

AN ANALYSIS OF THE PERSONAL ENTREPRENEURIAL COMPETENCIES (PECS) OF DAIRY BUFFALO FARMERS IN SAN AGUSTIN, ISABELA, PHILIPPINES

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ABSTRACT

This research, employing the Personal Entrepreneurial Competency (PEC) framework, sought to identify the entrepreneurial competencies of 137 dairy buffalo farmers in San Agustin, Isabela, the Crossbred Carabao Capital of the Philippines. The study also investigated whether the PECs of dairy buffalo farmers vary based on their group (e.g., cooperative and association) memberships. Understanding the PECs of the farmers is crucial as it informs targeted efforts to enhance specific skills and aids in designing effective interventions to bolster the crossbred dairy buffalo farming industry in the Philippines. The study revealed that the dairy buffalo farmers demonstrated one strong PEC, six moderate PECs, and three weak PECs. Competency and goal setting emerged as the highest-scoring PEC and the sole strength of the San Agustin dairy buffalo farmers. Conversely, the farmers showed weak competencies in taking calculated risks, maintaining high standards for quality and efficiency, and demonstrating persuasion and networking. The Mann-Whitney U Test further indicated that 4 PECs of group members' farmers significantly differ from group non-members. The results underscore the potential for enhancing PEC scores of dairy buffalo raisers through membership in dairy farmers' cooperatives and associations, thereby offering practical insights for the industry.

Keywords: *Cooperative, dairy farmers, group membership, Mann-Whitney U Test, personal entrepreneurial competencies*

INTRODUCTION

The Philippines remains a net importer of milk and other dairy products. Dairy farming in the country generally involves raising cattle, buffalo, and goats to produce milk and milk-processed products. Throughout the last decade, the Philippines dairy farming industry has shown sluggish growth and inadequate production volume, leading to a significant gap between the local demand and supply of milk and other milk derivatives. For instance, the Department of Agriculture - National Dairy Authority (DA-NDA) reported in 2023 that the industry had a total volume of milk production of 2,930 MT, which declined by 13% based on the previous year (2022). This level of dairy production contributed to agricultural livestock production of the Philippines by only 0.39% at current prices in 2023. It was also reported by the Department of Science and Technology - Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (DOST-PCAARRD) that the country is only producing 1% of the 2.5 billion litres of demand for milk. Out of this total milk production, dairy cattle contributed 62%, while carabao (buffalo) had 28%, and 10% came from goat (DA-NDA, 2023).

The same trend is observed in the national dairy industry and the dairy buffalo farming industry. This is not surprising because dairy buffalo farming supplies a significant volume of the local milk supply in the country. San Agustin, Isabela in the Philippines is coined as the country's Carabao's Crossbred Capital, having 1,672 crossbred dairy buffaloes and producing 6,378.2 litres of milk as of February 2023. Most of the milk produced in the municipality is sold to Sadaco Multipurpose Cooperative (Sadaco), a dairy farmer's cooperative in San Agustin primarily selling milk and dairy processed products. However, despite the opportunity to expand production given the large demand and supply gap of milk in the country, the dairy buffalo farming industry has faced a declining trend of farmers engaging in dairy farming since 2013 due to a variety of issues in the production and marketing of milk (Sadaco, 2023).

Given these issues and constraints, several initiatives were implemented to develop the local dairy carabao industry. In 2016, the DOST-PCAARRD and Philippine Carabao Center (PCC) project entitled “Strengthening the San Agustin Crossbred Carabao – Based Enterprise Development (CBED) Model” was implemented to strengthen and improve the economic activity of dairy buffalo farmers in Isabela. The project aimed to increase the productivity, production efficiency, and product quality of dairy in San Agustin and contribute effectively towards increasing the income of the participating dairy buffalo farmers. In addition, the Department of Science and Technology - Region 2 (DOST–Region 2) piloted a program in 2021 named “Community Empowering through Science and Technology (CEST)” to encourage enterprise development and improve the livelihood of dairy buffalo farmers in Cagayan Valley Region. Through the CEST program in 2021, DOST-Region 2 provided Php 500,000 to these dairy buffalo farmers for product development, packaging, and training in dairy farming. Further, the Department of Agriculture’s - Philippine Rural Development Project (DA-PRDP) also provided equipment and cash assistance to dairy buffalo farmers in San Agustin through Sadaco. Some of the processing machines that DA-PRDP provided were “electric blenders, milking machines, refrigerated vans, ice cream makers and incubators (DA–PRDP, 2018)”. Despite these initiatives and various support from the Local Government Units (LGUs) and some universities, the engagement of farmers in establishing enterprises remains low. The dairy buffalo farmers are also the target recipients of the DOST-Region 2 CEST program and the CBED program assistance to improve their livelihood. Moreover, the government officials from the governor’s and municipal offices of San Agustin expressed their support to dairy buffalo farmers, believing in the potential of their budding industry. These programs encouraged dairy buffalo farmers to engage in entrepreneurship or establish businesses to increase their income.

The local government officials and other government agencies, such as PCC and DOST-PCAARRD, have expressed their intentions to assist the dairy buffalo farmers in the past. They actively seek ways to revitalise the industry and continue the enterprise building in San Agustin. However, before further assisting these farmers in undergoing entrepreneurship, it is essential to assess the dairy buffalo farmers’ entrepreneurial competencies first to unfold their strong and weak points for proper interventions.

On the other hand, the CBED Program was introduced in the municipality of San Agustin in 2010 through the partnership between the Philippine Carabao Center (PCC) and the local government unit. This program aimed to increase milk output nationally and enhance the livelihood of carabao farmers by utilising carabaos in dairy farming. The program also established a central milk processing facility managed by Sadaco. However, research conducted by Del Barrio et al. (2020) revealed that the 13 dairy associations established under the CBED Program had become inactive. In response, Dr Del Barrio initiated efforts to revitalise the dairy associations in 2016, marking the beginning of a renewed phase of the CBED project.

According to Sadaco (2022), no study in San Agustin, Isabela has yet evaluated the personal entrepreneurial competencies of dairy buffalo farmers. There was a study conducted by Dela Cruz et al. in 2023 about the analysis of the PECs in the province of Nueva Ecija, Philippines; however, it was focused on dairy entrepreneurs. Therefore, assessing the competencies of the dairy buffalo farmers in San Agustin, Isabela, is very relevant to boost their entrepreneurial activities and eventually become their stable source of income.

An analysis that focuses on the personal entrepreneurial competencies of dairy farmers is important for proper industry intervention and future research, especially for the Crossbred Buffalo Capital of the Philippines. Hence, this study seeks to give a short overview of the value of the dairy industry in the Philippines and show the potential for growth of San Agustin, Isabela's Dairy Buffalo Industry. In addition, the research wants to review the literature about PECs, farmers' entrepreneurial competencies and group membership. Further, the study assesses the strength of San Agustin, Isabela's dairy buffalo farmers' entrepreneurial competencies and analyses their association with their group membership, such as dairy association and cooperative. Furthermore, based on its results, the paper aims to provide recommendations to boost the dairy buffalo industry. Moreover, the research can also help current and future government projects to craft proper interventions to encourage more enterprise development and encourage future researchers to conduct further studies about this industry.

Literature Review

The Concept of Entrepreneurship

Entrepreneurship is taking risks by exploring and establishing business opportunities to produce innovative ideas to solve a problem and hoping to gain profit (Parthasarathy et al., 2011). Peter Bryant (2015) also defined entrepreneurship as identifying opportunities to create, innovate, and offer new value products to people. He also characterised an entrepreneur as a person who practices establishing a business or who bears risks in creating new products and services. On the other hand, Parthasarathy et al. (2011) described entrepreneurs as creative and innovative, and they recognise opportunities to develop new products that can improve the lives of their target customers. This was supported by Sobel (2018), who said that entrepreneurs “organise, manage and assume the risk of the business or enterprise.” Also, entrepreneurs are said to maximise resources to produce innovative output for society. Sobel further recognised the value of entrepreneurs, saying that they serve an important role in any country by utilising their competencies, seeking opportunities, and bringing new ideas and products.

Entrepreneurship Trends in the Philippines

Entrepreneurship is becoming popular in the Philippines. A study conducted by OCTA Research found that 81% of Filipinos would want to start their businesses if given proper training on establishing them. Filipinos also think that starting their businesses can allow them to earn more income and support their families' needs (Global Entrepreneurship Monitor, 2014). This, however, contradicts the case of the local dairy buffalo farmers in San Agustin, Isabela. According to Sadaco (2022), farmers' low engagement in entrepreneurship is still evident despite all the support programs provided by the government. Based on interviews, farmers' primary role solely focuses on milk production and supplying raw milk to Sadaco, their only market. This limited scope of operation may explain why farmers are less inclined to explore entrepreneurial opportunities.

The Concept of Agripreneurship

Farmers can also be entrepreneurs by starting their businesses. Gupta (2017), for instance, reported that farmers can manage an agribusiness enterprise effectively, but they need the necessary competencies to become successful. It was also added that farmers (farmer-entrepreneurs) must consider their target market and take calculated risks to thrive.

Bairwa et al. (2014) described agripreneurship as a profitable union between agricultural practices and entrepreneurial ventures. This concept transforms a farm into an agribusiness. Agripreneurship, synonymous with agriculture in entrepreneurship, pertains to creating business ventures within the agricultural and related sectors. Arumugam and Manida (2023) similarly defined agripreneurship as the integration of “agriculture” and “entrepreneurship. The process infuses agricultural endeavours with entrepreneurial strategies and innovative concepts. This modern take on agriculture not only increases production but also plays a crucial role in improving the economy of rural areas.

On the other hand, Addo (2018) defines agripreneurship as recognising and seizing opportunities in the agricultural and food domains, which may include challenges, concepts, or market gaps. It includes dedicating resources to innovate or improve products, services, or procedures in response to these opportunities while also considering the risks and potential advantages, tangible or intangible.

Personal Entrepreneurial Competencies (PECs) as Measure of Entrepreneurial Capabilities

Bird (1995) defined entrepreneurial competency as a person's inherent character that can help build a successful business venture. It encompasses various aspects such as motives, traits, skills, self-image, knowledge, and proper motives/traits that a person must excel in their entrepreneurial endeavours. People's competencies in entrepreneurship can be measured through Management System International's (MSI) Personal Entrepreneurial Competencies (PECs) assessment tool.

The MSI questionnaire is a self-assessment tool to determine how well an individual demonstrates and lives the identified PECs. Knowing people's strengths and weaknesses in the PECs can help them capitalise on their strengths and improve on their weak points. According to MSI, 10 PECs are important for starting a new business, as given below.

Opportunity seeking - This competency believes entrepreneurs identify business opportunities and take proactive steps to capitalise on them. They go beyond mere recognition and actively establish their businesses.

Persistence - With this competency, entrepreneurs demonstrate resilience in the face of obstacles and do not easily give up. They remain steadfast even when faced with negative comments or scepticism discouraging investing in uncertain or risky business ventures.

Commitment to the work contract - The entrepreneurs assume complete accountability for their jobs. They actively participate alongside their workers to ensure the job is completed within the agreed-upon timeframe.

Demand for efficiency and quality - The entrepreneurs establish ambitious yet achievable benchmarks for themselves and find it challenging to compromise on those standards. They continuously seek ways to improve processes, enhance efficiency, and reduce costs.

Risk-taking - This competency demonstrates a willingness to embrace risks but does so with caution rather than as a reckless gambler. Entrepreneurs are inclined to undertake challenging tasks, fully aware that their knowledge, experience, and diligent efforts provide them with a reasonable opportunity for success.

Goal setting - Entrepreneurs recognise the significance of planning in fulfilling their strong drive for achievement. They actively set specific, clear, long-term, and measurable goals. They are cognizant that having clear objectives is instrumental in their pursuit of success.

Information seeking - To attain their planned goals, the entrepreneurs actively pursue learning and seeking relevant information concerning improving their products and giving value to their stakeholders. They seek advice from business and technical experts, consulting them for valuable insights.

Systematic planning and monitoring - Accomplished entrepreneurs engage in planning and diligently adhere to the plan by systematically monitoring the progress of activities and expected outcomes. Planning serves as a means for entrepreneurs to prevent costly errors and anticipate potential challenges. Monitoring involves verifying whether all aspects, including outcomes, are progressing according to the plan.

Persuasion and networking—Skilled entrepreneurs often possess persuasive abilities and can communicate and relate well with others. They exhibit natural leadership qualities and can influence others to align with their perspective, including financiers, suppliers, sources of information, and buyers.

Self-confidence—Entrepreneurs are characterised by strong trust and awareness of their capabilities. They believe in their ability to deliver their required tasks.

Entrepreneurial Competencies of Farmers

Limited studies have discussed the importance of personal entrepreneurial competencies in assessing the entrepreneurial activities of different individuals in the Philippines. First, Paladan (2021) evaluated the capacity of farmers from the Sagnay and San Jose provinces of Camarines Sur to establish a community business through their PECs. The researcher employed convenience sampling of 206 farmers, analysed their PECs, and determined their best and the least competencies. The study revealed that, on average, these farmers have a moderate strength of PECs. These farmers have the highest score in terms of risk-taking and the lowest score in terms of goal-setting. In addition, the researcher also found that self-confidence competency is positively related to age; male farmers have higher scores on persuasion competency, and prior experience in doing business leads to higher scores of competencies.

Secondly, Dela Cruz et al. (2023) studied the PECs of the dairy carabao entrepreneurs in Nueva Ecija to describe and profile their characteristics and competencies. The researcher interviewed 170 entrepreneurs through convenience sampling with the Philippine Carabao Center's assistance. The researcher grouped their respondents based on the classification of farms they manage: small-hold, family module, semi-commercial, and commercial. Then, the PECs of the respondents were ranked per classification. Results showed that only two competencies (persuasion and networking) got moderate scores, while the remaining ten competencies were strong for these dairy farm entrepreneurs.

Also, in their research, Romero and Nalangan (2023) analysed the PECs of 132 graduating business students from one Philippine university. They used Analysis of Variance (ANOVA) to compare the differences between the major programs of their business course, such as Marketing, Finance, Human Resource Management, and Business Economics. The result of ANOVA showed that all the 10 PECs did not have significant differences between the means of their major programs. Furthermore, they also found out that the highest-ranked PECs for their graduating students were goal setting (rank 1) and information seeking (rank 2). The lowest score was on risk-taking (rank 10) and persuasion and networking (rank 9).

Furthermore, Reyes et al. (2017) also used the Management Systems International assessment tool to study the PECs and entrepreneurial intentions of some students who are not taking a business course at one Philippine university. Analysing the students' PECs of the students, the Spearman rank correlation showed that eight of their competencies had positive relationships with entrepreneurial intentions after graduation. In addition, the Wilcoxon signed rank test also revealed that most of the competencies improved through the education intervention, as reflected in the student's pre-test and post-test.

Moreover, Depositario et al. (2011) studied the entrepreneurial traits of current and potential technopreneurs in different agriculture-based organisations. In this study, the researchers classify a competency as weak if it has an average score of less than or equal to 15, moderate strength from an average score of 16 -18, and strong competency for an average score greater than or equal to 19.

Entrepreneurial Competencies and Farmer's Performance

There is a promising opportunity for improvement in the performance of dairy buffalo farmers in the Philippines by enhancing their entrepreneurial competencies. This potential for growth, although yet to be fully explored, is underscored by research on rice and seaweed farmers in the country. For instance, Arellano and Delos Reyes's (2019) study on rice farming in the province of Laguna, Philippines, revealed that 50 per cent of the farmers needed stronger competencies in commitment to work contracts and opportunity seeking. The study also concluded that the positive determinants of technical efficiency for rice farmers in Laguna were composed of seven PECs, indicating a clear path for improvement.

Meanwhile, Dumilag et al. (2023) assessed the capacity of seaweed farmers in Sorsogon, Philippines, to undertake business ventures using the personal entrepreneurial competency (PEC) assessment test. The authors found that risk-taking and demand for quality and efficiency competencies indicated significant interactions with the educational attainment of seaweed farmers. It was also emphasised that entrepreneurial competencies among seaweed farmers might be improved by sharing tacit entrepreneurial knowledge, engaging in entrepreneurial education, and establishing and maintaining groups (cooperatives, clusters, or associations) to gain matched support from NGOs and the government.

Personal Entrepreneurial Competencies and Enterprise Performance

Mokbel Al Koliby et al. (2024) found that entrepreneurial competencies substantially impact manufacturing SMEs' innovation ability. These SMEs desire to be the first to market with innovative products, and their skills as entrepreneurs allow them to analyse the surroundings for high-quality business prospects. The study also discovered that entrepreneurial competencies have a strong direct impact on the long-term performance of manufacturing SMEs, providing a reassuring confirmation of the value of these competencies. These competencies enable SMEs to make crucial strategic decisions and execute actions that result in value-added products for their customers, instilling confidence in their long-term success.

In 2024, Soumena's research also explored the influence of entrepreneurial skills and Islamic business ethics on micro and small enterprises in Makassar. The study found that entrepreneurial competence, which encompasses skills, knowledge, attitudes, motivations, beliefs, values, personality traits, and cognitive abilities, is highly valued within the business community. This competence is significant as it provides entrepreneurs with the necessary expertise for effective business management and significantly enhances the success of micro and small enterprise operators, empowering them to manage their businesses effectively and inspiring confidence in their potential.

In a recent study that was carried out by Aulia et al. (2021), the authors investigated the influence that entrepreneurial traits have on the abilities and performance of business operations in the micro and small-scale coffee shop industries in Bogor. Their study investigated various personal and psychological characteristics, entrepreneurial talents such as managerial and decision-making abilities, and company performance measures such as profitability and sales volume. Data was collected from a sample of 60 coffee shops, chosen randomly, from February and June 2018. Results showed that individual characteristics exclusively influenced competencies in micro-scale models. In addition, the success of businesses was significantly influenced by the skills and abilities of entrepreneurs, regardless of their size.

Furthermore, Alam et al. (2016) studied the connection between entrepreneurial competencies and the development of innovative marketing strategies. Based on regression analysis, four out of six hypotheses show statistical significance. There is a moderate positive correlation between entrepreneurial competencies and the implementation of new marketing strategies. The study found that specific skills positively impact innovative marketing, while others can have a detrimental effect. According to this research, developing entrepreneurial skills can greatly enhance marketing innovation.

Group Membership and Farmers Performance

Studies have yet to analyse the relationship between group membership and the country's PEC scores of dairy buffalo farmers. However, several studies conducted in the past showed the positive impact of group (i.e., cooperative and association) membership and collective action in marketing (collective marketing) on farmers' performance (e.g., income, productivity) of local farmers.

The research by Okafor et al. (2024) highlighted the beneficial impacts of cooperative membership on the sustainability of farm businesses and the enhancement of food security within Anambra State. The study's findings indicate that being part of a cooperative can lead to a considerable increase in productivity, with members seeing an average rise of 1.279 units over non-members when other variables are accounted for. Regarding food security, cooperative members also observed improvement, averaging 0.699 units higher than those not in cooperatives. With these positive correlations, the study advocates for increased support and development of cooperatives, encouraging more farmers to become members. Additionally, it suggests further investment in agricultural research and adopting best practices to foster sustainable farming practices and food security.

Mina and Cuevas (2022) employed linear regression to analyse the effect of cooperative membership on the performance of dairy buffalo farmers in the Philippines. The authors concluded that cooperative membership positively correlates with dairy farmers' productivity and marketing efficiency. The study revealed the importance of cooperative presence in dairy farmers' livelihoods.

Further, Bachke (2019) investigated whether farmers' membership in an organisation benefits smallholder farmers in Mozambique. Using difference-in-difference estimators, the researcher found that organisation membership positively correlated with the farmers' marketed surplus and total income.

Link of Membership on Personal Entrepreneurial Competency (PEC) Development

Adekunle and Henson (2007) conducted a study to investigate the extent of entrepreneurship among microentrepreneurs in Nigeria. The study compared the entrepreneurial skills of cooperative members and non-members. The study's results indicated that individuals who were members of the given cooperative and societies in the research location exhibited higher entrepreneurial skills than those who were not. This can be attributed to these societies' readily available credit and interdependence. The entrepreneurial level of respondents was also significantly influenced by their gender and educational background.

The literature above provides insights into personal entrepreneurial competencies (PECs) and group membership. In addition, some studies found that group (e.g., cooperative and association) membership and PECs influence local farmers' performance. However, the relationship between group membership and PECs of dairy buffalo farmers in the country remains to be discovered. Hence, this warrants a study that analyses the PECs of dairy buffalo farmers and how organisational and/or group membership could influence their level of PECs.

METHODOLOGY

The Study Area

The study was conducted in San Agustin, Isabela, Philippines. The municipality is situated in the southernmost region of Isabela and encompasses a land area of 27,840 hectares. It comprises 23 barangays and shares borders with the city of Jones to the west. The south and southeast regions are adjacent to Quirino Province (Province of Isabela website, n.d.).

Sample Selection and Data Analysis

The study conducted interviews with 137 dairy buffalo farmers using convenience sampling. The interviewed dairy farmers comprised 68 members and 69 non-members of dairy associations, while 36 were members and 101 were non-members of cooperatives. The MSI and McBer company's assessment questionnaire was utilised to assess the personal entrepreneurial competencies of dairy buffalo farmers.

Descriptive statistics were used to profile the dairy farmers who are members and non-members of the dairy associations and the cooperative. In addition, the Mann - Whitney U Test was also used to compare the personal entrepreneurial competencies scores between dairy buffalo raisers (members and non-members) groups.

In analysing the response data, the research utilised JASP version 18.1, a free and open-source statistical software by the University of Amsterdam, and the Statistical Package for Social Sciences (SPSS).

RESULTS AND DISCUSSION

Profile of the Dairy Buffalo Farmer Respondents

The interview results showed that most (85%) of the respondents were male, whereas only 20 females (15%) were interviewed. This suggests that the dairy buffalo farmer respondents are primarily dominated by men, as shown in Table 1.

Table 1: Number of dairy buffalo farmers in San Agustin, Isabela, based on gender

Group	Frequency	%
Male	117	85
Female	20	15
Total	137	100

Source: Field survey (2022)

In addition, Table 2 shows the barangays in San Agustin, Isabela, where the farmers are currently situated. It can be observed that 12 out of 23 barangays of the municipality are represented by the dairy farmers interviewed. Brgy. Palacian has the highest number of participants, with a total of 35, accounting for 25% of the dairy farmers interviewed. It was followed by Brgy. Salay has 19 participants, which comprised 13% of the respondents. On the other hand, there is a lone respondent for each barangay of Nemmatan and Sto. Niño.

Table 2: Number of dairy buffalo farmers per Barangay in San Agustin, Isabela

Barangays	Frequency	%
Dabubu Grande	12	9
Dappig	11	8
Mapalad	11	8
Masaya Sur	12	9
Nemmatan	1	1
Palacian	34	25
Salay	19	14
Santos	4	3
Sinaongan	5	4
Norte		
Sinaongan Sur	13	9
Sto. Nino	1	1
Virgoneza	14	10
Total	137	100

Source: Field survey (2022)

Almost three-fourths (74%) of the respondents are members of Sadaco Multipurpose Cooperative (Sadaco), while thirty-six (26%) of the farmers are not members, as shown in Table 3. Many farmers are encouraged to join Sadaco to have a direct market for the milk they produce daily and for other dairy farming assistance. In addition, Sadaco offers benefits to members, such as the privilege of receiving incentives like interest on share capital, patronage refunds, and holiday packages during Christmas and New Year.

Table 3: Number of dairy farmers cooperative membership in San Agustin, Isabela

Membership	Frequency	%
Member of cooperative	36	26
Non-member of cooperative	101	74
Total	137	100

Source: Field survey (2022)

Further, about half (68 out of 137) of the dairy buffalo farmers interviewed are members of different dairy associations. Results showed that other farmers are

hesitant to join a dairy association, as about half (69 out of 137) are not members, as depicted in Table 4. Some non-dairy association members cited that dairy associations generally only offer the advantage of accessing grants used in farming.

Table 4: Number of dairy association members in San Agustin, Isabela

Group	Frequency	%
Member of Dairy Association	68	50
Non-member of the Dairy Association	69	50
Total	137	100

Source: Field survey (2022)

Furthermore, from the 68 farmers who are part of the dairy association, Masaya Sur Crossbred Owners Dairy Association has the highest number (11) of respondents, 15% of the participants. It was followed by the Sinaongan Sur Dairy Association, which has 10 participants (14%), and the Salay Dairy Association, which has nine participants (13%) of the farmers who are part of their dairy association (Table 5).

Table 5: Number of the Dairy Association Members in San Agustin, Isabela

Dairy Farmers' Association	Frequency	%
Dabubu Grande	7	5
Dappig	8	6
Mapalad	4	3
Masaya Sur	11	8
Nemmatan	1	1
Palacian	4	3
Salay	9	7
Santos	2	1
Sinaongan Norte	4	3
Sinaongan Sur	10	7
Sto. Nino	1	1
Virgoneza	7	5
Non-member	69	50
Total	137	100

Source: Field survey (2022)

Personal Entrepreneurial Competencies of the Dairy Buffalo Farmers

The analysis of the 137 dairy buffalo farmers' entrepreneurial competencies revealed that the respondents have only one strong competency, six moderate competencies, and three weak competencies. The dairy farmers have only demonstrated strength in goal setting (average score of 18.75). At the same time, they exhibited weaknesses in persuasion and networking (with the lowest average score of 13.56), demand for quality/efficiency (average score of 14.23), and risk-taking (average score of 14.30), as shown in Table 6.

In addition, the farmers scored moderate strength on the following competencies: self-confidence (average score of 17.56), opportunity-seeking (average score of 16.34), commitment to the work contract (average score of 16.65), information-seeking (average score of 16.63), and systematic planning and monitoring (average score of 16.50) and lastly, persistence (average score of 15.54). These findings suggest that the farmers can set goals since they have targets for milk production and target income. According to the farmers, they have moderate competency in commitment to work contracts because sometimes they see less opportunity to earn more income in dairy farming, as this depends on the lactation cycle. Farmers also exhibit a moderate commitment to their work contracts, which typically involves punctuality and dedication.

However, some farmers only milk their buffaloes when they feel like it, mainly because this requires them to wake up early. Additionally, they prioritise other income-generating activities, such as corn and rice farming. The farmers also scored a moderate level in information seeking and systematic planning because some still need to be part of Sadaco, their primary source of information for milking. Additionally, farmers typically rely on information about dairying from their fellow farmers. Not all can attend training and seminars, especially when the venue is far from their farms.

It was also observed that farmers need to keep records of their dairy milk production. This lack of record-keeping may be one reason why their score on systematic planning could be more moderate. Moreover, many farmers must systematically plan and schedule their activities, such as crop farming and dairying, to maximise their income.

Despite the challenges in dairy production, the farmers are still confident they can improve their dairy production and become influential entrepreneurs with expert mentorship and guidance.

Moreover, farmers need to be more persistent in reorganising associations and motivating members to participate actively in building dairy enterprises. Notably, most members reported needing help convincing others to engage in association activities such as attending their regular meetings, which explained the lowest mean score observed in persuasion and networking among the assessed competencies. Additionally, farmers have a weak demand for efficiency and quality because they are hesitant to use their buffaloes for dairy farming due to concerns about potential risks and its potential negative impact on calf growth due to insufficient milk intake.

The farmers also mentioned that due to their relatively low income from other farming activities, they need more spare money to serve as capital in doing business, hence having a weak risk-taking competency. The PEC analysis of dairy farmers revealed their strengths and weaknesses in entrepreneurship, which can serve as a guide for crafting strategies to help policymakers and government agencies. Lastly, the PECs analysis showed room for improvement in other skills, which can be achieved through business exposure and training.

Table 6: Personal Entrepreneurial Competencies' Average Scores of 137 Dairy Buffalo Farmers in San Agustin, Isabela

Personal Entrepreneurial Competency	Average Score	Rank	Interpretation*
Opportunity seeking	16.34	6	Moderate
Persistence	15.54	7	Moderate
Commitment to the work contract	16.65	3	Moderate
Demand for efficiency and quality	14.23	9	Weak
Risk-taking	14.30	8	Weak
Goal setting	18.75	1	Strong
Information seeking	16.63	4	Moderate
Systematic planning and monitoring	16.50	5	Moderate
Persuasion and networking	13.56	10	Weak
Self-confidence	17.56	2	Moderate

*Interpretation based on Depositario et al. (2011)

Source: Field survey (2022)

Descriptive statistics were used to describe the PEC scores of all 137 dairy farmers interviewed. Using some measures of central tendency, the highest median was found for PEC goal-setting, with a score of 19. The lowest median was computed as a score of 14 for the demand for quality/efficiency, risk-taking, persuasion, and networking. This can be attributed to farmers' need to adhere to recommended dairy farming practices to produce high-quality milk efficiently. Furthermore, persuasion and networking skills are also lacking among farmers, as many of them rely solely on Sadaco as their market and do not see the need to connect with other market outlets. The highest standard deviation was found to be equal to 3.43 with persuasion and networking. At the same time, the lowest is at 2.66, with information seeking suggesting that the PEC scores across dairy farmers are close to each other. Moreover, the highest PEC scores were equal to 25 for persistence, risk-taking, goal-setting, information-seeking, systematic planning, and self-confidence. On the other hand, the lowest PEC score was equal to 3 for persuasion and networking, as shown in Table 7.

Table 7: Descriptive statistics of PEC scores of 137 dairy buffalo farmers in San Agustin, Isabela

Personal Entrepreneurial Competencies	Median	Mean	Standard Deviation	Minimum	Maximum
Opportunity Seeking	17	16.336	3.214	8	24
Persistence	15	15.54	3.195	7	25
Commitment to Work Contract	17	16.65	3.072	8	22
Demand for quality/efficiency	14	14.226	2.943	5	20
Risk-taking	14	14.299	3.13	5	25
Goal setting	19	18.752	3.169	11	25
Information seeking	17	16.628	2.66	12	25
Systematic planning/controlling	17	16.504	3.132	8	25
Persuasion and networking	14	13.562	3.432	3	20
Self-Confidence	17	17.562	3.192	9	25

Comparing the PECs of the Dairy Farmers based on Group Membership

The PEC scores of dairy farmer group members (farmers who are members of either dairy cooperative and/or dairy association) and non-members (farmers who do not belong to any dairy cooperative and/or dairy association) were compared to determine whether a significant difference exists between these groups. The PEC scores of group and non-group members are presented in Tables 8 and 9.

The two groups' mean scores were determined, and the strength scores were interpreted. The PEC scores were ranked in each group and then compared. Results showed that, except for persuasion and networking, the mean PEC scores of farmers who belong to dairy farmer groups are slightly higher than those of non-members.

In addition, it was observed that members of the group had one strong competency (goal setting), six moderate competencies (opportunity seeking, persistence, commitment to work contract, information seeking, systematic planning/controlling, and self-confidence) and three weak competencies (demand for quality and efficiency, risk-taking and persuasion and networking). According to the dairy buffalo farmers, these competencies are attributed to the impact of their cooperative in terms of setting targets for the production and delivery time of milk. Furthermore, Sadaco also shares production techniques and information with cooperative members to help them in dairy farming. The dairy association and the cooperative highly support its members, and they consistently prioritise assisting farmers in generating income through dairying. Additionally, the farmer's group actively supports interventions aimed at helping farmers achieve their goals in dairy ventures.

On the other hand, the non-members of the group had no strong PEC, six moderate competencies (opportunity seeking, commitment to work contract, goal setting, information seeking, systematic planning/controlling, and self-confidence), and four weak competencies (persistence, demand for quality/efficiency, risk-taking and persuasion, and networking).

Although non-group members recognise that dairy associations and cooperatives can help them, some hesitate to join these groups. They believe that they still need the

help and benefits of these groups. Another reason is their fear of commitment to attend their activities and the perception of the high cost of membership fees. Additionally, many farmers (non-group members) are reluctant to take risks, mainly when milking their buffaloes, due to a misconception that insufficient milk feeding will lead to malnourished calves. Lastly, there was only a minimal difference between the PECs of group members and non-members, as shown in Table 8 and Table 9.

Table 8: PECs scores of dairy buffalo farmers who are members of dairy associations/cooperative

PECs	Group Members		
	Mean Scores	Interpretation	Rank
Goal setting	19.00	Strong	1
Self-Confidence	17.96	Moderate	2
Commitment to Work Contract	17.14	Moderate	3
Information seeking	16.92	Moderate	4
Systematic planning/controlling	16.60	Moderate	5
Opportunity Seeking	16.42	Moderate	6
Persistence	15.71	Moderate	7
Risk-taking	14.69	Weak	8
Demand for quality/efficiency	14.38	Weak	9
Persuasion and networking	13.53	Weak	10

Source: Field survey (2022)

Table 9: PECs scores of dairy buffalo farmers who are non-members of dairy associations/cooperative

PECs	Group Non-Members		
	Mean Scores	Interpretation	Rank
Goal setting	18.45	Moderate	1
Self-Confidence	17.05	Moderate	2
Systematic planning/controlling	16.38	Moderate	3

Information seeking	16.25	Moderate	4
Opportunity Seeking	16.23	Moderate	5
Commitment to Work Contract	16.02	Moderate	6
Persistence	15.32	Weak	7
Demand for quality/efficiency	14.03	Weak	8
Risk-taking	13.80	Weak	9
Persuasion and networking	13.60	Weak	10

Source: Field survey (2022)

Statistical Difference of the Dairy Farmers Based on Group Membership

Knowing if the difference between dairy farmer group members and non-members is statistically significant in crafting future development interventions for dairy buffalo raisers. Table 10 depicts the results of the Mann-Whitney U Test comparing the members and non-members of the dairy buffalo farmers' group. This study determined the PECs with significant differences between the two groups at 5% and 10% significance levels. Similarly, Hasan and Fatima (2018), Rasanjali and Wijesinghe (2021), and Tharuka and Dissanayake (2021) considered variables significant in their social science studies both at a 5% and 10% level of significance.

The results of the Mann-Whitney U test confirm some significant differences in the PECs of dairy buffalo farmers. The coefficient of commitment to a work contract is significant at a 5% probability. This means that there is a significant difference between the PECs of those who are members of the group and those who are not members. This is because the cooperative helped the dairy farmers commit to waking up early to milk their carabaos and maintain the highest quality of their produced milk. In the same way, the PEC information seeking is significant at a 5 % probability. Hence, the two groups are different in terms of seeking information. This is due to the farmer's privilege of seeking information from their cooperative (Sadaco) about proper and efficient milking practices, proper sanitation, and suitable management of their buffalos compared to the non-members, who need consistent sources of information. According to the farmers, being part of an organisation allows them to communicate

with other farmers to share experiences and information. Additionally, Sadaco offers several benefits and incentives that motivate members to engage in dairy ventures. This motivation prompts them to increase their milk production, ultimately leading to higher income provided by Sadaco.

Risk-taking and self-confidence are also significantly different PECs at a 10% probability between the two groups. According to the farmers, Sadaco members are more inclined to take risks. They understand that their expertise, experience, and hard work offer them a good chance of success in the dairy industry. Further, farmers have confidence in Sadaco's effective management and strong support for its members in their dairy ventures. This confidence also encourages them to take risks, knowing their group supports them.

Moreover, the Mann-Whitney U Test results also showed that group membership was positively associated with improved opportunity seeking, commitment to work contracts, risk-taking, and self-confidence of dairy buffalo raisers. These findings also highlight the importance of dairy buffalo farmer groups (e.g., dairy associations and cooperatives) in further enhancing the PECs of dairy buffalo farmers. According to the dairy farmers, these results are because their associations and cooperatives allow farmer members to discuss ideas and knowledge, which could lead to improved opportunity-seeking and self-confidence. In addition, the farmers are encouraged by their group to commit to the on-time delivery of milk to their collectors. Furthermore, through collective marketing, farmers gained some bargaining power, which could be attributed to enhanced risk-taking behaviour. This could be because most of the training and other capacity-building support from the national government, SUCs, and LGUs are provided through registered farmer groups.

Table 10: Comparison of PECs between Members and Non-members of Dairy Buffalo Farmers' Group

PECs	Coefficient
Opportunity Seeking	0.41
Persistence	0.60
Commitment to Work Contract	2.01**
Demand for quality/efficiency	0.61
Risk-taking	1.75*

Goal setting	1.10
Information seeking	2.09**
Systematic planning/controlling	0.32
Persuasion and networking	0.19
Self-Confidence	1.88*

Note: **, * significant at 5% and 10% probability, respectively

Source: Field survey (2022)

CONCLUSION

Assessing the personal entrepreneurial competencies (PECs) of dairy buffalo farmers in San Agustin, Isabela, Philippines, is vital in developing strategies to further enhance the farmer's engagement and production of the local dairy buffalo industry. Many initiatives have been implemented to boost farmers' dairy buffalo production and income in San Agustin, Isabela; however, there is still a stagnant trend in dairy production and farmers' participation. One strategy to address these challenges is encouraging the farmers to engage in entrepreneurship. Many current and future interventions from the local government units and national government agencies are focused on encouraging dairy farmers to do business. This study analysed the PECs of 137 dairy buffalo farmers in San Agustin, Isabela, and assessed how group membership was associated with these PECs.

Results revealed that the dairy buffalo farmers have one strong, six moderate, and three weak PECs. First, goal setting is identified as a strong attribute among dairy farmers. This means these farmers exhibited the ability to set clear objectives for their dairy farming activities; however, the challenge lies in translating these goals into tangible outcomes. Farmers have shown weak entrepreneurial competencies in persuasion and networking, risk-taking, and demand for quality/efficiency. These aspects received relatively lower scores compared to other attributes due to cited reasons such as difficulty in engaging other farmers to become part of an association, lack of spare money to risk on a business, and hesitance of farmers to use their carabao due to fear of the negative potential impact of milk insufficiency for their calves respectively. On the other hand, the farmers' moderate competencies are opportunity seeking, persistence, commitment to work contracts, information seeking, systematic planning and monitoring, and self-confidence. This is because most of the farmers had

no background in doing business and had yet to receive any training related to entrepreneurship. The above findings highlight the need to boost weak and moderate-level competencies of dairy buffalo raisers and provide them with the necessary knowledge and support to overcome these obstacles. Enhancing these weak and moderate entrepreneurial competencies through targeted training and support can improve their PECs.

Furthermore, the research uncovered a significant difference between some PECs and group membership. Specifically, there are positive and significant differences between group membership and PECs: commitment to work contract, information seeking, risk-taking, and self-confidence. This suggests that farmer's cooperative and dairy associations could significantly enhance the entrepreneurial competencies of dairy buffalo farmers in San Agustin, Isabela. Farmers gained some bargaining power through collective marketing, which could be attributed to enhanced risk-taking behaviour. This could be because most of the training and other capacity-building support from the national government, SUCs, and LGUs are courses conducted by registered farmer groups.

Since this study found that dairy buffalo raisers generally have weak to moderate personal entrepreneurial competencies and that group membership is positively associated with enhanced PECs, the national government and LGUs of San Agustin and the province of Isabela could explore enhancing dairy buffalo farmers PECs by finding possible ways on how to increase awareness of farmers about the dairy farmers' associations/groups and eventually encourage them to join these farmer groups.

The findings of this study agree with the initial findings of Dumilag et al. (2023) that farmers generally have low risk-taking competency and demand for quality and efficiency. In addition, the association of PECs and group membership of this study supports Mina and Cuevas (2022) study's conclusion that cooperative membership positively impacts dairy farmers in the Philippines. The result of the study provides the basis for the future intervention of the Local Government Units to help more dairy buffalo farmers in San Agustin. The study can also serve as a basis for national government agencies such as DA-PCC and DOST-PCAARRD to craft and implement

projects to further help the dairy buffalo farmers, dairy associations and cooperatives in their municipality.

Based on the study's results, it is recommended that future researchers increase the study's sample size further and explore the use of probability sampling in selecting the respondents. This can help describe and conclude more about dairy buffalo farmers. In addition, cooperatives are encouraged to conduct more training about enterprise development in the dairy buffalo industry to enhance the skills of the industry players and encourage more farmers' participation. Dairy cooperatives can explore and initiate training about the best milk collection and storage practices, proper diet preparation for milking buffaloes, and basic entrepreneurial skills for business development. Moreover, SADACO Multipurpose Cooperative is suggested to promote its cooperative through orientation in different municipalities' barangays to enhance farmers' awareness and encourage their participation in cooperative activities.

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APPENDIX

PERSONAL ENTREPRENEURIAL COMPETENCIES' (PECs) QUESTIONNAIRE

I. Farmer's Profile

ITEM	ANSWER
Name	
Address	
Gender	
Membership in the Dairy Association	<input type="checkbox"/> Yes <input type="checkbox"/> No
Membership in Cooperative	<input type="checkbox"/> Yes <input type="checkbox"/> No

II. Farmer's Personal Entrepreneurial Competencies

PEC Answer		SCENARIO				
		1-Never	2-Rarely	3-Sometimes	4-Usually	5-Always
	1	I look for things that need to be done.				
	2	When faced with a difficult problem, I spend much time trying to find a solution.				
	3	I complete my work on time.				
	4	It bothers me when things are not done very well.				
	5	I prefer situations where I can control the outcomes as much as possible.				
	6	I like to think about the future.				
	7	When starting a new task or project, I gather much information before going ahead.				
	8	I plan a large project by breaking it down into smaller tasks.				
	9	I get others to support my recommendations.				
	10	I feel confident that I will succeed at whatever I try to do.				
	11	No matter whom I am talking to, I am a good listener.				
	12	I do things that need to be done before being asked by others.				
	13	I try several times to get people to do what I would like them to do.				
	14	I keep the promises I make.				
	15	My own work is better than that of the people I work with.				
	16	I do not try something new without making sure I will succeed.				
	17	Worrying about what to do with your life is a waste of time.				
	18	I seek the advice of people who know about the tasks I am working on.				
	19	I think about the advantages and disadvantages of different ways of accomplishing things.				
	20	I do not spend much time thinking about how to influence others.				
	21	I change my mind if others strongly disagree with me.				
	22	I feel resentful when I do not get my way.				

23	I like challenges and new opportunities.
24	When something gets in the way of what I am trying to do, I keep trying to accomplish what I want.
25	If necessary, I am happy to do someone else's work to complete the job on time.
26	It bothers me when my time is wasted.
27	I weigh my chances of succeeding or failing before I decide to do something.
28	The more specific I can be about what I want in life, the greater my chances of success.
29	I take action without wasting time gathering information.
30	I think of all the problems I may encounter and plan what to do if each situation occurs.
31	I get important people to help me accomplish my goals.
32	I am confident that I will succeed when trying something difficult or challenging.
33	In the past, I have had failures.
34	I prefer activities that I know well and with which I am comfortable.
35	When faced with a major difficulty, I quickly go on to other things.
36	When I do a job for someone, I make a special effort to ensure that the person is happy with my work.
37	I am never entirely happy with how things are done; I always think there must be a better way.
38	I do risky things.
39	I have a very clear plan for life.
40	When working on a project for someone, I ask many questions to be sure I understand what that person wants.
41	I deal with problems as they arise rather than spend time trying to anticipate them.
42	In order to reach my goals, I think of solutions that benefit everyone involved in a problem.
43	I do very good work.
44	There have been occasions when I took advantage of someone.
45	I try things that are very new and different from what I have done before.
46	I try several ways to overcome things that get in the way of reaching my goals.
47	My family and personal life are more important than the work deadlines I set for myself.
48	I find ways to complete tasks faster at work and home.
49	I do things that others consider risky.
50	I am as concerned about meeting my weekly goals as my yearly goals.
51	I use several sources to get information and help with tasks or projects.
52	If one approach to a problem does not work, I think of another approach.
53	I am able to get people who have strong opinions or ideas to change their minds.
54	I stick with my decisions even if others disagree strongly with me.
55	When I do not know something, I do not mind admitting it.

GRIT Answer		SCENARIO			
		1-Not like me at all	2-Not much like me	3-Somewhat like me	4-Mostly like me 5-Very much like me
	1	I have overcome setbacks to conquer an important challenge.			
	2	New ideas and projects sometimes distract me from previous ones.			
	3	My interests change from year to year.			
	4	Setbacks do not discourage me.			
	5	I have been obsessed with a particular idea or project for a short time but later lost interest.			
	6	I am a hard worker.			
	7	I often set a goal but later choose to pursue a different one.			
	8	I have difficulty focusing on projects that take more than a few months to complete.			
	9	I finish whatever I begin.			
	10	I have achieved a goal that took years of work.			
	11	I become interested in new pursuits every few months.			
	12	I am diligent.			

Answer		SCENARIO						
		1-Disagree Strongly	2-Disagree Moderately	3-Disagree a Little	4-Neutral	5-Agree a Little	6-Agree Moderately	7-Agree Strongly
	1	I see myself as EXTRAVERTED/ENTHUSIASTIC.						
	2	I see myself as CRITICAL/QUARRELSOME.						
	3	I see myself as DEPENDABLE/SELF-DISCIPLINED.						
	4	I see myself as ANXIOUS/EASILY UPSET						
	5	I see myself as OPEN TO NEW EXPERIENCE/COMPLEX						
	6	I see myself as RESERVED/QUIET.						
	7	I see myself as SYMPATHETIC/WARM.						
	8	I see myself as DISORGANIZED/CARELESS.						
	9	I see myself as CALM/EMOTIONALLY STABLE						
	10	I see myself as CONVENTIONAL/UNCREATIVE.						