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| **Leading Future Growth of Agricultural Industry with Green-bio**  **- MAFRA Announced Strategy to Foster Green-bio Industry -** | | | | |

**Summary**

□ MAFRA announced the “Strategy to Foster Green-bio Industry.”

Promoting the green-bio industry’s growth will open up new opportunities for agricultural and food industries to create high added value. The strategy focuses on expanding export, achieving carbon neutrality and enhancing productivity by fostering companies with global competitiveness.

□ The strategy aims to grow the domestic market to 10 trillion won by 2027, achieve export volume of 5 trillion won and nurture 15 large-scale global unicorns. To this end, three key implementation plans have been devised: ①Promoting the industry’s growth, ②Developing innovative technologies and nurturing human resources, and ③Establishing a sound ecosystem for the industry.

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| **Three Key Implementation Plans** | **Major Tasks** |
| 1.Promoting the industry’s growth | ① Expanding funds and investment dedicated to green-bio startups  ② Fostering 6 green-bio hubs ③ Advancing material supply system  ④ Supporting entry into overseas markets and creating demands in the private sector |
| 2.Developing innovative technologies and nurturing human resources | ① Expanding R&D in 12 key technologies  ② Nurturing human resources for convergence ③ Fostering venture businesses and startups |
| 3.Establishing a sound ecosystem for the industry | ① Promoting digital transformation ② Introducing preferential purchasing system ③ Building a public platform such as innovation of regulations |

Fostering the green-bio industry in a systematic manner through improved implementation system such as (tentative) Green-bio Industry Promotion Act and industry-specific statistics.

**Ⅰ. Background**

The Ministry of Agriculture, Food and Rural Affairs (Minister Chung Hwang-keun, MAFRA) aims to proactively foster the green-bio industry, a high value-added new industry in agri-food sector, to make agriculture an industry for future growth, which is a key policy task in agri-food area. (“Strategy to Foster Green-bio Industry”)

Green-bio industry is a new industry that creates added value throughout agriculture including upstream and downstream industries by applying biotechnology to agricultural life resources. Key areas include seeds, veterinary medicines, microorganisms, insects, natural products and food materials, and the industry can enhance sustainability by substituting fossil fuel-based production with bio-based one.

\* Example①: Shortens the breeding period that usually takes 10 years to 3-5 years through digital breeding using nucleotide sequence information.

\* Example②: Solves residual pesticide issues in advance and reduces chemical pesticides by developing eco-friendly pesticides using microorganisms

\* Example③: Manufactures insect oil (for food and cosmetics), protein (for food and feed) and fertilizer (feces) by recycling processed food that has passed its expiration date and using it as a food source for insects.

​​The global green-bio market is worth 1.2 trillion dollars in 2020 and is expected to rapidly grow by 6.7% on average annually (source: Seoul National University R&DB Foundation). The domestic market is merely 0.3% of the global market with 5.4 trillion won in 2020, and it is necessary to make preparations at a national level in line with the industry’s global growth.

Along with the development of innovative technologies, it is necessary to grow green-bio industry as a future growth engine and proactively promote export in the industry by nurturing human resources for convergence (IT and biotechnology) that meet businesses’ needs and building massive supply system for biomaterials (cutting-edge farms dedicated to materials, biofoundries).

Against this backdrop, MAFRA has developed and implements the “Strategy to Foster Green-bio Industry” centering on ①Promoting the industry’s growth, ②Developing innovative technologies and nurturing human resources, and ③Establishing a sound ecosystem for the industry. The strategy aims to grow the domestic market to 10 trillion won by 2027, achieve export volume of 5 trillion won and nurture 15 large-scale global unicorns.

**Ⅱ. Key contents by each implementation strategy**

**1. Promoting green-bio industry’s growth**

◇ Supporting businesses centering on six sectors\* (tentatively “Green-bio hubs”)

\*Seeds, microorganisms, veterinary medicines, insects, natural products and food materials

◇ Promoting investment, solidifying massive material production system and creating domestic and international demands

**First, investment will be expanded through financial support dedicated to startups.**

The amount of funds dedicated to the green-bio industry will be expanded, aiming to raise 100 billion won or more by 2027. Funds to start a business and consulting will be supported by connecting with investment institutions specialized in the green-bio sector so that various funds, such as UAE sovereign wealth fund and policy finance (new growth 4.0), can be used. Also, product development will be promoted with a program that links large and mid-market enterprises and startups.

**Strengthening the support for businesses centering on the six industrial hubs (“Green-bio hubs” tentatively).**

MAFRA plans to comprehensively support green-bio companies’ commercialization processes including product evaluation and demonstration at ①K-Seed valley (Gimje-si), ②Veterinary Medicines Efficacy and Safety Evaluation Center (Iksan-si), ③Microorganism Industry Promotion and Support Center (Jeongeup-si), ④Insect Industry Hub (Yecheon-gun), ⑤Natural Product Material Hub (to be selected in 2023), ⑥National Food Cluster (Iksan-si).

**《 Green-bio Hubs Implementation Plan 》**

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| **Area** | **Hub** | **Key functions** |
| ①Seeds | K-Seed valley (Gimje-si, Jeollabuk-do) | - Establishment of the foundation for seed-gathering/ digital breeding/ processing/ verification for seed companies  \* Prioritized building the Seed Processing Center (coating etc.) for common use of seed companies (2023-2026, 12.6 billion won) |
| ②Veterinary medicines | Veterinary Medicines Efficacy and Safety Evaluation Center (Iksan-si, Jeollabuk-do) | - Evaluation of efficacy and safety, support for product manufacturing and international conferences  \* Building the Veterinary Medicines Efficacy and Safety Evaluation Center (2020-2023, 25 billion won) |
| ③Microorganisms | Microorganism Industry Promotion and Support Center (Jeongeup-si, Jeollabuk-do, in operation) | - Support for demonstration and entry into overseas countries of bio pesticides, fertilizers, feed additives |
| ④Insects | Insect Industry Hub (Yecheon-gun, Gyeongsangbuk-do, etc.) | - Support for smart breeding facilities, material production and prototypes  \* Building the Insect Industry Hub (2022-2024, 20 billion won, one more hub will be selected in 2023) |
| ⑤Natural products | Natural Product Material Hub (to be selected in 2023) | - Support for providing natural materials tailored to medicines, cosmetics and food  \* Building the Natural Product Material Hub (2023-2027, 30 billion won) |
| ⑥Food | National Food Cluster (Iksan-si, Jeollabuk-do, in operation) | - Functional evaluation of food materials, support for commercialization such as sales channels and marketing |

**Material supply system will be established and provide comprehensive support for entry into overseas markets and demand creation.**

MAFRA will support the establishment of cutting-edge farms (vertical farms etc.) dedicated to the crops used as raw materials for massive supply of materials (two facilities from 2023). Biofoundry facilities that automate and accelerate material production and demonstration will also be built by 2028.

Overseas certification, registration and export customized support\* for bio pesticides, fertilizers and functional food will be provided, while the plan that relates the use of green-bio materials to ESG index will be reviewed to encourage business demands.

\* Offering information (markets, institutions), customs clearance·quarantine·labeling and marketing (consultation and fairs in overseas countries).

**2. Developing innovative technologies and nurturing human resources for convergence**

◇ Support for project-type research and development and innovative technology development that reflect business demands

◇ Nurturing professionals specialized in convergence (bio and IT) centering on startups

**Expand R&D in core technology areas and encourage businesses’ participation.**

\* Microbiome, digital breeding, biofeed·pesticides·fertilizers, veterinary medicines, fermentation product material development

On twelve key technologies, short-term project-type R&D that businesses need will be expanded to 118.4 billion in 2023, and a roadmap (preliminary feasibility study, etc.) will be developed and implemented for the sectors that require long-term investment (digital breeding etc.).

With regard to R&D planning, projects with marketability, such as technology commercialization, will be expanded, and special taxation on green-bio R&D will also be more broadly applied.

**Nurture professionals specialized in convergence for each area (research, industry, service).**

Green-bio researchers will be nurtured through 16 education and research teams of BK21 and R&D project (hiring one person per 500 million won), and human resources for the industry will be fostered through contracted departments at 4 universities, convergence department and specialized graduate schools. New types of personnel, such as bio data coordinator and safety production manager will also be nurtured.

**Support startups that utilize promising green-bio technologies.**

MAFRA plans to provide comprehensive support for startups from prototype development, marketing and research facilities by establishing green-bio venture campuses in Iksan-si, Pohang-si and Pyeongchang-gun. For continuous growth of startups, networks with startup support centers will be strengthened and accelerators will also be encouraged to take part in the efforts.

**3. Establishing green-bio industry ecosystem**

◇ Promoting digital transformation of green-bio companies

◇ Introducing institutions and implementing innovative regulations to create demand in the green-bio industry

**Promote digital transformation by supporting consumer-oriented data collection and use.**

More data from the National Agricultural Biotechnology Information Center will be opened to the public, and data standardization and analysis service using high performance computing\* will be offered so that businesses can utilize them.

\*3,000 resource genome of rice (including rice flour) information analysis period: (conventional) 3 months → (high performance computing) 2 weeks

In addition, the system that sells materials (functional raw materials, microbial strains, etc.) companies desire will be run by utilizing useful microorganism banks and functional raw material banks from 2023, while also implementing data R&D.

**Drive demand by introducing a public preferential purchasing system for green-bio products.**

The system to implement preferential purchasing of green-bio products such as functional foods (school meals, corporate cafeterias etc.), microbial fertilizers and pesticides (landscape, etc.) by public institutions will be legislated by 2023, and the classification system and preferential purchasing criteria for green-bio products will be specified.

\* The public institutions’ requirement of preferential purchasing will be described in the “Green-bio Industry Promotion Act (tentative).”

**Establish a public platform for resolving challenges such as regulatory issues in the green-bio industry.**

A consultative body for the development of the green-bio industry participated by the government, businesses and related institutions will be formed so that the public and private can collaborate on innovative regulations, information sharing and strengthening networks among businesses to support businesses’ international competitiveness.

**Ⅲ. Implementation system and expected results**

MAFRA plans to support stable implementation of policies by legislating the “Green-bio Industry Promotion Act (tentative),” while also organizing domestic and foreign industrial statistics in a consistent manner so that companies can utilize them.

Minister Chung Hwang-keun of Agriculture, Food and Rural Affairs said, “I expect that the opportunities for further growth that creates high added value will be provided with a new value chain structure of agriculture and food industry through systematic implementation of the Strategy to Foster Green-bio Industry. The Strategy will enable businesses’ proactive entry into overseas markets and the country’s sustainable growth through carbon reduction.”