Managerial Capabilities and Practices in MaricultureFish Production as Basis for Policy Framework on Sustainable Mariculture Industry

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Abstract—The objective of this study was to assess the degree to which the two Mariculture Zone Parks (MZPs) in Region 1 are operated by mariculture managers using various management methodologies. The descriptive-correlation method was employed in this study, which included all 45 MZP managers. The findings showed that the amount of management strategies used by mariculture managers is influenced by factors such as gender, employment status, civil status, and the number of personnel under their care. Furthermore, the data showed that the respondents' level of management techniques is unaffected by age, highest level of education attained, monthly salary, number of years as manager, and number of relevant trainings attended. The results also suggest that mariculture managers' perceptions of the obstacles associated with mariculture production are influenced by factors such as age, marital status, and employment position. Finally, the findings demonstrate that the obstacles to agriculture development are not influenced by factors such as gender, money, experience, training, or educational background.

Indexed Terms— Agricultural Development, Employment status, Managers, Mariculture, Mariculture Zone Parks

I. INTRODUCTION

The Philippines places a high priority on ensuring food security, with the agricultural sector playing a critical role in both boosting food availability and guaranteeing food sufficiency. Several legislation, including Republic Act 10654 and the Code of Conduct for Responsible Fisheries within the Food and Agricultural Organization, promote this purpose. The code encourages the protection of living aquatic resources, their habitats, and coastal areas, as well as the contribution of fisheries to food security and quality. This code requires that the growth of aquaculture, which includes mariculture, be guaranteed as an environmentally sustainable endeavor that encourages resource efficiency. The Philippine Fisheries Code (Republic Act 10654), which establishes guidelines for the growth, management, and preservation of fisheries and aquaculture in order to provide food security for the Filipino people, supports this international code. The Department of Agriculture, which enacts and upholds all laws, rules, and regulations pertaining to the preservation and responsible use of agricultural and fishery resources, is in charge of carrying out these policies. The Bureau of Fisheries and Aquatic Resources' Mariculture Park Program was one of the initiatives to support food security, employment stability, and income growth to spur local development (BFAR). The mariculture operations in the Mariculture Zone Park (MZP) are managed by managers who possess technical understanding in milkfish production. According to the management functions that were covered, managing businesses or organizations, like mariculture zone parks, is essential to building a profitable enterprise. To run a company efficiently and accomplish any enterprise's goals, it is imperative to adopt and implement the management functions of organizing, planning, directing, and controlling. Therefore, the researcher designed this study with the explicit goal of assessing managers' management strategies in their mariculture activities in Region. Sual and Infanta, two municipalities in Pangasinan, are home to two Mariculture Zone Parks. The goal is to evaluate

mariculture managers' methods along the crucial axes of oversight.

II. METHODOLOGY

Descriptive-correlational research design was used in this study. Establishing the association between several variables and describing the features of a population or phenomenon are the goals of a descriptive correlational design. It can present an overview of the current state of affairs or a portrait of a particular group of people, including their attitudes, ideas, actions, and feelings. Rather than focusing on direct cause-and-effect links, correlational designs entail the systematic research of the nature of relationships, or associations, between and among variables. Given that it addresses the demographic traits of mariculture managers, the management strategies they employ, their familiarity with mariculture policy, and their assessments of the gravity of the issues facing mariculture development, this study is both descriptive and correlational in nature. The study's participants included managers of mariculture operations operating under the MZP in the towns of Sual and Infanta, Pangasinan (BFAR Report, 2022). Using 997 cages spread across 257 hectares, Sual MZP raises milkfish, siganids, and pompano. Currently, 10 managers are in charge of the Infanta MZP, which is smaller at 86 hectares and has 343 cages used for the production of milkfish, while 35 managers are in charge of the Sual MZP. Because comprehensive enumeration was used in this study, the respondents in all were 45 managers from the Sual and Infanta MZPs.Frequency counts and percentages were used in this study to examine the respondents' demographic makeup. This study employed a weighted mean to ascertain the mariculture managers' perceptions of the extent of management techniques and the various problems in mariculture growth. The Pearson Correlation Coefficient (r) was used by the researcher to determine the relevant correlations between the variables taken into consideration in this investigation.

III. RESULTS AND DISCUSSIONS

Level of Knowledge on Mariculture Policy. With a weighted mean of 3.44, the mariculture managers demonstrated average knowledge of mariculture policies. The information that mariculture managers know the most about, according to the relevant policies, is found in the following areas: "Utility areas including floating houses for feed storage," "Good water quality shall be maintained using appropriate stoking and feeding practices," and "No improvement shall be made and no sea cage structure, building, facility, and electro-mechanical equipment be constructed and installed without prior permission from the LGU," with a weighted mean of 4.00. On the other hand, with weighted means of 1.60 and 1.62 for each, mariculture managers' knowledge of "Special Use Agreements in Protected Areas (SAPA)" and "The importing person or entity shall provide quarantine policies before releasing the commodity into the production areas in Mariculture Park" is limited.

Extent of Management Approaches Adopted by Mariculture Managers. The GAqP criteria for facilities and sanitation, which mariculture managers have adopted, have an average weighted of 4.93, suggesting that these criteria are highly adopted by mariculture managers. With a weighted mean of 4.95 for almost all metrics, it is clear that they are all widely used. These include the following: aquaculture farm facilities and the area around them should be kept clean and hygienic; containers, equipment, and farm facilities should be kept in good condition to make cleaning and sanitizing easier; and fuel, chemicals, feed, and veterinary drugs should be stored separately and safely. After every use, waste storage facilities and containers should be cleaned and sanitized. Wastes ought to be kept in a way that prevents pollution.After harvest, organic wastes need to be disposed of correctly to avoid contamination. However, the availability of facilities for disposing of both liquid and solid waste in an appropriate location and in accordance with current regulations has resulted in a weighted mean of 4.82, suggesting a very high adoption rate.

Extent of Management Approaches Adopted by Mariculture Managers on Facilities and SanitationThe average weighted mean of 4.79 indicates that mariculture managers are using farm management standards at a very high rate. The weighted mean of 5.0 indicated that mariculture managers adopted the following criteria very highly: water quality should meet the current standard set by the responsible authority; aquaculture farm preparation should minimize risk for cross-contamination; and water quality should be suitable for milkfish production. The aquaculture farm's adoption of the 4.64 score for the forbidden chemicals and biological substances should not be utilized criteria shows how highly agriculture managers have implemented this policy. In a similar vein, they have greatly embraced the requirements that probiotics, fertilizers, and chemicals be used in compliance with manufacturer labels or recommendations from authorities with a weighted mean of 4.51. According to Kaleen and Sabi (2021), mariculture can significantly help achieve global food security if it is developed and promoted properly, including the ability to raise fish at sea. Sustainable mariculture has advantages for the environment and the economy. In addition to being thought to be of superior quality, fish cultivated in mariculture offer a wider variety of species than fish kept in ponds or tanks (Khan, et al., 2021).

Extent of Management Approaches Adopted by Mariculture Managers onFarm Management. The average weighted mean of 4.59, which indicates that the GAqP criteria are highly implemented, indicates the management practices of mariculture managers regarding feeds and feeding criteria. The weighted means of 5.0 indicate that the mariculture managers gave high priority to adhering to the requirements regarding commercial feeds, feed ingredients, premixes, and additives that must be sourced from a registered company. Additionally, feed packages must bear appropriate labels containing pertinent information in English. Similarly, the weighted means of 4.95 for all of the feed and feeding techniques criteria show that mariculture managers highly embraced them. The results also demonstrated how highly mariculture managers embraced the requirements of imported feeds, which state that they must be purchased from a registered business and supervised by a qualified authority.The majority of aquaculture businesses must store feed on site (Yang, et al., 2021). The feed store ought to be housed in a building that is appropriately designed, has good ventilation, and is shielded from mice, birds, and insects. The floor ought to be made of concrete. Feed ought to be kept in appropriate bags or sacks or, if kept in large quantities, in sealable bins or containers. Feed sacks or bags should not come into contact with the walls or the floor; instead, gaps should be left to allow for efficient ventilation. This lessens the chance of contamination, mold growth, and spoiling. Feed storage containers such as sacks, bins, and the like should be labeled with the batch and place of origin of the feed that is contained within. Preventing overfeeding is the most crucial nutritional guideline for fish according to Navlor, et al (2021). Expensive feed is wasted when animals are overfed, in addition, it causes low dissolved oxygen levels, elevated bacterial loads, increased biological oxygen demand, and water pollution (Pandey and Kumay, 2022). Feeding the fish roughly 80% of what they desire to eat (satiation) is a good general guideline. Using this method, you feed the fish as much on one day as they will eat on a regular basis—possibly twice a month. After that, feed is provided at a rate of around 80% of that ration for a few weeks, and the process is repeated. To monitor feeding behavior and determine how much feed is needed, many growers utilize floating or extruded feeds.

Extent of Management Approaches Adopted by Mariculture Managers on Feeds and Feeding
The weighted averages of the two GAqP requirements, which concern the surveillance program and the need that milkfish products put on the market be safe for human consumption, are 4.47 and 4.15, respectively. Finally, with a weighted mean of 2.28, it was decided to somewhat embrace the criterion that a designated quarantine facility should be kept for the treatment of milkfish infections as well as for the processing and disposal of diseased milkfish. This result suggests that the mariculture managers of Alaminos and Sual MZP did not follow these GAqP standards. Preventing illness rather than treating it is the first step towards effective fish health management (Xu, et al., 2022). Good feeding, cleanliness, management, and water quality are the keys to preventing fish disease. Therefore, there will

be a growing need for enhanced aquatic animal biosecurity due to a variety of factors, including the need to protect resources (wild fisheries, aquaculture, and the environment as a whole), food security, trade, consumer preferences for safe and high-quality goods, profitability of production, issues with investment and development, and new threats of emerging health issues. Programs for biosecurity have a solid scientific foundation to assess the biggest risks of illness, potential entry points, chance of establishment, potential for dissemination, and risk management strategies to guarantee the right kind of security (Jolly, et al., 2023).

Extent of Management Approaches Adopted by Mariculture Managers on Fish Health Management. The average weighted mean of 2.58 indicates that the mariculture managers implemented the GAqP criterion on chemical use to a modest extent. The weighted mean of 2.73 indicates a moderate adoption rate for the criterion that veterinary medications, medicated feeds, chemical, and biological substances should only be allowed and registered in accordance with national legislation and purchased from registered makers and suppliers. Similarly, by monitoring the withdrawal duration to make sure the maximum residue level (MRL) is appropriate depending on the norm set by Codex or trade partner, mariculture management gently embraced the criterion that drug residues should not be present in the body of the milkfish.The weighted mean of 2.28 indicates that non-prescription drugs should be used in accordance with the manufacturer's instructions and as listed on the label.The Philippines' growing aquaculture industry has made the usage of chemicals and biological products unavoidable, and research is being done to find ecologically safe medications and disease management alternatives. The sustainability of commercial aquaculture production depends on the responsible use of veterinary medicines, in addition to the health and safety of animals, consumers, and the environment (Kaleem and Sabi, 2021). Such medications ought to be used in compliance with a comprehensive national policy for aquatic animal health management and sustainable aquaculture, as well as national and on-farm health and biosecurity strategies. Producers, medical professionals, product manufacturers, and customers all have important roles to fulfill.Developing and implementing good aquaculture practices is a major duty of the public sector and the government (Stickney and Gatlin, 2022). Laws and regulations pertaining to the production, licensing, and use of veterinary medicines should be made transparently, in consultation with pertinent private-sector stakeholders, and in accordance with international standards and guidelines. Better enforcement of present rules and enhanced health extension support to aquaculture producers could lead to a wiser and responsible use of veterinary medicines, as opposed to the imposition of new limitations (Troell, et al., 2023). Aquaculture should therefore be mindful of the dangers associated with chemical handling as well as any potential effects on the environment and food safety.

Extent of Management Approaches Adopted by Mariculture Managers on Chemical Use. To guarantee the quality of the harvest, harvesting containers are designed ahead of time and kept spotless. To avoid causing physical harm to the gathered milkfish, it is important to handle them hygienically and to chill them appropriately. The following transportation strategies were also widely used, but they used less weighted methods of 4.95. To prevent physical damage to the milkfish, mariculture managers carry the captured fish in sterile boxes and containers at a temperature of 0 to 4 degrees Celsius. However, two criteria are the only ones that are highly adopted, as shown by the weighted means that are lower, 4.47 and 4.42. Managers of mariculture facilities move live fish in ways that don't compromise the fish's quality.Fish is normally healthy and safe, but if it's not refrigerated, it deteriorates quickly, and it can become polluted both during growth and after harvest. The characteristics and state of the raw material, as well as variables like temperature regulation, air humidity, cleanliness, and handling, all affect quality. Enzymatic activity, microbial development, and lipid oxidation—which results in the loss of desirable sensory qualities—are the primary causes of fish spoiling. This means that some enzymatic functions benefit from mechanical injury. The microorganisms penetrate the fish flesh and hasten the fish's deterioration. Fish deterioration issues may arise from temperatures rising quickly during harvesting and throughout transportation due to a lack of cold

storage facilities (Khan, et al., 2021. Furthermore, storing harvested fish (postmortem) in nets or outdoors at a high temperature for an extended period of time may cause the fish's quality to rapidly deteriorate. The fish starts to spoil as soon as it dies. Rigidity brought on by rigor mortis causes the fish's body to become taut. This kind of rotting might occur one to seven hours after the fish pass away. In order to reduce losses due to harvest quality degradation, agriculture producers need to have access to cold storage facilities or ice plants (Akram, et al., 2023).

Extent of Management Approaches Adopted by Mariculture Managers on Harvesting and Transport. The managers of mariculture are realizing how crucial it is for milkfish to grow and survive in a proper and healthy environment. Ensuring optimal water quality throughout the whole production process is crucial for the general well-being and productivity of fish. In aquaculture production systems, the most significant factor influencing fish health and performance is water quality. It is imperative to have a thorough understanding of the water quality requirements of fish under culture, as this is what the fish need in order to grow and survive. Fish live in water and rely entirely on it for all of their requirements. The range of water quality parameters that allow different fish species to live, thrive, and reproduce includes things like temperature, pH, oxygen content, salinity, hardness, and so on. Every species has an optimum range, or the range in which it performs at its best, within certain tolerance limitations (Fernandez, et al., 2023). Therefore, it is crucial for fish farmers to make sure that the water's physical and chemical parameters always stay, to the greatest extent possible, within the ideal range for the fish they are raising. Fish that are kept outside of these ideal ranges will grow slowly, behave erratically, and show signs of illness or parasite infection.

Extent of Management Approaches Adopted by Mariculture Managers on Animal Welfare. The physical fitness of employees to work in aquaculture facilities, including their ability to dress appropriately for the job, is a major concern for the mariculture managers. With weighted values of 4.95 and 4.82, respectively, the standards on farm level hygiene practices and smoking, spitting, and alcohol consumption in working and storage areas are highly embraced. Workers should practice an acceptable level of personal cleanliness and take all required precautions and actions to prevent the contamination of aquaculture products in order to limit the risk of contamination. Cuts and wounds on the hands and forearms should be covered as away with gloves or an appropriate water-proof bandage. It is not permissible to allow someone to work in an aquaculture operation if they have diarrhea, boils, other skin infections, infectious diseases, or helminthic parasite infections. Employees should not be penalized financially for disclosing such situations because that would encourage them to keep them a secret. Workers in aquaculture businesses should get a health examination upon hiring and then annually to make sure they don't have any of the conditions listed above (Stickney and Gatlin, 2022). Employees and anybody visiting an aquaculture facility should abstain from eating, drinking, urinating, or defecating outside of areas that are specifically allocated for these activities, which must be kept away from areas used for production (Bregnballe, 2022).

Extent of Management Approaches Adopted by Mariculture Managers on Personnel Health. The weighted mean of 5.0 indicates that four out of the seven criteria are highly adopted, according to the findings. Managers of mariculture maintain sufficient information about the kinds of fry, fingerlings, and broodstock, as well as about harvesting and final product purchasers. Records are archived, preserved, and made accessible both during the culture process and a year following harvest. Similarly, weighted averages of 4.95 show that the requirements for traceability and appropriate records are both highly embraced. The capacity to track a food through certain phases of its manufacturing, processing, and distribution is known as traceability. It is a crucial instrument that makes it possible to preserve food safety. Having a reliable record-keeping system and well-maintained, accurate records is one of the first stages to being a successful farm manager (Rahman, et al., 2020). Records are management tools that can assist managers in monitoring an aquaculture system's productivity. Managers that maintain expense and sales information from prior years are better able to forecast changes in input and output prices. Managers can report the precise amount of

money earned or spent from production by maintaining accurate records, which aids in their preparation for appropriate planning and budgeting.

Extent of Management Approaches Adopted by Mariculture Managers on Traceability and Record Reporting. Based on the average weighted mean of 4.98, the mariculture managers followed the labor and community criteria with great esteem. The results showed that five of the seven indicators had very high adoption, with a weighted mean of 5.00. These include the availability of a first aid kit, safe housing for stray-in laborers, policies against discrimination against workers based on their gender, religion, culture, or age, and aggressive measures to prevent child labor. The results demonstrated that, with weighted means of 4.95, mariculture managers highly valued two categories related to workers' first aid and safety awareness as well as inspections of electrical connections, hazardous items, potentially dangerous farm inputs, toxins, and accidents. In order to discover any negative effects of chemical intoxication early on, laboratory workers and other staff members who use chemicals should undergo routine medical examinations (Su, et al., (2020). Every aquaculture facility should have first aid kits available, along with sufficient instructions on how to use them. To raise awareness of these risks, accurate records of aquaculture and related hazards should be maintained and updated. This will function as a preemptive or cautious action. Therefore, it is imperative to enhance comprehension of the primary occupational risk factors and assess risk-reducing measures in order to safeguard and enhance the well-being of mariculture workers.

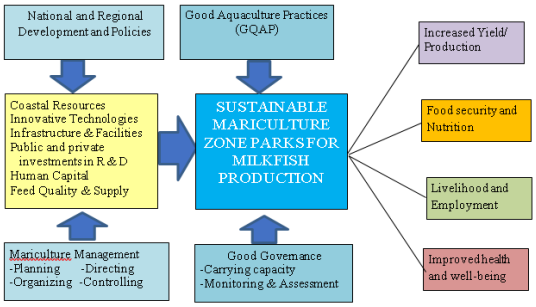
Degree of Seriousness in Mariculture. The extent to which mariculture management consider the obstacles associated with mariculture development to be severe. According to the data, mariculture managers face a number of significant issues that have an impact on their output, including: a) production losses brought on by climate change and/or extreme weather; b) an unstable supply and demand for bangus fingerlings; c) an unstable supply and price of marketable bangus; d) high mortality rates and fish kill incidents; e) poor quality fingerlings and milkfish fry; f) insufficient credit assistance; g) rising feed and other input costs; e) a limited fingerling production area to support mariculture operations; f) conflict or competition for space with other resource users; g) limited capital for the operation of cages; and h) poaching of the stocks. However, the mariculture managers regarded the issue of fishing close to the MP's cages as being of a relatively serious nature. A political dispute, a lack of an Environmental Compliance Certificate (ECC) from some investors, a dormant Executive Management Council and Project Management Unit, a lack of equipment to track the capacity of mariculture parks, and the movement and distribution of bangus produce domestically are among the other issues they identified as being somewhat serious.The mariculture managers, meantime, classified a number of issues as "Not Serious," including: a) the possibility of an oil spill; b) the lack of a suitable location for the construction of a land-based support facility; c) An insufficient policy or regulation regarding the quantity of cages; d) Adherence to food safety regulations; e) The mariculture site's accessibility for workers and investors; f) An untidy production area and inappropriate waste management; g) Inadequate postharvest facilities and technologies; h) A restricted information system; and i) Illegal fishing (dynamite) in the vicinity of MZP.Based on the overall weighted average of 2.62, the challenges associated with mariculture production are generally considered to be moderately substantial. The findings imply that mariculture managers view the obstacles to mariculture growth as neither significant nor minor. Stated differently, they consider the difficulties to be moderately to moderately serious.

Significant Relationships between the Management Approaches adopted by Mariculture Managers and their Profile Variables. With a p value of.032 and a r value of -0.32, which is considered to be a slight negative correlation, the study shows that there is a significant association between the management styles and gender of mariculture managers. The demographic profile of the responses indicates that men predominate in the role of mariculture manager. The results therefore suggest that the extent of management techniques somewhat decreases as more men hold managerial jobs. Robertson et al. (2011) state that men have historically held management positions and that these positions are linked to

masculine agentic traits. More management skills are seen by male managers as more macho and crucial to their success as managers.According to Clavelle, et al. (2019), both men and women have unfavorable opinions of women in management roles, and women also possess fewer managing skills and competences than males. According to Joffre, et al., (2019), age, gender, and marital status all shown noteworthy main impacts in predicting employees' competency demands. Their results indicate that when it comes to forecasting competency demands, there are notable interaction effects between the variables of married status and gender as well as marital status and the number of subordinates. Gender and employment status significantly impacted the work performance of a subset of government employees, according to Wang, et al., (2020). They did not, however, discover any evidence of a substantial relationship between employees' success levels and their gender and employment status.

Significant Relationships between the Mariculture Development Challenges and Respondents' Demographic Profile. It is certain that the difficulties in mariculture output were significantly correlated with age and civil status. The correlation coefficients for age and civil status, respectively, show that both demographic variables have inverse or negative relationships with the challenges in mariculture production ($r = -0.492$ and $r = -0.455$), which are both interpreted as moderate negative correlations even at the.01 level of significance. The data shows that the difficulties mariculture managers face in producing mariculture decrease as they grow older and more responsible.Furthermore, as mariculture managers' work security increases, so do the difficulties they face in the field of mariculture development (Su, et al., 2020). As a result, the hypothesis that claims there are no meaningful connections between the profile variables of age, marital status, and employment status and the challenges of mariculture development is rejected. These results suggest that mariculture managers' perceptions of the importance of mariculture production issues are influenced by factors such as age, marital status, and employment position.It is investigated if age, as a demographic element, has a substantial impact on employment productivity. Wettzman and Filgueira (2020) revealed that experience increases with age in the workforce, and experience is typically linked to increased productivity and wages. Navlor, et al., (2021) studied how older workers perceived the caliber of connections in the workplace and how well they performed in physically and cognitively taxing care service environments. The association between age and job happiness was shown to be mediated by the superior exchange connections that older workers had with their supervisors. Higher connection quality is associated with higher quality job appraisals for older workers, which may serve as a springboard for older followers to reconsider their career goals and begin further personal growth in terms of families, one can conclude that those who have children have more responsibilities; hence, continuing to work is necessary for them to be able to support their families. Due to their spouse's support in sharing household duties, married people make more money per hour than single people, a difference in productivity that experts have linked to positive differences. Comprehending the influence of these factors on the viewpoints of mariculture managers might facilitate the development of programs for the targeted populations, enabling them to more effectively balance their professional and personal obligations.

Proposed Management Framework for Sustainable MZP. Aquaculture has grown dramatically in recent years, making development planning more and more crucial. Through the provision of incentives and safeguards, attraction of investment, and promotion of development, effective planning will both promote and steer the evolution of the sector. Additionally, it will support the sector's long-term social, environmental, and economic sustainability as well as its eventual role in promoting economic expansion and reducing poverty. The enhancement of current coastal aquaculture development plans, which involves bolstering the capacity of many sectors that either directly or indirectly affect production, is a necessary part of the planning and administration of sustainable aquaculture development (Free, et al., 2020).



Good Aquaculture Practices can also be used as a means of economic regulation to get rid of socially and ecologically damaging practices without taking away from the spirit of entrepreneurship. Effective governance is about striking a balance between promoting wealth development in the private sector and safeguarding the general welfare of society. Put differently, the governance of aquaculture contributes to sustainability. Since sustainability makes aquaculture viable over the long term, it is the main objective of aquaculture governance. The four standard components of sustainability are environmental integrity, social license, economic viability, and technical feasibility (Wang, et al., 2020). The socio-economic benefits of aquaculture activities include the provision of food, improving nutrition and health, creating jobs and income, and enhancing the well-being of the Filipino people when mariculture zone parks are managed sustainably for milkfish production.

CONCLUSION

Without a doubt, the mariculture managers play a crucial role in organizing, planning, leading, and overseeing the activities of the Mariculture Zone Parks (MZPs). The study's conclusions imply that the mariculture supervisors are capable, experienced, responsible, and mature enough to carry out their duties. The findings also suggest that the mariculture managers knew enough about mariculture regulations. This confirms the result that the mariculture managers have extensive experience in the field, particularly in producing milkfish, which is the main activity in the mariculture parks in Sual and Infanta. The research's conclusions also show that, in establishing and managing MZP activities in accordance with GAP guidelines, mariculture managers strongly embraced the planning, organizing, directing, and controlling tasks of management. Furthermore, this study demonstrated that the difficulties associated with mariculture production are mildly severe. The findings show that mariculture managers don't view the obstacles to mariculture development as particularly big or tiny. Stated differently, they consider the difficulties to be moderately to moderately serious. Additionally, this study found that the amount of management strategies used by mariculture managers was significantly correlated with the gender, marital status, job status, and number of personnel managed. Thus, the hypothesis that claims there are no meaningful connections between the number of people managed by mariculture managers, their gender, employment level, and civil status, and the management strategies they apply, is rejected. Likewise this study found a substantial correlation between the mariculture managers' age, marital status, and work status and the difficulties they face in developing mariculture programs. As a result, the hypothesis that claims there are no meaningful connections between the profile variables of age, marital status, and employment status and the challenges of mariculture development is rejected. These results suggest that mariculture managers' perceptions of the importance of mariculture production issues are influenced by factors such as age, marital status, and employment position. However, the hypothesis that states that the profile variables of gender, highest educational attainment, monthly income, number of years as manager, number of employees handled, and number of relevant trainings attended do not significantly correlate with the challenges of mariculture development is accepted.

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