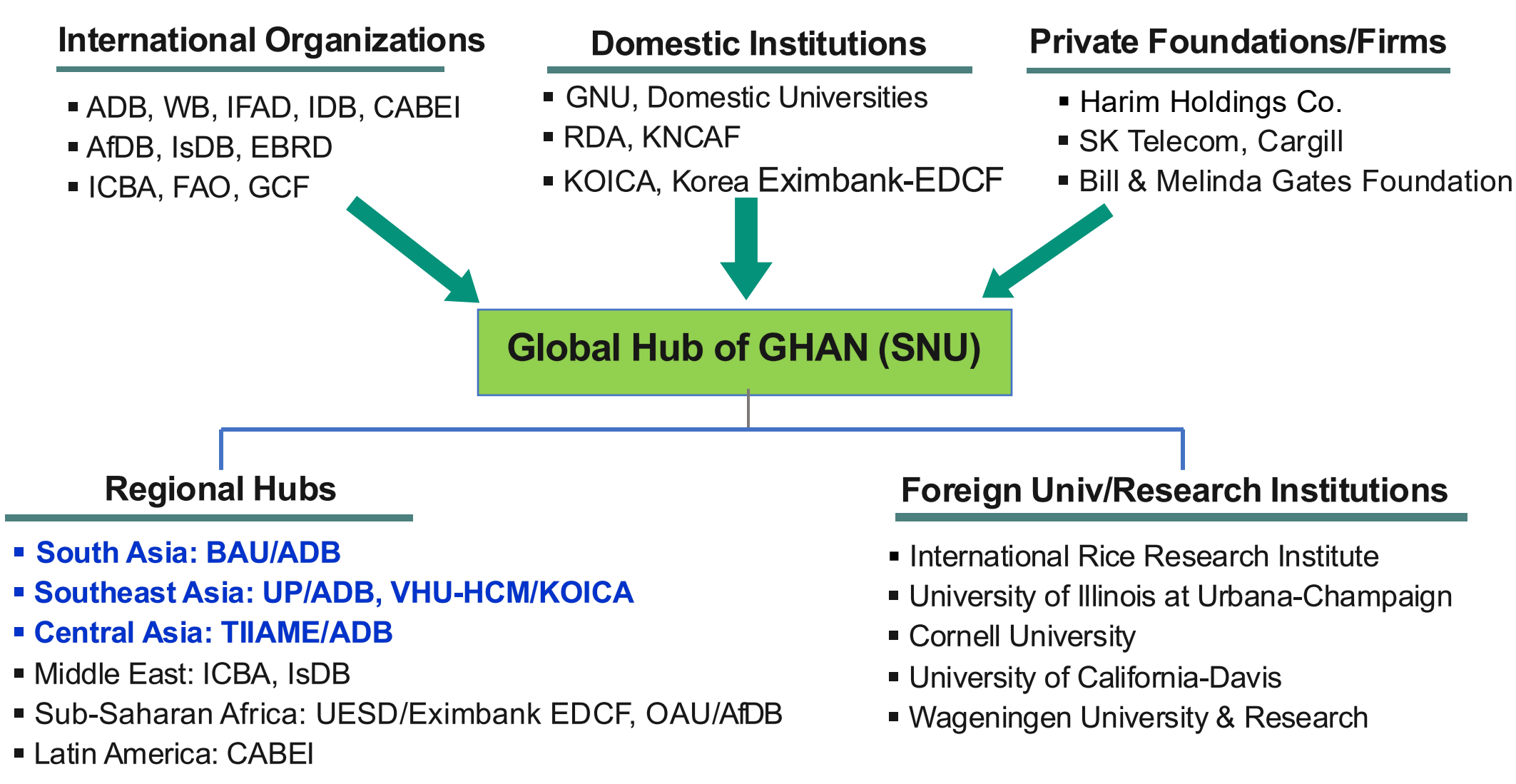
Key Roles of Global and Regional Hubs

- Global Hub/Secretariat: Teaching and training, Innovative technology development, policy-making and implementation, and network management and outreach
- Regional Hubs: Teaching & training, high-tech localization and business incubation

Key Functions of the Secretariat

- Networking functions (cooperation and coordination between global and regional hubs)
- Coordinator and facilitator roles
- Liaison between SNU and domestic universities/research institutes
- Functions to support the Steering Committee and Global Advisory Council

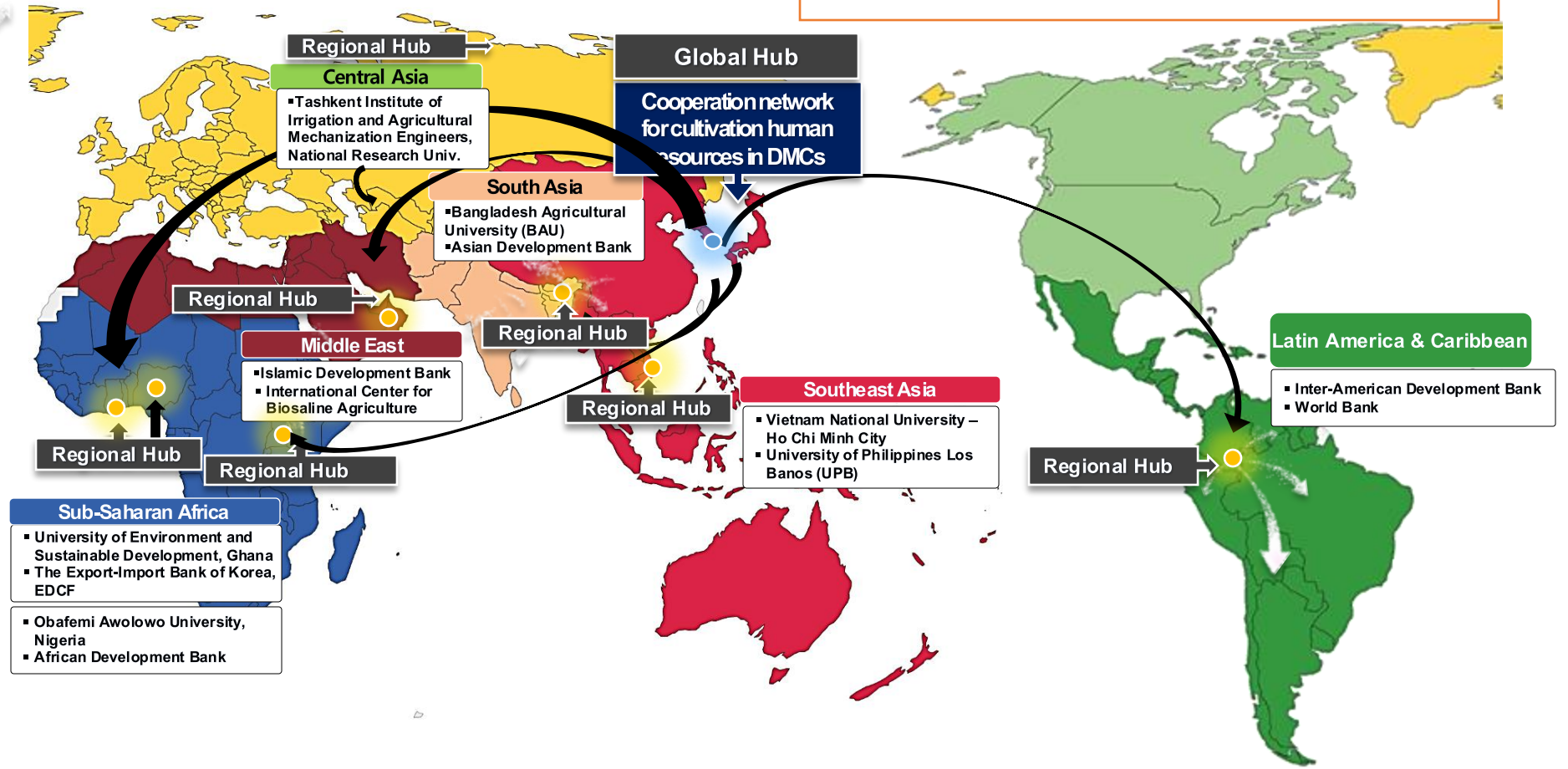
Governance Framework of GHAN



Global Hub and Regional Hubs of GHAN

- **Global Hub**
  General management of education and training, development of innovative technologies, policy planning and implementation, network operation and outreach activities

- **Regional Hubs**
  Regional management of education and training, localization of high-tech and business incubation, support with representative universities, and matching international organizations



II. Progress of Global Initiatives

- **The 3rd Global ODA Forum for Sustainable Agricultural Development (May 13-14, 2019, Seoul)**
  Proposal on "Initiating GHAN" by the Director General's Meeting of the In ternational Organizations (ADB, FAO, WFP, ICBA, and MAFRA)
- **Kickoff Workshop for ADB-MAFRA Cooperation Project on Agricultural Value Chain Development in Selected Asian Countries (July 31, 2019, Seoul)**
  ABD Proposal for establishing GHAN in Korea to train agricultural officials, leaders and young agropreneurs in Asia
- **Signed LOA between SNU-CALS and BAU (2021. 7. 16)**
  LOA was signed on the basis of MOU in December 2019 for cooperation in the promotion of agricultural human resources in Bangladesh
- **Keynote Presentation (Prof. Suk-Ha Lee) on GHAN at the ADB Asia And the Pacific Food Security Forum 2024 (Apr. 11, 2024)**
  The keynote presentation covered the progress and current status of global initiatives, mission and vision of GHAN, governance structure of GHAN, and future prospects of GHAN.
- **Keynote Presentation (Prof. Hong Sok Kim) on GHAN at the International Conference dedicated to the 90th anniversary of TIIAME National Research University in Uzbekistan (Apr. 9, 2025)**
  The keynote presentation covered the background, overview of GHAN, and the way forward
- **2025 GHAN International Workshop (2025. 9. 25~26)**
  In the workshop session, presentations and discussions were held on GHAN's vision and implementation roadmap, ADB's role within GHAN, introductions to UPLB, BAU, and UAF, as well as topics related to international development cooperation, impact assessment, and smart agriculture research in Korea.

IV. The Way Forward

1 Composition and Operations of Governance

- **Organization of the secretariat and presentation of specific roles**
- **Composition and roles of related committees**

  - Technical Committee
  - Steering Committee
  - Global Advisory Council (High Level Group)

- **Establish a cooperative system of GHAN governance**

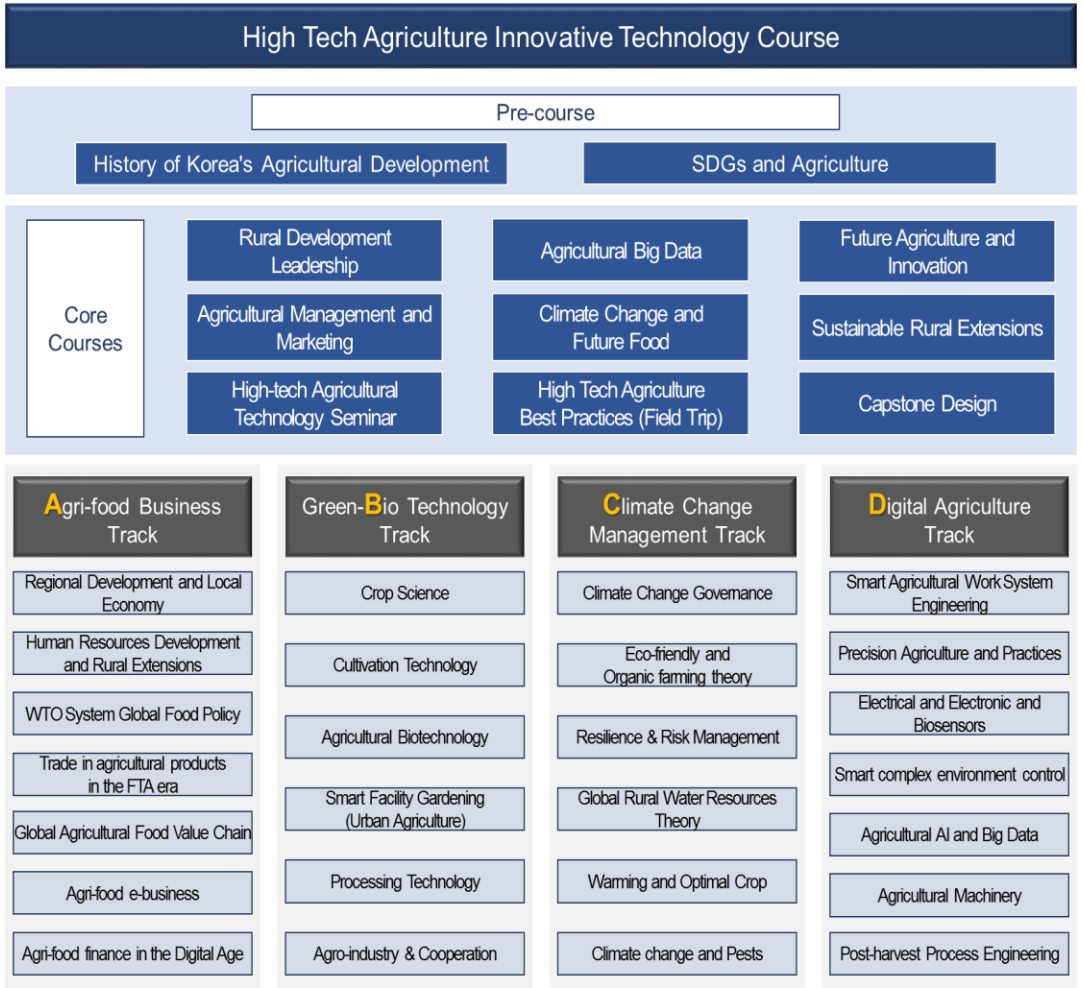
- Sign MOU with related international organizations to fulfill the role of global hub
- Establish an organic cooperative system with world-class universities and domestic agricultural universities to participate in the global hub

2 Operational Management of the Programs

- Completed roadmap and master plan to establish GHAN
- Prepared curriculum for master's degree and short-term training programs
- Organized dedicated faculty for each field and selected on-site training institutions
- Prepared detailed programs including curriculum and step-by-step training for each discipline
- Prepared for trainee selection

Illustrated Example of Curriculum

- The agricultural manpower training plan derived from the needs assessment and DACUM was established as a high-tech agricultural innovation technology course.
- The core curriculum of agricultural manpower training consists of pre-courses, core courses, and four tracks (ABCD)
  - Agri-food Business
  - Green-Bio Technology
  - Climate Change Management
  - Digital Agriculture



Choi,S.J. et al. 2021. *Studies on Establishing Cooperative Network for Fostering Agricultural Human Resources in DMCs – 2nd Stage*. Ministry of Agriculture, Food and Rural Affairs. p.262.

3 Financing Plan for GHAN Operation

- **Financial resources for the operation of the GHAN Secretariat**

  Finding ways to support operating funds for the Secretariat from Korean government (Ministry of Agriculture, Food and Rural Affairs)

- **Financial resources for GHAN education and training**

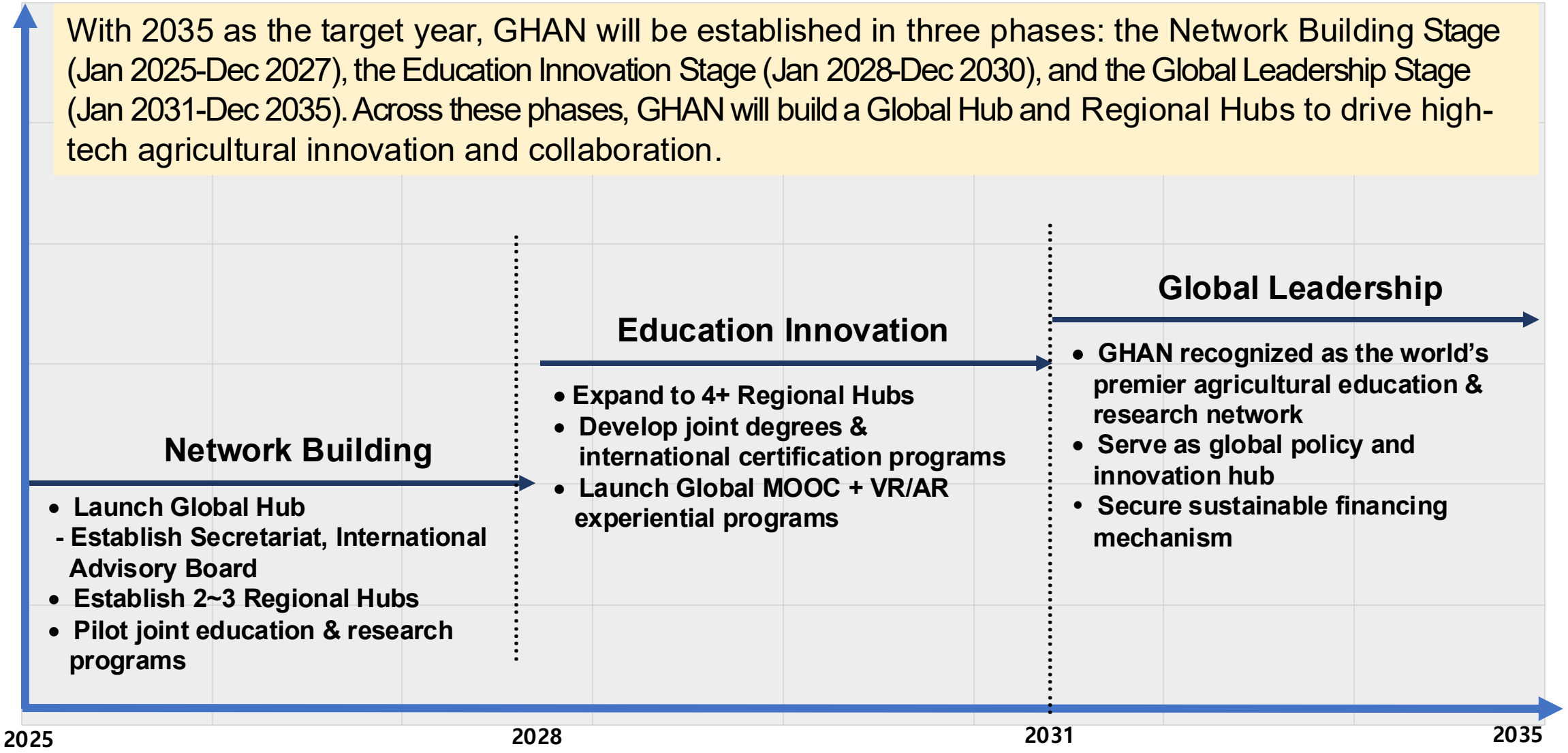
• Step 1: Utilize funds to support education and training for the cultivation of agropreneurs through the signing MOU with ADB.

• Step 2: Leverage funds to strengthen capacity building of international organizations (WB, GCF, etc.) to realize UN SDGs.

• Step 3: Funding from private foundations (Bill & Melinda Gates Foundation, etc.) related to strengthen capacity building in DMCs.

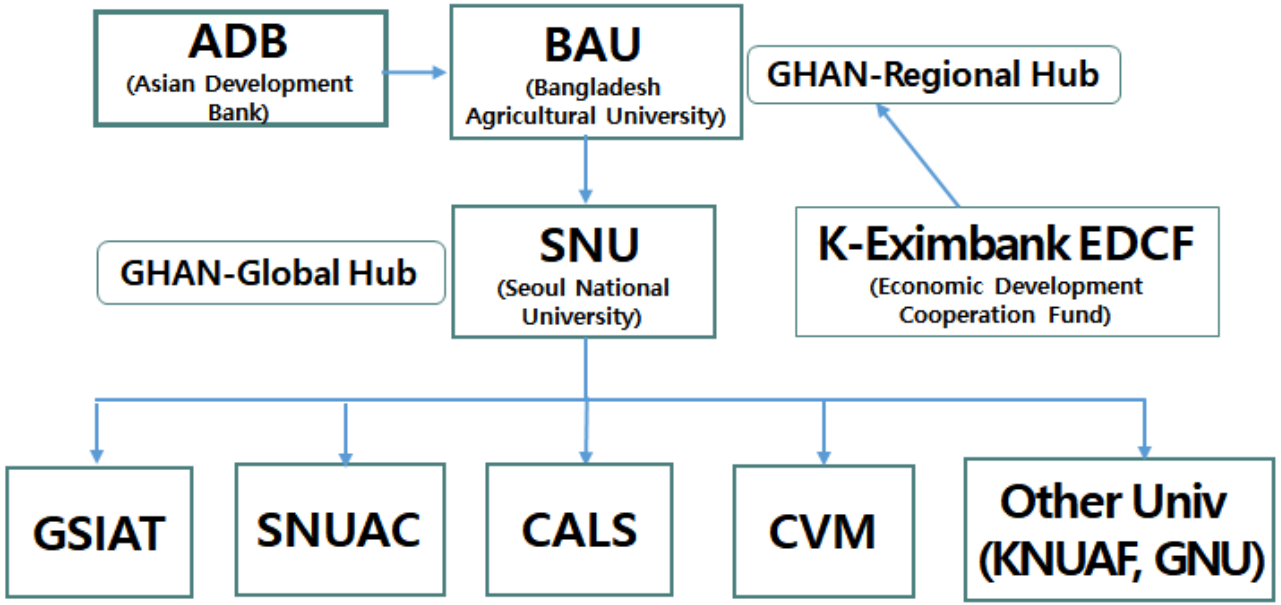
4 Roadmap for Establishing the GHAN

With 2035 as the target year, GHAN will be established in three phases: the Network Building Stage (Jan 2025-Dec 2027), the Education Innovation Stage (Jan 2028-Dec 2030), and the Global Leadership Stage (Jan 2031-Dec 2035). Across these phases, GHAN will build a Global Hub and Regional Hubs to drive high-tech agricultural innovation and collaboration.



5 Phase 1 Milestones for Building GHAN

- **Pursuing cooperation with SNU-BAU as a regional hub for South Asia**



- GSIAT : Graduate School of International Agricultural Technology at SNU
- SNUAC : Seoul National University Asia Center
- CALS : College of Agriculture and Life Sciences at SNU
- CVM : College of Veterinary at SNU
- KNUAF : Korea National University of Agriculture and Fisheries
- GNU: Gyeongsang National University)

- EDCF support for the establishment of Cooperative Center for Agricultural Research Facilities in BAU

6 Expected Impacts of GHAN

Global

- Narrow education & technology gaps in DMCs
- Strengthen global food security

Korea & SNU

- SNU-CALS positions as a global hub for Agtech education
- Export the K-AgTech model and strengthen global leadership

ADB

- Foster agricultural innovation in Asia and DMCs
- Leverage ODA and investment synergies
- Contribute to food security, climate resilience, and SDGs

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GHAN: Transforming the Future of Agriculture

- GHAN will become the world's leading platform for high-tech, climate-smart agricultural education and innovation.
- By connecting SNU (Global Hub), ADB, and Regional Hubs, GHAN will narrow technology and education gaps across DMCs.
- The network will train next-generation agro-innovators and accelerate the diffusion of advanced technologies.
- GHAN strengthens food security, climate resilience, and sustainable development through global collaboration.
- Together, we can build an inclusive, knowledge-driven agricultural ecosystem that leaves no country behind.

Thank You

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Seoul National University