A Study on Action Plans of Smart-Aquaculture Clusters in Korea

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1. Purpose

▸ Korea's aquaculture industry is expected to undergo qualitative growth following the adoption and distribution of smart aquaculture technologies.

- Demonstration of smart aquaculture technologies as well as a transition towards advanced aquaculture industries have been fueled by 4 project sites for leading smart aquaculture clusters participated by the private sector after being selected, with one public offering project underway for one additional project site .
- Private sector also announced a direct investment plan worth of approximately 200 billion won into smart aquaculture sector. Through such effort, improvement of the aquaculture industry will be accelerated both in terms of quality and quantity.

▸ Although smart aquaculture clusters lie at the center of distributing smart aquaculture, these projects are implemented

in the form of public offering projects by region, falling short of measures for utilizing and connecting outcomes at the national level.

- With the 'Aquaculture Industry Development Act' taking effect on August 2020, A Basic Plan for the Aquaculture Industry Development Act, soon to be established afterwards, is expected to include strategies and measures to invigorate these projects.

▸ Taking from the perspective of a national innovation system, this study aims to explore development directions of smart aquaculture clusters, suggesting development strategies for cluster projects through proposing specific models for implementing projects.

- Due to the nature of private participatory public offering projects, a special purpose company (SPC), which is leading the projects, should pursue profitability , whereas the government's financial investment should guarantee public interest.
- Furthermore, the value possessed by the public, the final consumer of smart aquaculture products, should be included in the development strategy of smart aquaculture clusters.
- Thereby, the ultimate purpose of this study is to present development strategies capable of simultaneously securing profitability (innovation), public interest and sustainability.

2. Methodology and Feature

▸ This study conducted a systematic research to reflect the

conditions of present and future aquaculture industries as well as to include values pursued by stakeholders surrounding smart aquaculture clusters.

- Hence, this study incudes theoretical and literature reviews, analysis of project site conditions, industry analysis (SWOT), Delphi survey, a survey and AHP analysis on experts.

▸ The first exploratory policy research on the subject of smart aquaculture clusters

- In contrast to the rapid development of smart aquaculture and clusters which integrate advanced aquaculture technologies with ICT technologies, policy research on these subjects have been generally insufficient.

- This study carried out an exploratory research by formulating an expert advisory group centering on relevant experts in industrial, academic, research and governmental circles, suggesting policy measures based on the results.

▸ Application of futures research methodology to reflect conditions of the future aquaculture industry

- In the case of Gijang gun in Busan, the 1st project site, the project is expected to take a full-fledged operation by 2023, hence, resulting in the vitalization of following project sites.

- Since smart aquaculture clusters will be actively operated within 5 years, this study primarily intends to suggest development measures taking potential future situations into account.

- After formulating a research network for Delphi analysis

consisting of a group of professors in fisheries sector in Busan, Jeonnam, Gyeongnam and Jeju as well as researchers in charge of fisheries in provincial areas, this study made forecasts on conditions of the future aquaculture industry.

▸ A coupling analysis research simultaneously utilizing qualitative and quantitative data

- A quantitative data was secured by collecting the opinions of experts by each phase of the research and, in particular, conducting large-scale consumer awareness survey (1,000 persons of effective samples with the hierarchical classification by age, gender and region).

- After summarizing the results of surveys carried out by this study (results of qualitative and quantitative analysis), this study conducted an AHP analysis on the purpose of implementing smart aquaculture clusters with an intention of produce a development direction of smart aquaculture clusters.

3. Results

▸ This study extracted a basic direction for project implementation as well as a number of types of projects according to the importance of smart aquaculture clusters by purpose.

- Together with existing models of smart aquaculture clusters by breed and region, this study drew types of implementing projects which include; the ‘production-oriented cluster’, the ‘technology commercialization cluster’, the ‘Green New Deal cluster’, the

'processing and distribution cluster', and the 'public technology development and distribution cluster'.

- This study presents a linkage system of clusters and a distribution system of smart aquaculture technology into fishery households according to type of project.

4. Policy suggestions

▸ This study provided five policy alternatives to vitalize smart aquaculture clusters as stated below;

- Establishing a cooperation system for national innovation of the aquaculture industry: Cooperative supports should be developed and operated to switch smart aquaculture cluster projects currently carried out by public offering projects by region towards innovation projects at the national level
- Diversifying smart aquaculture clusters: Smart aquaculture cluster projects currently limited to lands should be expanded to oceans. In addition, it is necessary to allow aquaculture concentration regions such as Jeju where production complex is already established but not being designated as project sites, to separate and operate test-bed projects, promoting the flexibility of project implementation.
- Preparing a guideline for eco-friendly aquaculture within smart aquaculture clusters: It is necessary to develop a guideline for eco-friendly operation of smart aquaculture test-beds and aquaculture facilities which will be placed in hinterland production areas and then assign the priority for those moving

into clusters

- Boosting policy effects by expanding industries linked to smart aquaculture clusters: The scope of companies able to move in smart aquaculture clusters should be expanded to equipment companies to establish and expand the value chain system of smart aquaculture.

- Establishing grounds for legal and institutional support for carrying forward smart aquaculture cluster projects: The smart aquaculture cluster projects currently carried out in the form of two government-funded projects should be specified into the subordinate laws of the Aquaculture Industry Development Act as well as its Basic Plan in order to build a solid foundation for project implementation.

▸ During the process of conducting the research, this study formulated a group of outside experts (participated by 4 from academy, 4 from research institutes and 1 from the government) to draw policy suggestions, while holding an expert policy seminar to secure the objectivity and seek feedback on the results.

5. Expected benefits including policy contribution

▸ This study ultimately contributes to the advancement and enlargement of the aquaculture industry by proposing implementation directions and connection measures for establishing smart aquaculture cluster projects current underway.

- Invigoration of smart aquaculture clusters will shift the existing production paradigm of aquaculture which used to depend on natural environment as well as manpower and experience of workers, and ultimately promoting a qualitative change.