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Comprehensive insights into swine breeding practices in Misamis Occidental, Philippines: A study on demographics, breeding methods, and challenges faced by raisers

Villaver, J. P.[1*] ,Tangalin, M. G. G.[1] and Malalis, J. M. F.[2]

[1]School of Agriculture, Forestry and Environmental Studies, J. H. Cerilles State College-Dumingag Campus, Dumingag, Zamboanga del Sur, Philippines; [2]Municipal Agriculture Office, Jimenez, Misamis Occidental, Philippines.

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Abstract The study unveiled key demographic and operational insights into swine raising practices in Misamis Occidental, Philippines. The predominant swine raisers in the region were approximately 41 years old, predominantly male (69.12%), married (95.59%), and hold college degrees (79.40%). A significant proportion (36.76%) was consistently employed their current breeding methods for over a decade. Across both backyard and commercial settings, the Large White breed emerged as the most favored bloodline, closely followed by Duroc and Landrace. Intriguingly, a substantial majority of respondents (91.17%) did not adhere to boar to sow ratio management, with only a minor fraction (4.41%) implementing a 1:10 ratio. Notably, respondents are commonly experienced a production rate of 6-10 piglets per sow (63.24%), with a substantial portion (27.94%) maintaining a total population of 15 heads or fewer. Perceived advantages of artificial breeding included the preference for superior breeders with a high genetic component. In contrast, natural breeding methods are regarded as more accurate, less laborious, and particularly useful when heat signs of the sow are detected. While respondents are generally encountered issues such as failure to detect estrus, low litter size at birth, low piglet survival rates, stillbirth, insufficient technical skills, and high breeding resource costs, statistical analysis was not significant differences between backyard and commercial raisers in terms of problems encountered (P=>0.05). Interestingly, a substantial portion of respondents (38.24%) did not avail any government interventions. Among those, environmental compliance certificates (23.53%) and government-sponsored training/seminars (22.06%) are found to be the most commonly utilized interventions. The study recommended the establishment of local swine breeding centers by the government to provide affordable services to swine raisers. This initiative is targeted to facilitate the adoption of innovative technologies that can reduce farm operating expenses while enhancing profitability for all interested stakeholders in the industry.

Keywords: Artificial insemination, Backyard, Commercial, Natural breeding, Swine raisers

[*] **Corresponding Author:** Villaver, J. P.; **Email:** jepoy_villaver@yahoo.com.ph

Introduction

The swine industry in Misamis Occidental, Philippines, is marked by a dynamic landscape where swine raisers employ both natural breeding and artificial insemination (AI) technologies. Boar travelers and AI technicians actively engage in providing breeding services to local swine raisers, leading to a competition between the two methods. Some raisers favor AI, while others adhere to the natural breeding method for personal reasons.

AI, as noted by Ioanis *et al.* (2000) and Ichikawa and Koketsu (2011), offers a technique that enables the use of fresh or frozen semen from selected boars, reducing the incidence of inbreeding and enhancing the genetic component in the swine breeding herd. This technology also contributes to cost reduction by minimizing the number of boars required on the farm. Despite its advantages, AI faces challenges in the community due to its higher management requirements, the need for well-trained service providers, specialized equipment, and a longer timeframe compared to natural services.

Conversely, natural breeding is prevalent among backyard swine raisers due to the widespread availability of boars in the locality, as communicated by F.M. Palangan (personal communication, January 14, 2021). While this method offers advantages, including accessibility, issues arise concerning the size disparity between boars and sows during mating, leading to potential injuries. Aggressive boar behavior further poses risks to sow and handler safety. Notably, the "AI sa barangay" project sponsored by the Agricultural Training Institute has brought AI technology closer to swine raisers through learning sites. However, government attention and intervention are crucial to addressing the broader needs of swine breeding services in Misamis Occidental.

Government interventions, including production loans, insurance, training, and seminars, are essential for enhancing livestock sector output, as emphasized by Maharjan and Fradejas (2005) and Patr *et al*. (2014). These interventions address issues such as disease spread, low animal performance due to improper breeding practices, and the lack of good breeding boars. Practical solutions involve promoting cleanliness, implementing AI, adopting bio-security measures, engaging in disease control, and participating in educational seminars. Additionally, government initiatives, such as purchasing quality breeding stocks, establishing small swine breeding centers, applying AI techniques, and conducting free seminars, can significantly contribute to overcoming these challenges.The research aimed to benchmark the best breeding practices adopted by swine raisers in Misamis Occidental, providing valuable insights for government interventions.

Materials and methods

The research employed a descriptive method to comprehensively capture data and information pertaining to the breeding practices of swine raisers. This design facilitated the exploration of advantages, problems encountered, and government interventions associated with various breeding methods, particularly distinguishing between backyard and commercial swine raisers.

The study was conducted in the province of Misamis Occidental, encompassing ten municipalities and two cities: Sapang Dalaga, Baliangao, Calamba, Lopez Jaena, Aloran, Panaon, Jimenez, Sinacaban, Tudela, Clarin, Oroquieta City, and Ozamis City. The sample included 40 backyard swine raisers and 28 commercial swine raisers, identified based on the Provincial Veterinary Office (PVO) list, resulting in a total of 68 valid respondents in each municipality/city, as summarized in Table 1.

Table 1. Data on swine raisers and sample numbers in each location

Municipality/City	Swine raisers	Swine population
Sapang Dalaga	5	226
Baliangao	4	127
Calamba	7	747
Lopez Jaena	6	297
Oroquieta City	4	800
Aloran	9	650
Panaon	4	42
Jimenez	10	1,114
Sinacaban	1	65
Tudela	4	182
Clarin	13	5,712
Ozamis City	1	1,538
Total	68	11,500

Source: Provincial Veterinary Office of Misamis Occidental (calendar year August 2020)

The data collection involved face-to-face interactions utilizing a structured survey questionnaire organized into four parts. Part 1 focused on demographic information, including age, sex, civil status, educational attainment, training attended, and organizational affiliation. Part 2 delved into breeding practices, encompassing the current method used, years of implementation, breeds employed, boar to sow ratio, piglets per sow, and overall swine population.Part 3 aimed to gauge the perceived advantages of the respondents' current breeding method, employing a five-point Likert scale for interpretation: very high (5), high (4), average (3), low (2), and very low (1). Meanwhile, Part 4 addressed problems

encountered using a similar Likert scale, with interpretations ranging from very serious (5), and to not a problem (1). The final section, Part 5, centered on government interventions, capturing respondents' experiences with such initiatives.

To ensure clear comprehension, the survey inquiries were clarified to participants in their native language during the interview. Following this, the researchers gathered and amalgamated the filled-out questionnaires for a meticulous analysis and interpretation. Descriptive statistical methods, including frequency counts, percentages, ranks, and weighted means, were utilized to offer a thorough and precise understanding of the collected data.

Results

Respondents' profile

The demographic and educational background of swine raisers in Misamis Occidental offered valuable insights into their profile. A substantial 79.41% of respondents fall into the 41 years and above age category, indicating a seasoned and experienced group. Additionally, 20.59% were within the 28-39 years age range, contributing to a diverse range of age groups involved in swine raising activities. The prevalence of mature individuals suggested a well-established and experienced swine industry in the region.

In terms of gender distribution, the study showed that 69.12% of respondents were male, emphasizing a predominant male presenced in the swine-raising sector in Misamis Occidental. However, it was noteworthy that 30.88% of respondents were females, signifying a significant and noteworthy participation of women in this field. The inclusion of women brought diversity to the sector and highlighted the inclusive nature of swine-raising activities.

Marital status was a key aspect of the respondents' profile, with a substantial 95.59% of swine raisers being married. The small percentage of respondents who are widowed (2.94%) or single (1.47%) underscored the prevalence of family-oriented structures within the swine-raising community. This marital status distribution indicated a familial and cooperative approach to swine farming, aligning with the often family-centric nature of agricultural activities.

Education emerges as a key factor influenced the profile of swine raisers as 79.40% of respondents who graduated from college, signifying a well-educated cohort within the industry. A smaller but was still noteworthy proportion of 16.17% who completed from high school, while 4.41% were graduated from elementary school. This educational diversity underscored the

varied backgrounds and knowledge levels of individuals engaged in swine raising.

Considering the importance of continuous learning in agricultural practices, it was notable that a significant majority of respondents of 77.94%, did not attend any training related to the swine industry. In contrast, 22.06% was actively participated in training activities, indicating a subset of swine raisers who are proactive in seeking knowledge and skills enhancement.

Organizational affiliation was a relatively uncommon trait among the respondents, with only 1.47% reporting membership in any swine-raising-related organization. This indicated that being part of such organizations was not a prevailing practice among swine raisers in the surveyed region.

The profile of respondents portrayed a mature, mainly male, and married cohort of swine raisers, with a considerable portion having completed a college education. The findings underscored notable disparities in training participation and organizational affiliations within the community, offering a comprehensive snapshot of the diverse backgrounds of individuals engaged in swine raising in Misamis Occidental.

Table 2. Profile of the respondents

Profile	Backyard	Commercial	Frequency	Percentage
Age				
28 – 39 yrs. old	9	5	14	20.59
41 yrs. old and above	31	23	54	79.41
Sex				
Male	25	22	47	69.12
Female	15	6	21	30.88
Civil status				
Single	-	1	1	1.47
Married	39	26	65	95.59
Separated	-	-	-	-
Widowed	1	1	2	2.94
Educational attainment				
Elementary graduate	3	-	3	4.41
High school graduate	10	1	11	16.17
College graduate	27	27	54	79.40
Trainings attended				
Not attended	31	22	53	77.94
Attended	9	6	15	22.06
Organizational affiliation				
Not affiliated	40	27	67	98.52
Affiliated	-	1	1	1.47

Breeding methods and practices

The shed light on the prevailing swine breeding methods and practices among respondents, providing valuable insights into their preferences and operational strategies is presented in Table 3. The majority of swine raisers constituted 53% of the respondents, adhered to natural breeding methods. A smaller percentage was 8.82%, practices artificial insemination, while 13.23% adopted a combination of both natural and artificial insemination. This distribution implies that a substantial portion of swine breeders in the study area still adheres to traditional breeding methods, with a notable reliance on natural mating.

Examining the duration of preferred breeding methods, 36.76% of respondents are practiced their chosen method for more than ten years, indicating a sustained commitment to their established practices. A significant proportion, 29.41%, falls within the 4-to-6-year range, while 26.47% had practiced for three years, and 7.35% for 7-to-9 years. This diversity in practice duration suggested a range of experience levels among swine raisers in Misamis Occidental.

The large white breed emerged as the predominant choice among swine raisers at both backyard and commercial levels, with an overwhelming 83.82% preference. Duroc and landrace breeds are also exhibited substantial usage, with percentages of 79.41% and 63.23%, respectively. This breed distribution reflected the popularity and preference for specific genetic lines within the local swine-raising community.

A significant majority of respondents, 91.17%, did not actively practice boar to sow ratio management. Only a minimal percentage was 4.41%, followed by a 1:10 boar to sow ratio. This lack of active management suggested that many swine raisers may not be implementing specific strategies to optimize breeding ratios in their operations.

The respondents commonly encountered 6-10 piglets per sow, representing 63.24% of the cases. Additional proportions included 11-13 piglets at 25% and 14-16 piglets at 11.76%. These figures are provided valuable insights into the typical litter sizes experienced by swine raisers in the region.

Swine raisers in Misamis Occidental exhibit varied herd sizes, with 27.94% maintaining a total population of at least 15 heads. Other population brackets included 16-30 heads at 23.53%, 31-60 heads at 19.11%, above 121 heads at 17.64%, and 61-120 heads at 13.23%. This diversity underscored the range of scale and operational sizes within the swine-raising community.

The interpretation of breeding methods and practices highlighted a prevailing reliance on natural breeding methods, a diverse range of operational durations, and a clear preference for specific swine breeds. The findings also

underscored areas where active management, such as boar to sow ratio, was less commonly implemented among swine raisers in Misamis Occidental.

Table 3. Breeding methods and practices of the respondents

Breeding methods and practices	Backyard	Commercial	Frequency	Percentage
Breeding methods				
Artificial insemination	2	4	6	8.82
Natural breeding	36	17	53	77.94
Both artificial and natural breeding	2	7	9	13.23
Number of years				
3 years and below	10	8	18	26.47
4 - 6 years	12	8	20	29.41
7 - 9 years	3	2	5	7.35
10 years and above	15	10	25	36.76
Breeds used				
Landrace	19	24	43	63.24
Large white	33	24	57	83.82
Duroc	20	24	44	64.71
Boar to sow ratio				
Not practiced	40	22	62	91.17
1:10	-	3	3	4.41
1:13	-	1	1	1.47
1:30	-	1	1	1.47
1:100	-	1	1	1.47
Piglets per sow				
6 – 10	28	15	43	63.24
11 – 13	6	11	17	25.00
14 – 16	6	2	8	11.76
Swine population				
1-15	19	-	19	27.94
16-30	15	1	16	23.53
31-60	6	7	13	19.11
61-120	-	9	9	13.23
More than 121	-	11	11	17.64

Respondents' perceived advantages to artificial insemination

A comprehensive view of the swine raisers' perceptions regarding the advantages associated with the artificial insemination method is presented in Table 4. Notably, respondents consistently rated the method as highly advantageous, with an overall mean of 3.85, reflecting a collective acknowledgment of its benefits.

Swine raisers, both in backyard and commercial settings, expressed a unanimous assessment, rating "high" for all items related to artificial insemination. This uniformity is responsed an underscore of the widespread recognition of the method's merits among the respondents.

A standout aspect was the perception of artificial insemination bringing a high genetic component from a superior breeder, with a remarkable weighted value of 4.46. Respondents assigned a "very highly advantageous" rating to this statement, highlighting the perceived excellence in enhancing the genetic quality of the swine population through artificial insemination.

Swine raisers considered artificial insemination as cost-effective, disease-free, and capable of maintaining accurate breeding records. The weighted values ranged from 3.59 to 3.89, indicating a consensus among respondents that these aspects are highly advantageous. The recognition of cost-effectiveness aligned with the economic considerations of swine breeding, emphasizing the potential for reduced expenses and improved resource allocation through artificial insemination.

Respondents are also acknowledged the method's advantages in terms of being hassle-free and less dangerous, particularly in mating animals of different sizes. The weighted values for these aspects fell within the range of 3.59 to 3.89, further emphasizing the perceived ease and safety associated with artificial insemination practices.

The swine raisers in both backyard and commercial contexts consistently attributed high advantages to the artificial insemination method. The exceptional genetic component, coupled with considerations of cost-effectiveness, disease prevention, accurate record-keeping, and safe mating practices, collectively contribute to the method's positive reputation among the respondents. The results are strongly suggested an inclination towards embracing artificial insemination as a preferred breeding technique in the studied community.

Table 4. Perceived advantages of the respondents to artificial insemination

Items	WAM	Interpretation
Cost-effective	3.8	High
High genetic component from a superior breeder	4.46	Very high
Disease-free	3.59	High
Accurate breeding records	3.79	High
Hassle-free	3.66	High
Less dangerous	3.87	High
Makes possible mating of animals with differences in sizes	3.8	High
Overall mean	3.85	High

Notes: 4.20-5.00 (very high); 3.40-4.19 (high); 2.60-3.39 (average); 1.80-2.59 (low); 1.00-1.79 (very low); WAM – weighted arithmetic mean

Respondents' perceived advantages to the natural breeding method

The valuable insights into the swine raisers' perceptions regarding the advantages associated with the natural breeding method is illustrated in Table 5. Both commercial and backyard respondents consistently described natural breeding as "highly advantageous," with a notable weighted mean of 4.09, particularly emphasizing the accuracy of this method.

Swine raisers, whether in commercial or backyard settings, uniformly expressed a substantial advantage in terms of the accuracy of natural breeding. The robust consensus is indicated by a weighted mean of 4.09, underscores the high confidence among respondents in the precision of this method for achieving successful breeding outcomes.

Another notable advantage is highlighted by respondents pertains to the perceived ease of handling boars in natural breeding. This finding suggested that swine raisers, in both commercial and backyard contexts, value the practicality and efficiency of the natural breeding process, particularly in the management of boars.

Furthermore, swine raisers acrossed both commercial and backyard sectors viewed natural breeding as highly advantageous in addressing the challenge of silent heat in sows. This perceived effectiveness in resolving reproductive challenges contributed to the positive overall perception of the natural breeding method among respondents.

The swine raisers in both commercial and backyard sectors are consistently regarded natural breeding as highly advantageous, emphasizing its accuracy, efficiency in boar handling, and efficacy in addressing reproductive challenges. The collective assessment implies a widespread consensus among swine raisers regarding the effectiveness and positive attributes of natural breeding in their operations.

Table 5. Perceived advantages of the respondents to natural breeding methods

Items	WAM	Interpretation
More accurate	4.09	High
Less laborious	3.75	High
Useful when heat signs of females cannot be easily detected	3.76	High
Overall mean	3.87	High

Notes: 4.20-5.00 (very high); 3.40-4.19 (high); 2.60-3.39 (average) 1.80-2.60 (low); 1.00-1.79 (very low); WAM – weighted arithmetic mean

Problems encountered

The challenges faced by both backyard and commercial breeders are elucidated in Table 6, where the overall data suggested that these issues are

perceived at an average level. The comprehensive assessment is underscored by the overall mean of 2.81, falling within the interpretation of an average level of severity.

Table 6. Problems encountered by the breeders

Problems	WAM	Interpretation
1. Failure to detect estrus	2.83	Average
2. Low litter size at birth	3.39	Average
3. Low number of piglets born alive	3.03	Average
4. Stillbirth	3.35	Average
5. Low number of piglets survive until weaning	2.59	Low
6. Swine abortion	2.59	Low
7. Lack of equipment/tools	2.14	Low
8. Lack of technical skills	2.69	Average
9. High costs of breeding resources	2.7	Average
Overall Mean	2.81	Average

Notes: 4.20-5.00 (very serious); 3.40-4.19 (serious); 2.60-3.39 (average); 1.80-2.59 (less serious); 1.00-1.79 (not a problem); WAM – weighted arithmetic mean

Backyard and commercial breeders shared a common perspective, considering the encountered problems as having an average impact on their operations. The range of weighted means from 2.69 to 3.39, indicated a consistent perception across a variety of challenges, including failure to detect estrus, small litter size at birth, low number of piglets born alive, stillbirth, lack of technical skills, and high cost of breeding resources.

Issues such as failure to detect estrus, indicative of challenges in identifying the optimal mating period, were perceived at a moderate level of concern. Similarly, concerns about small litter size at birth, a low number of piglets born alive, stillbirth occurrences, the need for enhanced technical skills, and the financial burden associated with high breeding resource costs fell within the average range of severity.

On the other hand, problems related to a low number of piglets that survived until weaning, swine abortion, and the lack of necessary equipment and tools were considered as low severity concerns. It suggested that, while these challenges exist, they are perceived as having a relatively lower impact on the breeders' overall operations.

Collectively, the breeders, both backyard and commercial, view the encountered problems as having a moderate impact on their swine-raising activities. The overall mean of 2.81 provided a quantitative reflection of this moderate assessment.

In summary, the interpretation of the problems encountered by backyard and commercial breeders indicates a consistent perception of challenges at an

average level of severity. The range of concerns, spanning issues related to reproductive management, technical skills, and resource constraints, collectively contributes to the breeders' understanding of the operational hurdles in swine-raising activities in Misamis Occidental.

Test for significant difference between the backyard and commercial raisers in their perceived problems encountered

The analysis sought to identify significant differences between backyard and commercial raisers in their perceived problems encountered as presented in Table 7. However, the statistical examination did not yield any significant differences, as indicated by a p-value greater than 0.05.

The absence of significant differences implied that both backyard and commercial raisers face nearly identical levels of problems and uncertainties in managing their swine industry. It suggested a comparable landscape of challenges across these two sectors, reinforcing the notion that the issues encountered by swine raisers were not significantly influenced by the distinction between backyard and commercial operations.

The outcome underscored the shared nature of challenges experienced by both backyard and commercial raisers. Despite potential variations in scale and operational scope, the absence of statistical significance implied that the perceived problems, ranging from reproductive challenges to technical skill constraints, exhibit a unified pattern across the studied groups.

The result signified that there was no discernible difference in the problems encountered by backyard and commercial raisers. This harmonizes in the context of swine raising in Misamis Occidental, both sectors contend with similar challenges and fostering sensed of unity in the face of common operational uncertainties.

Understanding that both backyard and commercial raisers confront akin challenges carried important implications for industry management and intervention strategies. Rather than segmenting efforts based on operational scale, a holistic approach that addresses to share those challenges can be more effective in supporting and enhancing the overall swine industry in the region.

In summary, the statistical analysis indicated that there were not significant differed in the perceived problems encountered by backyard and commercial raisers. This finding contributed to a unified understanding of challenges within the swine industry in Misamis Occidental, facilitating more targeted and collaborative approaches for industry management and improvement.

Table 7. Test for significant difference between the backyard and commercial raisers in their perceived problems encountered

Problems Encountered	Farm Classification										CHISQ. Test	P=value
	Commercial Rating Scale					Backyard Rating Scale						
	1	2	3	4	5	1	2	3	4	5		
1. Failure to detect estrus	0	11	14	3	0	2	12	14	12	0	5.45	0.14
2. Low litter size	0	2	9	16	1	1	9	11	17	2	4.03	0.40
3. Low number of piglets born alive	0	6	10	12	0	1	13	16	9	1	4.41	0.35
4. Stillbirth	0	2	15	11	0	1	5	13	20	1	4.05	0.40
5. Low number of piglets survived until weaning	1	8	16	3	0	4	16	17	3	0	2.46	0.48
6. Swine abortion	2	9	12	5	0	5	17	12	6	0	1.78	0.62
7. Lack of equipment/ tools	2	19	7	0	0	3	30	7	0	0	0.57	0.75
8. Lack of technical skills	0	13	14	1	0	2	11	23	4	0	4.17	0.24
9. High cost of breeder materials	0	13	11	4	0	0	17	18	4	1	1.14	0.77

Government interventions

A comprehensive overview of government interventions in both commercial and backyard swine farming, shedding light on the extent to which respondents are availed themselves of various programs (Table 8). The analysis revealed noteworthy patterns and preferences among swine raisers in Misamis Occidental.

Approximately 32.24% of respondents, totaling 26 out of 68, were not received any government interventions, indicating a segment of swine raisers who may not have actively sought or participated in government-sponsored programs. It pointed to potential areas for outreach and engagement to ensure wider coverage and participation in beneficial initiatives.

Among the government interventions, the issuance of environmental compliance certificates standed out as the most availed, with 23.53% of respondents who obtained this certification. Similarly, government-sponsored training or seminars garnered substantial participation was 22.06% of respondents benefitting from these educational initiatives. It suggested a recognition among swine raisers of the value of both environmental compliance and ongoing education in optimizing their farming practices.

A smaller percentage of respondents engaged in other government interventions, such as animal insurance, swine dispersal, and a loan program, with proportions of 8.82%, 4.41%, and 2.94%, respectively. While these interventions had lower uptake, they represented a diverse avenue through which the government supported and enhanced swine farming activities in the region.

The mention of training and seminars underscored the role of knowledge dissemination in government interventions. These initiatives served as platforms for farmers and swine raisers to share and learned best management practices in swine production. The emphasis on simplicity in processing techniques further aligned with the objective of empowering farmers with practical skills for successful pig farming.

In summary, the interpretation of government interventions in swine farming in Misamis Occidental revealed a mixed landscape. While a portion of swine raisers did not avail themselves of government programs, there was a notable emphasis on environmental compliance certificates and training/seminars. It indicated a potential avenue for targeted interventions and underscored the significance of ongoing education in advancing swine farming practices in the region.

Table 8. Government interventions for swine raisers

Intervention	Backyard	Commercial	Frequency	Percentage
Swine dispersal	2	1	3	4.41
Loan program	1	1	2	2.94
Insurance	3	3	6	8.82
Government-sponsored training or seminar	9	6	15	22.06
Environmental compliance certificate	2	14	16	23.53
Not availed any intervention	23	3	26	38.24
Total			68	100%

Discussion

The decision of swine breeders to affiliate with organizations involved in animal breeding holds implications for the adoption of new practices and

innovations. Affiliation can introduce breeders to additional information and alternative practices, potentially influencing their willingness to embrace change. The hesitance observed in some breeders might stem from a lack of effective communication strategies to encourage affiliation with these organizations. Strengthening communication channels could enhance collaboration between breeders and organizations, fostering a more dynamic exchange of knowledge and practices.

The role of boars in swine breeding is pivotal, influencing both genetic diversity and reproductive outcomes. Whitney *et al*. (2010) emphasized the significance of boars in breeding programs, noting their impact on farrowing rates and litter sizes. However, the cost associated with acquiring a good-quality boar, especially for breeders with limited gilts, remains a substantial barrier. Lapus (2009) highlighted the prevalence of backyard swine farming in the Philippines, underscoring the need for improved rearing practices and enhanced biosecurity measures to mitigate infection risks in these one-site systems.

The decision between natural and advanced breeding methods fundamentally relies on a breeder's comprehension of the physiological functions of the reproductive system, as emphasized by Vicencio *et al.* (2017). Artificial insemination, an evolving technology, presents advantages in terms of safety and genetic control, especially when aiming to produce high-quality breeds without direct boar involvement. However, its successful implementation demands well-trained personnel. In contrast, natural breeding retains its merit due to its accuracy, particularly in scenarios where the heat signs of the sow are unpredictable.

In addressing broader challenges within swine farming, Danao (2012) identified issues encompassing disease occurrence, high feed costs, waste disposal, and market instability. Montsho and Moreki (2012) further delineated challenges, including inadequate slaughter facilities, poor breeding stocks, and insufficient extension service programs. These challenges underscore the multifaceted nature of problems encountered by swine raisers, emphasizing the necessity for comprehensive management, selection, and sanitation practices.

Government interventions, such as insurance, training, and seminars, emerge as critical elements for enhancing existing practices and ensuring production continuity, particularly in the face of unforeseen disease occurrences. Continuous training and seminars are underscored as indispensable tools for knowledge acquisition in swine raising (Guzman, 2015). The active involvement of veterinarians and technical experts is paramount in averting failures in project implementation and fostering the overall success of swine production initiatives.

This study provided valuable insights into the breeding practices, challenges, and interventions in swine farming in Misamis Occidental,

Philippines. The findings emphasized the importance of communication, knowledge dissemination, and targeted interventions to enhance the swine industry's sustainability and productivity in the region. The integration of advanced technologies, such as artificial insemination, must be accompanied by a focus on education and training to ensure successful implementation and improved outcomes for swine raisers. Moreover, collaborative efforts between breeders, organizations, and government agencies are found to be essential to address the diverse challenges and foster a resilient and thriving swine industry in the region.

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