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Knowledge, Attitudes, and Practices of Native Pig Raisers: Exploring Coconut-Based Ration Utilization in the Zamboanga Peninsula Region, Philippines

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Abstract
Aim: This study aims to describe the socioeconomic profile of native pig raisers (NPR), assess their knowledge, attitudes, and practices (KAP) towards the utilization of coconut-based feedstuffs, determine the relationship of socioeconomic profile and KAP, and determine the differences of KAPS of NPRs in the Zamboanga Peninsula Region.
Methodology: This study employed quota sampling, semi-structured questionnaires, and face-to-face interviews for data collection. It used descriptive statistical analysis, Pearson's correlation analysis, and one-way analysis of variance set at an alpha 0.05 level of significance.
Results: The study revealed that the NPRs' profile revealed predominance of middle-aged married females with low levels of formal education and income, primarily engaged in personal business as their main source of income, and relatively new to native pig raising. Mostly cultivated coconut and banana as main crop, and using coconut dregs, freshly grated coconut, corn bran, and rice bran as cheap feed ingredients, feeding thrice daily and occasionally providing Kang-Kong (*Ipomea aquatica* L.), and using fish scraps as protein source for backyard-raised native pigs in the region. The key challenges of NPRs include high feed costs, unavailability of formulated feeds, and lack of technical support.
Conclusion: Despite strong positive attitudes towards the utilization of coconut-based feedstuffs, NPRs have limited knowledge of the nutritional benefits and occasionally use coconut-based feedstuffs in their feeding practices. There is a weak positive correlation between educational attainment and the monthly income, while significant differences in the KAPs were observed in the NPRs among the provinces in the Zamboanga peninsula region.

Keywords: Coconut-based ration, Native pig, Knowledge, Attitudes, and Practices (KAP), freshly grated coconut, coconut dregs, coconut by-product, Zamboanga Peninsula

INTRODUCTION

Agriculture is the backbone of the Philippine economy, providing a source of income for over half of the population and driving national development forward (Armenia et al., 2016; Nonan et al., 2024). In rural communities, swine raising stands out as a vital enterprise, not just for its economic benefits but also for its cultural significance. Swine contributes significantly to agricultural output, making up 12.7% of the total, and is a staple in many Filipino households, with the majority raised in backyard settings (Armenia et al., 2016; Nonan et al., 2024). Despite its importance, the swine industry faces challenges such as declining backyard operations due to commercialization and high feed costs, which account for a substantial portion of production expenses (Gallardo et al., 2023; Villanueva & Sulabo, 2018; De Castro, 2019).

The Philippines is also renowned for its coconut production, with millions of hectares dedicated to this crop. As of mid-2023, coconut farming covered 3.62 million hectares, producing 3.41 million metric tons, a notable increase from the previous year (PSA, 2023). Coconut by-products offer a promising solution for swine feed,

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providing a cost-effective and sustainable alternative that can help bridge the gap between swine production and economic viability (Villanueva & Sulabo, 2018). This synergy between coconut and swine farming supports food security and the livelihoods of countless rural families (De Castro, 2019), contributing significantly to the country's agricultural GDP (Nonan et al., 2024). However, challenges persist. Native pig raisers face low productivity (De Castro, 2019) and limited access to technical support, which hampers their ability to thrive (Villanueva & Sulabo, 2018; Muth et al., 2020). High feed costs, comprising about 70% of total production costs, limit the development of native pig production (Villanueva & Sulabo, 2018; De Castro, 2019). Socioeconomic factors, market forces, and government interventions also play a crucial role in the success of native pig production (Zulueta, 2018).

Various research has shed light on the socio-demographics and management practices of swine raisers across the Philippines, conducted by Armenia et al. (2016), Zulueta (2018), Villanueva and Sulabo (2018), Gallardo et al. (2023), Ordanel et al. (2024), among others. Moreover, prior work was conducted by Geromo (1993); however, this survey was a pre-COVID-19 pandemic and the ASF outbreak in the region. Considering the wider gap between the prior work and the recent study, the current author proposed that there remains a significant gap in understanding the needs and challenges of native pig raisers in the Zamboanga Peninsula region since the recent work was done during the post-pandemic period. Moreover, the knowledge, attitudes, and practices towards the utilization of coconut-based feedstuffs have not been documented, despite being practiced in the region. This lack of information hinders a comprehensive understanding of their role in sustainable agriculture and rural development. Addressing this knowledge gap is critical for supporting native pig conservation and enhancing the livelihoods of local native pig farmers. Hence, this study.

Objectives

The objectives of the study are the following:

1. Describe the socioeconomic profiles, feeding practices, and the feeding-related challenges faced by native pig raisers in the region;
2. Determine the relationship between socioeconomic profile and the KAP of the native pig raisers in the region; and
3. Determine the differences in the knowledge, attitudes, and practices KAP of native pig raisers among the provinces in the region.

Hypothesis

Based on the research problem stated, the following hypotheses were tested at alpha 0.05 level of significance:

Hypothesis 1: There is no significant association between the socioeconomic profile and the knowledge, attitudes, and practices of NPRs in the region.

Hypothesis 2: There is no significant difference in the knowledge, attitudes, and practices (KAP) of native pig raisers among the provinces in the region.

METHODS

Study Area

The municipalities were selected based on coconut production obtained from the Philippine Coconut Authority, predominantly with Christian populations, accessibility by transportation, and stable peace and order conditions. Moreover, the barangays were chosen using lists of pig raisers provided by the City Veterinarians' Office within the overall study area, as shown in Figure 1 (*next page*).

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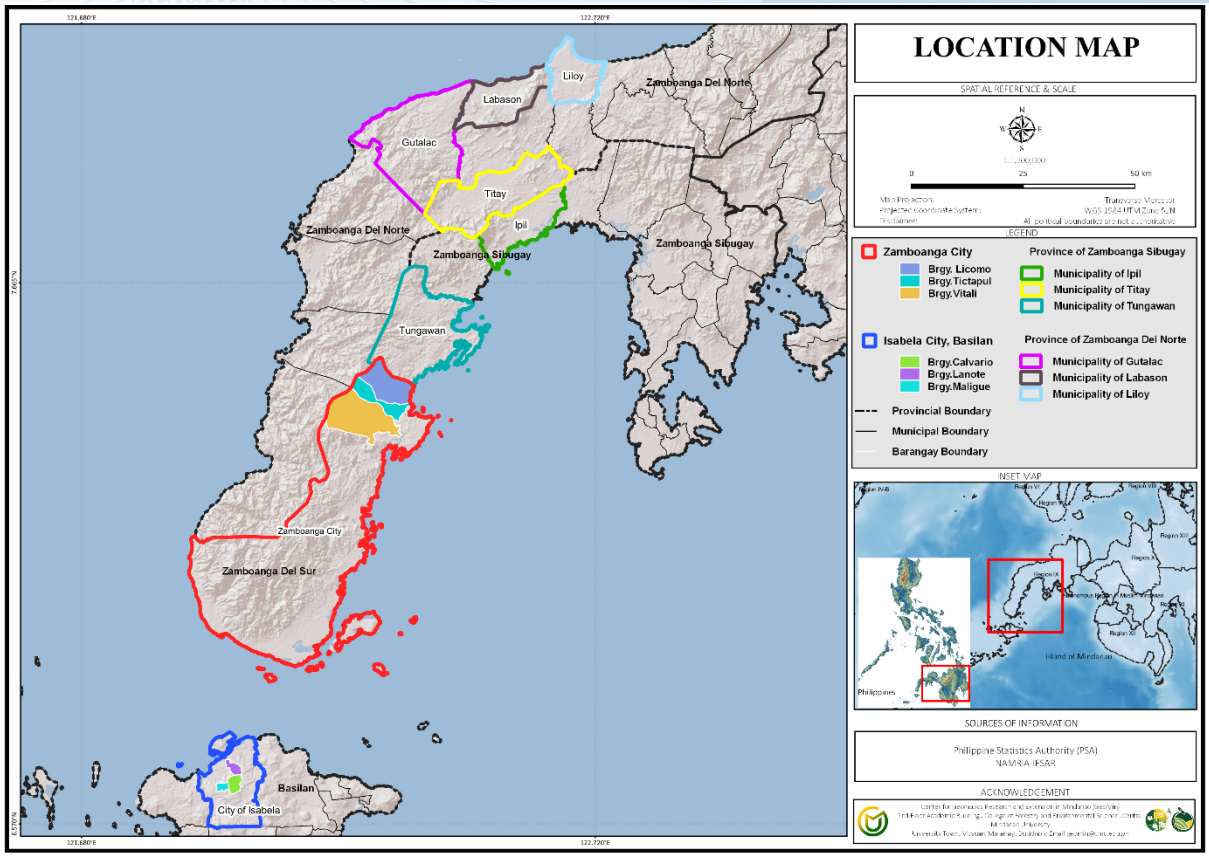

Figure 1: Map of Zamboanga Peninsula Region (R-IX), Philippines, showing the whole study area.

Research Design

This study employed a descriptive research design to evaluate the knowledge, attitudes, and practices of native pig farmers in the Zamboanga Peninsula.

Population and Sampling

The participants comprised farmers who were actively engaged in backyard native pig raising during the survey period with a minimum inventory of one head with at least one year of experience, regardless of the system of swine production used, as reflected in Table 1.

On the other hand, this study adopted the quota sampling technique in determining the sample size. Due to the scarcity of backyard native pig raisers following the African swine fever (ASF) outbreak, the researchers established a quota of 30 native pig raisers per province. The quota ensured the availability of participants of the study in the different provinces. This study covered four major survey sites with 120 native pig raisers (NPR) identified as participants.

Table 1. Distribution of participants of the study

PROVINCE	SAMPLE SIZE
Isabela City, Basilan	30
Zamboanga City, Zamboanga del Sur	30
Zamboanga Sibugay	30
Zamboanga del Norte	30
Total	120

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Instrument

This study used a semi-structured survey questionnaire that consisted of personal and socioeconomic profiles, feeding practices, knowledge, attitudes and practices (KAP), and problems encountered by the NPRs related to feeding. The questionnaire was drafted in English to ensure universality and comprehensibility. Subsequently, it was translated into the local dialect to facilitate understanding among local participants and field enumerators.

The questionnaire underwent validation, including both expert and internal validity tests. The validated survey questionnaire was pre-tested in a place outside of the study sites, where scores were subjected to reliability analysis using Cronbach's Alpha, yielding a result of 0.89, indicating good internal consistency.

Data Collection

This study used a survey questionnaire and face-to-face interviews to collect information and other pertinent data relevant to the study. The collected data includes personal and socioeconomic profiles, knowledge, attitudes, and practices (KAP), feeding frequency, and challenges encountered.

Data Analysis

The data collected were collated, coded, and tabulated using Microsoft Excel and analyzed following the study's objectives. Descriptive statistics, including frequency counts, means, ranks, and percentages, were employed to describe the personal and socioeconomic profiles of the NPRs, feeding practices, and challenges encountered using SPSS version 20 as a statistical package.

The KAP was described using the Likert scale, where 5 is the highest and 1 is the lowest. Moreover, the relationship between the KAP and the personal and socioeconomic profiles was analyzed using Pearson's Correlation. Finally, the one-way analysis of variance was used to determine the differences in the KAPs of the NPRs. All statistical tools were set at an alpha 0.05 level of significance.

Ethical Considerations

This study was conducted with an approved permit granted by the Institutional Ethics Review Committee of Central Mindanao University bearing IERC control number 1230 s. 2024. Moreover, the participants received an orientation about the purpose of the research, tokens, and provided signed informed consent to signify voluntary participation before the conduct of the actual interview process. Ultimately, it was ensured that they could withdraw anytime if they felt discomfort during the interview process.

RESULTS and DISCUSSION

Personal and Socioeconomic Profile

The personal and socioeconomic profiles, including the feeding practices of Native Pig Raisers (NPR) in the Zamboanga Peninsula, are shown in Table 2. The result revealed that NPRs were predominantly aged 38–55 years, with a mean age of 48.65 years, indicating they are within the "prime working" and middle-age groups, capable of performing labor-intensive tasks in native pig production. The oldest and youngest raisers are aged 77 and 20 years, respectively.

The native pig raisers (NPR) in the region have an average age of 48.65 years, with most (57 participants) falling within the "prime working age" range of 25–54 years (Wood et al., 2016). This average also aligns with the "middle age" bracket of 40–59 years (Horng et al., 2001). Similar patterns were observed among pig raisers in Salavan, Lao PDR (Lormaisim et al., 2021), and *Sinirangan* native pig raisers (Ordanel et al., 2024). The predominance of middle-aged individuals highlights their pivotal role in pig farming due to their ability to combine experience and energy for efficient farm management and knowledge transfer to younger generations. However, younger individuals are increasingly absent from the practice. According to Wood et al. (2016), "prime-age" individuals are typically strong workforce participants, and their declining involvement may signal economic challenges. These findings raise concerns about the sustainability and generational continuity of native pig farming in the region.

In terms of gender and marital status, females dominated this sector, accounting for 76% of NPRs, with 84% being married. This reflects substantial female involvement and empowerment, where women contribute significantly to family income through backyard native pig raising.

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The industry also demonstrates significant involvement by women, consistent with findings from Ahmed et al. (2017), Gallardo et al. (2023), and Nonan et al. (2024). This trend indicates the empowerment of women in managing pig farming for income generation (Patel et al., 2016) and emphasizes their capacity to contribute equally to household livelihood. Traditionally, males are seen as primary breadwinners engaging in fieldwork (Nonan et al., 2024; Falculan, 2021), while females manage household chores, including pig feeding (Zulueta, 2018). For middle-aged women, caregiving and motherhood reinforce their sense of identity (Selvaraj & Sandaran, n.d.). These dynamics highlight gender roles within the native pig industry and the vital contributions of women. In contrast, Villanueva and Sulabo (2018) attributed this pattern to the physically demanding nature of swine raising, which men tend to dominate.

Most NPRs in the region are married, consistent with Armenia et al. (2016), Villanueva and Sulabo (2018), Falculan (2021), Nonan et al. (2024), and Ordanel et al. (2024). Marriage appears to motivate individuals to engage in pig farming as a supplementary income source (Mesia et al., 2018). Factors such as poverty, limited farm size, and a desire to increase profits often drive families to manage pigs, a practice similarly noted in Bangladesh (Nahar et al., 2013; Ritchil et al., 2013). Married respondents prioritize earning and saving for their families, treating backyard pig raising as the "piggery bank" of Filipino households (Armenia et al., 2016). Unlike in some countries, NPRs do not rely solely on pig raising as their primary income source; rather, it serves as a supplemental livelihood (Islam et al., 2021).

Concerning the main source of income and monthly income, 20% of NPRs engaged in personal businesses as their main source of income, and more than half (58%) of them were earning between 2,000–7,599 PHP monthly, with a mean income of 8,537.50 PHP, which is below the regional and national averages. This implies a marginalized economic status that restricts scalability and inventory improvements in native pig production.

NPRs primarily rely on personal businesses for income, indicating limited dependence on farming as their major source of livelihood. Their lower incomes may stem from limited educational opportunities, restricting access to stable white-collar jobs. Islam et al. (2021) reported that over half of pig raisers lacked literacy, limiting their employment prospects in private or government sectors. Consequently, they engage in low-income jobs and backyard pig raising as a "piggy bank" (Armenia et al., 2016). Arifin (2020) emphasized the simultaneous impact of education and income levels on poverty rates, suggesting that NPRs diversify their income sources to sustain their households. Mesia et al. (2018) noted a similar trend among pig raisers in Western Pangasinan, where pig farming serves as supplementary income. However, contrasting findings from Villanueva and Sulabo (2018), Ordanel et al. (2024), and Nonan et al. (2024) indicate some raisers rely on agricultural production for their primary income.

In terms of monthly income, NPRs in the region generally fall into the lower-income bracket, with an average of 8,537.50 PHP. This is notably below the national average monthly income of 22,250.00 PHP (PSA, 2024) and the regional average of 19,000.00 PHP (PSA-R-IX, 2022). Ritchil et al. (2013) reported similar findings in Assam, India, where pig raising is predominantly undertaken by poor and landless individuals. Such income disparities emphasize the economic struggles of native pig raisers, aligning with studies by Armenia et al. (2016), Falculan (2021), and Gallardo et al. (2023).

The educational attainment remains low among NPRs, with 39% achieving only elementary education, 20% graduated, and 19% did not complete elementary levels. This limited educational background presents a constraint to adopting modern agricultural technologies. Thus, it poses a potential struggle with advancements in nutrition balancing, health care management, record keeping, and profitability accounting, essential aspects of sustainable native pig farming.

Educational attainment among NPRs in the region is relatively low, mirroring findings from Villanueva and Sulabo (2018), Falculan (2021), Nonan et al. (2024), and Ordanel et al. (2024). However, these results contrast with Armenia et al. (2016), Mesia et al. (2018), Gallardo et al. (2023), and Ahmed et al. (2017). Lower levels of education hinder the adoption of advanced farming techniques. Research by Mignouna et al. (2011) highlights the influence of education on farmers' willingness to adopt innovations, supported by Khanum et al. (2018) and Umeh et al. (2015). Islam et al. (2021) found that illiterate pig raisers face profitability challenges compared to their educated counterparts. Education enhances farmers' ability to interpret and apply essential knowledge, influencing decisions to adopt new technology (Gallardo et al., 2023).

The experience levels of NPRs in the region vary widely. The result revealed that 45% of NPRs raising pigs for 1–8 years, averaging 13 years overall. The result suggests that the native pig industry in the region has long been practiced but predominated by novice practitioners in the recent survey. The presence of raisers with up to 40 years of experience suggests a generational transfer of skills and traditional knowledge, while the minimal involvement of

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younger raisers (20 years old) is indicative of a threat to the sustainability of traditional enterprise. Could be due to the advent of information technology, which they found native pig raising unattractive.

The native pig industry in Region IX is also characterized by the predominance of novice raisers with an average of 13 years of experience. Most NPRs have between 1–8 years of farming experience, consistent with Gallardo et al. (2023), who noted similar trends among raisers in Northern Negros. Limited experience often correlates with financial challenges, as income levels dictate the ability to sustain or expand operations. Perey (2016) found that financial constraints occasionally force hog farmers to suspend operations. Gallardo et al. (2023) reported that respondents in their study admitted that insufficient income prevents them from expanding and sometimes compels them to cease farming activities. Therefore, the prevalence of inexperienced raisers increases concerns about the stability and growth of the native pig industry.

In terms of crops grown, coconut and bananas are the primary crops cultivated by NPRs, grown by 71% and 64%, respectively. These crops were selected due to their versatile applications and serve as integral components of the native pig diet. Moreover, coconut meat and its by-products and plant residues are readily available feed resources in the area. This implies that NPRs employ these crops together with livestock farming to supplement incomes. This result suggests that NPRs rely on conventional feeding methods rather than adopting modern approaches.

The NPRs in the region demonstrated a positive attitude toward the use of coconut-based feedstuffs (CBF), considering its practicality in reducing production costs and increasing profit margins. Islam et al. (2021) explained that such feeding systems often arise due to limited input availability or a need to maximize profits, with similar practices documented in traditional pig farming in Bangladesh. Despite their belief in the benefits of CBFs, NPRs face knowledge gaps regarding its effects on meat quality, influencing their feeding practices. Similar methods were observed by Lormaisim et al. (2021), Ordanel et al. (2024), Mesia et al. (2018), and Armenia et al. (2016), who documented the use of leftover food, vegetable peelings, and fruit scraps for swine feed. As described, swine are omnivorous and adaptable animals capable of consuming a wide variety of feeds, including kitchen waste (Armenia et al., 2016). Pig raisers in Bangladesh and India sourced waste from restaurants, composed of rice, fish, meat, and vegetables, either free of charge or at minimal cost (Khan et al., 2014; Rahman et al., 2008). These practices align with swine's dietary flexibility (Wang et al., 2013).

Feeding practices among NPRs in the region are resourceful but lack consistency, with coconut dregs used by 75%, and freshly grated coconut (65%), rice bran (62%), and corn bran (63%). They occasionally provide Kang-Kong (*Ipomea aquatica)* herbage (72%) and use fish scraps as a protein source, utilized at 41% by NPRs.

The feeding frequency of NPRs in the region varies, with 66% of them feeding pigs thrice daily, while the remaining feed twice daily. This implies that NPRs employ optimal feeding schedules but inconsistent application of feeding strategies. The employment of indigenous feeding methods that were inherited from foreparents reflect a reliance on ancestral knowledge without significant advancements. This implies an inadequacy of technical knowledge on NPRs as a result of the "nonavailability of technical support," as indicated in Table 4.

Feeding frequency among NPRs in the region is typically three times daily, with 65% adhering to this schedule. This pattern is consistent with findings by Patr et al. (2014) and Rahman et al. (2008), who reported similar practices in other pig-raising communities (Islam et al., 2021). Supplemental feeding often includes Kang-Kong (41%) and fish scraps (41%). Kang-Kong grows abundantly in rice fields and swamp areas in the region, providing a practical and affordable source of fresh herbage, while 38% of NPRs use sweet potato vines, which are commonly planted in backyards for household consumption. About 33% of raisers incorporate Ipil-Ipil (*Leucaena leucocephala*) leaves, mirroring the findings of Mesia et al. (2018). These supplemental practices reflect NPR's resourcefulness in utilizing available vegetation and minimizing feed costs.

Table 2. Personal and socioeconomic profiles and feeding practices of native pig raisers in the Zamboanga peninsula region

Parameters	***Frequency***	***Percentage (%)***
Age		
20 – 37 yrs. old	26	22
38 – 55 yrs. old	57	48
56 – 73 yrs. old	35	29
74 – 91 yrs. old	2	2

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Youngest raiser (yrs. old)	20	
Oldest raiser (yrs. old)	77	
Mean age (yrs. old)	48.65	
Sex		
Female	91	76
Male	29	24
Marital status		
Married	101	84
Not married	19	16
Educational attainment		
Elementary level	23	19
Elementary graduate	24	20
High school level	25	21
High school graduate	20	17
College level	16	13
College graduate	11	9
With masters' units	1	1
Main source of income		
Personal business	24	20
Others	24	20
Agri-crop farming	21	18
Animal farming	18	15
Hired labor	14	12
Government employment	8	7
Self-employment	6	5
Private employment	5	4
Monthly income (PHP), 2024		
2,000.00 – 7,599.00	69	58
11,600.00 – 17,199.00	23	19
9,600.00 – 11,599.00	14	12
7,600.00 – 9,599.00	8	7
17,200.0 – 22,799.00	3	3
22,800.00 – 28,399.00	2	2
28,400.00 – 33,999.00	1	1
Lowest income level (PHP)	2,000.00	
Highest income level (PHP)	30,000.00	
Mean monthly income (PHP)	8,537.50	
Number of years in native pig-raising		
1 – 8 yrs.	55	46
9 – 16 yrs.	31	26
17 – 29 yrs.	12	10
25 – 32 yrs.	13	11
33 – 40 yrs.	9	8
Shortest native pig-raising experience (yr.)	1	
Longest native pig-raising experience (yrs.)	40	
Mean number of years in native pig raising (yrs.)	13	
Crops grown*		
Coconut	85	71
Banana	77	64
Corn	32	27
Cassava	41	34
Sweet potato	41	34
Taro	30	25

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Rice	12	10
Feedstuffs used*		
Coconut dregs	90	75
Freshly grated coconut	78	65
Corn bran	75	63
Rice bran	74	62
Banana pseudostem	52	43
Vegetable scraps	46	38
Taro leaves	44	37
Cassava tubers	15	12
Herbage used*		
Kang-Kong vines	87	72
Sweet potato vines	45	38
Ipil-Ipil leaves	39	32
Madre de Agua	12	10
Spinach vines	2	2
Protein sources*		
Fish scraps	49	41
Scrap dried fish	44	37
Fish offal	34	28
Fish meal	11	9
Slaughter by-products	5	4
African snails	2	2
Frequency of feeding		
Thrice a day	78	66
Twice a day	42	34
Frequency of giving herbage		
Seldom/occasional	34	28
Not giving at all	20	17
Thrice a week	23	19
Everyday	19	16
Twice a week	10	8
Once a week	8	7
Once a day	4	3
Thrice a day	2	2

*Multiple response.

Knowledge, Attitudes, and Practices (KAP) of pig raisers on the utilization of coconut-based feedstuffs for native pigs

The NPRs' knowledge, attitudes, and practices in the Zamboanga peninsula is reflected in Table 3. The results revealed an overall mean of 1.65, which means that NPRs in the region were slightly knowledgeable about the benefits of coconut-based feedstuffs (CBFs) and its effect on the meat quality of native pork. The lower score implies that native pig raising has long been practiced in the region by their foreparents, which forms the indigenous knowledge that was subsequently transferred down from generations and serves as the NPRs' initial knowledge in this practice without any advancement. This suggests that the knowledge of the NPRs in the region was substantially indigenous, where the utilization of CBF was driven by its availability and firsthand knowledge. According to Villanueva and Sulabo (2018) the knowledge about native pig enterprise is mainly a product of an individual's interaction with family, friends, and his community (Artiza et al., 2022). This study proposes the need for targeted training programs to bridge the knowledge gaps and empower NPRs with the technical information required to optimize the use of CBFs in native pig farming.

The attitudes of NPRs towards the use of coconut-based feedstuffs in the region are shown in Table 3. The result revealed a mean of 3.58, which means strong. This implies that the NPRs in the region exhibited a strong positive attitude towards the incorporation of CBFs in their feeding practices, despite the slightly knowledgeable

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result indicated in the former table (Table 3). Thus, the NPRs in the region strongly believe in the potential of CBF to deliver positive growth to their native pigs and maximize profit margin as indicated in the table, particularly in indicators a, b, d, and e. Their enthusiasm and receptiveness to CBF utilization suggest they recognize its potential benefits, presenting an opportunity for extension workers to promote and regulate sustainable adoption through advocacy and consistent interventions.

The feeding practices of NPRs in the region are presented in Table 3. The result revealed that the feeding strategies of NPRs remain inconsistent, with occasional application resulting in an overall weighted mean score of 3.01, which means occasionally practiced. While the incorporation into their own-mixed ration was frequently practiced, CBFs were occasionally practiced, including the use of swill feeding posing a threat to ASF contamination nowadays. This suggests that the practices of NPRs in the region are purely conventional without any advancement. The lack of adoption of improved practices in native pig raising appears to stem from limited access to relevant information and essential services that support this enterprise. According to Villanueva and Sulabo (2018), the practice of raising native pigs is a tradition handed down from parents to their children. Furthermore, the knowledge related to this activity largely stems from an individual's interactions with their family, friends, and community. This variability proposes the need for standardized approaches. Enhanced technical support promoting a safety feeding guide, coupled with accessible resources, can help NPRs adopt consistent practices and ultimately improve productivity.

Table 3. Knowledge, attitudes, and practices of native pig raisers towards the utilization of coconut-based ration in the Zamboanga peninsula region (R-IX)

	INDICATORS	WEIGHTED MEAN	DESCRIPTIVE RATING
KNOWLEDGE			
a.	I know that freshly grated coconut pulp is a good source of fats.	2.18	Slightly knowledgeable
b.	I know freshly grated coconut pulp has a higher fat content than coconut dregs.	1.88	Slightly knowledgeable
c.	I know that feeding a higher amount of coconut meat will downgrade the meat quality of native pigs.	1.84	Slightly knowledgeable
d.	I know that freshly grated coconut meat has a higher fat content than copra meal.	1.70	Slightly knowledgeable
e.	I know that coconut dregs have a higher amount of crude fiber than freshly grated coconut pulp.	1.69	Slightly knowledgeable
f.	I know that the fat content of meat greatly influences the flavor profile of roasted pigs.	1.69	Slightly knowledgeable
g.	I know that the type of coconut-based feedstuff highly influences the fatty acid composition of the native pig meat.	1.58	Slightly knowledgeable
h.	I know that the kind of fat deposited by the native pigs depends on the kind of fats being ingested.	1.42	Not knowledgeable
i.	I know that using copra meal feedstuff is more advantageous than using freshly coconut pulp feedstuff.	1.33	Not knowledgeable
j.	I am knowledgeable about the appropriate amount of coconut meat in native pig ration.	1.22	Not knowledgeable
	OVERALL MEAN	1.65	Slightly knowledgeable
ATTITUDES			
a	I believe that feeding my native pigs with coconut meat will make them grow bigger	4.49	Strong
b.	I believe that feeding my native pigs with coconut meat will make them heavier	4.48	Strong
c.	I believe that educating the native pig raisers about the		

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	benefits of using coconut-based feedstuffs will improve the local native pig feeding practices	4.40	Strong
d.	I project that the utilization of coconut meat will help lessen the feeding cost	4.05	Strong
e.	I project that feeding coconut meat to native pigs will gain more profit than commercial feeds	4.03	Strong
f.	I believe that feeding coconut meat is a maintainable practice for native pig-raising	3.26	Moderate
g.	I believe that feeding coconut meat will not affect the market acceptability of the roasted native product	3.21	Moderate
h.	I believe that feeding native pigs with high amount of coconut pulp will not affect the meat quality of native pigs	2.77	Moderate
i.	I believe that feeding coconut pulp will improve the palatability of roasted native pig product	2.70	Moderate
j.	I believe that feeding a higher amount of coconut pulp will decrease the taste acceptability of roasted native products	2.40	Weak
b.	I believe that feeding my native pigs with coconut meat will make them heavier	4.48	Strong
	OVERALL MEAN	3.58	Strong
PRACTICES			
a.	I incorporate corn bran in native pig ration	3.62	Frequently practiced
b.	I mix my ration for native pigs	3.54	Frequently practiced
c.	I incorporate rice bran in native pig ration	3.37	Occasionally practiced
d.	I incorporate freshly grated coconut in native pig ration	3.28	Occasionally practiced
e.	I cook plant-based materials as feed for native pigs.	3.12	Occasionally practiced
f.	I feed "swill/leftover" to my native pigs.	3.03	Occasionally practiced
g.	I incorporate coconut dregs in native pig ration.	3.02	Occasionally practiced
h.	I feed fresh herbage to my native pigs in between meals.	2.93	Occasionally practiced
i.	I use root crops as an alternative feed for native pigs.	2.30	Rarely practiced
j.	I incorporate fish meal in native pig ration	1.91	Never practiced
a.	I incorporate corn bran in native pig ration	3.62	Frequently practiced
b.	I mix my ration for native pigs	3.54	Frequently practiced
	OVERALL MEAN	3.01	Occasionally practiced

Legend: Knowledge: 4.51–5.0 Extremely knowledgeable; 3.51–4.50 Very knowledgeable; 2.51–3.50 Moderately knowledgeable; 1.51–2.50 Slightly knowledgeable; 1.00–1.50 Not knowledgeable at all; Attitudes: 4.5–5.0 Very strong; 3.51–4.50 Strong; 2.5 –3.50 Moderate; 1.51–2.50 Weak; 1.00–1.50 Very weak; Practices: 4.51–5.0 Always practiced; 3.51–4.50 Frequently practiced; 2.51–3.50 Occasionally practiced; 1.51–2.50 Rarely practiced; 1.00–1.50 Never practiced.

Challenges of native pig raisers on feeds and feeding

Native pig raisers (NPR) face significant challenges that hamper production efficiency indicated in Table 4. The results show that high feed costs remain the most pressing issue, ranked as top 1, compounded by the limited availability of formulated feeds specifically designed for native pigs. Insufficient capital and financial resources make it difficult for NPRs to invest in better practices or technologies. Limited technical assistance and the high cost of protein sources ranked as the 5th that further aggravates the challenges, negatively affecting pig nutrition and growth performance. These findings align with those reported by other livestock raisers, who identified high feed cost, insufficient capital, and limited technical knowledge as the primary challenges hindering native pig enterprise.

Native Pig Raisers (NPR) face numerous challenges, with the escalating costs of feed emerging as the most critical constraint. This issue is consistent with the findings of Ordanel et al. (2024) and Artiza et al. (2022), who reported similar struggles among pig farmers raising exotic sows in Infanta, Quezon. These farmers referred to feed expenses as "a significant challenge," further corroborating the earlier observations of Callo-Etis (2015), as cited in

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Ordanel et al. (2024). Similarly, Ahmed et al. (2017) highlighted comparable challenges in Assam, India, underscoring the global prevalence of this economic barrier in pig farming practices.

In addition to feed costs, a lack of financial resources for capital investment remains a critical constraint. Villanueva and Sulabo (2018) found that inadequate capital was the most common problem faced by 28.8% of pig farmers in the Philippines. Artiza et al. (2022) reported comparable findings in Agusan del Sur, where 24% of respondents cited financial limitations as a major obstacle. Moreover, Muth et al. (2020) emphasized the negative impact of insufficient investment on pig farmers in Infanta, Quezon. These challenges align with the observations of Muhanguzi et al. (2012), as cited in Artiza et al. (2022), who identified feed costs and capital inadequacy as persistent barriers in livestock enterprises.

Another significant issue is the lack of technical support. Studies by Lormaisim et al. (2021) and Ahmed et al. (2017) revealed that pig farmers in Lao PDR and Assam, India, respectively, struggled due to limited access to technical knowledge. These findings are consistent with those of Villanueva and Sulabo (2018), Ordanel et al. (2024), and Artiza et al. (2022), who attributed these gaps to insufficient training programs and inadequate extension services.

Table 4. Challenges encountered by native pig raisers on feeds and feeding

PROBLEMS ENCOUNTERED	FREQUENCY*	(%)	RANK
a. High feed cost	109	91	1
b. Unavailability of formulated feeds for native pigs in the market	97	81	2
c. Lack of finance	93	78	3
d. Nonavailability of technical support	87	72	4
e. High cost of protein source	60	50	5
f. Nonavailability of protein source	45	38	6
g Availability of root crops as alternative feeds	34	28	7
h. Nonavailability of herbage	22	18	8
i. Nonavailability of feedstuffs	21	17	9
j. Nonavailability area for planting alternative feed	19	16	10

*Multiple response.

The relationship between the socioeconomic factors and the KAP of native pig raisers

Table 5 shows the results of the correlation analysis between the Kaps and the socioeconomic factors of native pig raisers in the region. The results show that the educational attainment shows a significant positive correlation with KAP (r=0.206; p=<.05), indicating that higher education enhances the ability to adopt advanced farming techniques. Similarly, the main source of income is positively correlated with KAP (r=0.186; p=<.05), suggesting that financially stable NPRs are better equipped to invest in innovative practices and technologies. Similar findings reported that both limited education and lower income can drive poverty. Low literacy levels hindered their ability to secure employment in private or government offices. Consequently, they were confined to various low-income jobs, reflecting trends observed globally, including in Bangladesh (Maharjan et al., 2005; Toppo et al., 2016). Illiteracy remains a challenge in the pig industry, as research indicates that educated pig farmers achieve higher profits compared to their uneducated counterparts (Khanum et al., 2018; Umeh et al., 2015).

Table 5. Results of correlation analysis between the KAP and the socioeconomic factors of native pig raisers

FACTORS	CORRELATION COEFFICIENT	P- VALUE
Age	.129	.162^{ns}
Gender	-.037	.689^{ns}
Marital Status	-.064	.491^{ns}
Highest Educational Attainment	.206	.024*
Main Source of Income	.186	.042*
Monthly income	.082	.374^{ns}

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Native pig farming experience	.139	.146^{ns}

*significant at α 0.05 level of significance; ^{ns}-nonsignificant.

Differences of KAP in the Zamboanga Peninsula Region

Table 6 highlights significant differences ($p < 0.01$) in KAP levels among NPRs across provinces in the Zamboanga Peninsula. Similarities in KAP levels were observed between NPRs in ZDS, ZS, and B, as well as ZS and ZDN, likely driven by geographical proximity, as shown in Figure 1 of this study. Conversely, geographical distances contributed to variations in KAP, as evident between ZDS and B compared to ZDN. According to Vlajčić et al. (2019), cultural intelligence plays a vital role in knowledge transfer performance, with geographical distance moderately affecting reverse knowledge transfer but showing no significant impact in conventional knowledge transfer.

NPRs in ZS and ZDN exhibited similar KAP levels, while ZDS and B showed high KAP similarities in utilizing coconut-based feedstuffs. These patterns likely stem from shared geographical proximity, as depicted in Figure 1. Differences in KAP across provinces are influenced by factors such as education, income, and geographical connectivity. Regions with greater educational attainment and resources scored higher in KAP, while geographically connected provinces shared practices due to access to common resources and infrastructure.

As indicated in the table (Table 2), native pig raising in this region is predominantly carried out by women. This variability in KAP may be linked to limited access to education for urban farming women in earlier periods when women were often excluded from schooling. Trauger et al. (2008) highlighted the underrepresentation of women in agricultural education and technical assistance. However, Jayakumar & Surudhi (2015) documented significant progress in gender equality, with women's participation in agricultural courses reaching near parity. Over the past four years, women's enrollment, growth, and academic achievements in agriculture have surpassed those of men, marking a positive shift in the sector.

Table 6. Difference in the KAPs of native pig raisers among the provinces in the region

PROVINCE	MEAN
Zamboanga del Sur (ZDS)	31.26^{a}
Zamboanga Sibugay (ZS)	27.29^{ab}
Zamboanga del Norte (ZDN)	23.29^{b}
Basilan (B)	30.99^{a}
Grand Mean	28.21
CV (%)	8.16
p-value	0.000**

Note. Means with the same letter are not significantly different; **-highly significant at alpha 0.05 level of significance.

Conclusions

Based on the results of the study, the authors concluded that the native pig industry in the Zamboanga peninsula region is predominated by middle-aged married females with low levels of formal education and income, primarily engaged in personal business as their main source of income, and relatively new to native pig raising. Mostly cultivated coconut and banana as main crop, and using coconut dregs, freshly grated coconut, corn bran, and rice bran as cheap feed ingredients, feeding thrice daily and occasionally providing Kang-Kong (Ipomea aquatica L.), and using fish scraps as protein source for backyard-raised native pigs in the region. The NPRs are frequently challenged with high feed costs, unavailability of formulated feeds, and lack of technical support.

The study further concluded that the Native Pig Raisers (NPR) in the Zamboanga Peninsula region show strong positive attitudes towards the utilization of coconut-based feedstuffs (CBFs), recognizing their potential for growth and profitability. However, limited technical knowledge and reliance on traditional practices hinder advancements in their feeding methods. Inconsistent conventional feeding strategies further highlight the need for harmonization and modernization.

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Recommendations

It is recommended to address these issues through standardized feeding practices for native pigs, targeted training, increased extension visits, and accessible resources that can empower NPRs, improving productivity and ensuring the sustainability of native pig farming.

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