Original Article

Buffalo Bulletin (April-June 2026) Vol.45 No.2
https://doi.org/10.56825/bufbu.2026.4525760

CHARACTERISTICS AND PERFORMANCE OF MICRO-ENTERPRISES IN THE BUFFALO PRODUCTION SECTOR: A SURVEY IN COASTAL REGIONS OF BANGLADESH

Md Khalilur Rahman[1], Gautam Kumar Deb[2], Ovirup Bhushan Paul[2], Nurnabi Ahmed[1], Babul Chandra Roy[1], Hiranmay Biswas[3], AKM Anisur Rahman[1], Md Tanvir Rahman[1] and Md Hasanuzzaman Talukder[1,*]

Received: 15 February 2024
Accepted: 30 June 2026

ABSTRACT

There is limited scientific information on the nature and characteristics of micro-entrepreneurship within the buffalo farming and production sector. To address this gap, the present survey aimed to enhance understanding of how buffalo micro-entrepreneurs perceive risks related to various aspects of water buffalo production, as well as their adaptive strategies in response to existing challenges. A questionnaire-based survey was conducted between August and October 2022, gathering data from 190 micro-entrepreneurs (MEs) perceive involved in buffalo rearing, production, and product marketing. Findings on the profiles of micro-entrepreneurs and their enterprises indicated that 64% of respondents were male and 34% were female. About 50.49% of MEs had completed primary school, approximately 46.53% of MEs received training on livestock's health and vaccination, and 28.71% received technical training on entrepreneurship and business management. Results highlight average 16.50% of MEs expressed knowledge of business management and marketing. Regarding business management, it was found that about 65.0% of MEs sold milk as a top product of selling. Only 7.84% of MEs were registered with any Government's concern, and 65.35% of MEs were members of a savings cooperative/NGOs. Majority of MEs found existed market conditions somewhat unfavorable for businesses (71.57%) and were dissatisfied with government strategies or policies in providing access to finance and business services and working facilities (71.64%). Whereas 57.35% of respondents showed satisfaction with the government's actions on ease access/availability of goods in rural areas. Majority of MEs (62.75%) identified current electricity supply as an important constraint for their enterprise's production. Most of MEs emphasized the stable political environment (71.74%), improvement of infrastructure (68.48%) and entrepreneurship training (46.03%) for ensuring the sustainability of microenterprises. Results indicate insufficient finance, lack of qualified human resources, inadequate market information and lack of marketing skills, insufficient adaptation skills to climate and environmental effects as major challenges for micro-enterprises producing buffaloes. The findings indicate that obtaining

[1]Departments of Parasitology, Medicine, Microbiology and Hygiene, Bangladesh Agricultural University, Mymensingh, Bangladesh, *E-mail: talukdermhasan@bau.edu.bd

[2]Bangladesh Livestock Research Institute, Dhaka, Bangladesh

[3]Department of Livestock Services, Dhaka, Bangladesh

appropriate vocational, technical, business, management, and entrepreneurial skills is essential for the sustainable growth and development of micro-entrepreneurs and their enterprises. This field-based analysis enhances the understanding of MEs in the selected study areas and highlights the significant role that microenterprises play in the economic advancement of buffalo-based coastal regions.

Keywords: *Bubalus bubalis*, buffaloes, buffalo rearing, production, product marketing, micro-entrepreneurship, buffalo farming, Bangladesh

INTRODUCTION

Due to an agro-based country, livestock is the part and parcel for most of the rural peoples in Bangladesh. Buffalo is a large ruminant animal genetic resource potentially used for meat, milk and draught power. However, buffalo is the animal mostly neglected in our country for the purpose of meat consumption, despite having their potential uses for making milk products, draught power and hides. Buffalo requires very limited input for its livelihood and production. Most importantly, they can utilize low quality roughages or any other crop residue very efficiently. In Bangladesh buffalo are distributed over limited areas for their eco-physiological habitat. Buffaloes are commonly found in low-lying coastal and riverine regions, where they typically graze freely under open-range conditions. As noted by Das and Khan (2010), these animals are predominantly distributed across tropical and subtropical countries. Globally, the buffalo population spans more than 42 countries, with an estimated total of about 194 million animals (Hamid *et al*., 2016).

Interestingly, Asia is dominating and representing more than 90% of the world buffalo population (FAO, 2012; Chakravarty, 2013). In Asia, India and Pakistan are two leading countries rich in buffalo population representing about 58% and 17% of the world population, respectively. There are 1,485,000 buffaloes contributing about 3 to 4% milk and 5 to 6% meat produced respectively, in Bangladesh (BBS, 2020). At present, the total buffalo population in coastal area is more than one million. Among 1.464 million, 40% of them are inhabitants in coastal regions (Faruque *et al*., 1990). River buffaloes are primarily raised for milk production (Dhanda, 2013). In Bangladesh, several regions, such as the coastal belt, the Sylhet haor area, the sugarcane-growing zones of Jamalpur, and the Kanihari buffalo pocket in Trishal upazila of Mymensingh district have maintained buffalo-rearing traditions focused exclusively on milk production for centuries (Sohel and Amin, 2015). Due to available grazing land and favorable geographical environment make buffalo rearing as a popular business in this area for livelihood opportunities, rural development, dairy industry support, local meat supply, leather etc (Talukder, 2020).

Buffalo production is often concentrated in rural areas, and micro entrepreneurs contribute to the development of these regions by creating economic activity and generating employment opportunities in otherwise underdeveloped areas (Rahman *et al*., 2020). Micro entrepreneurs contribute to the dairy industry by supplying milk, which is a valuable source of nutrition and income for many households. Buffalo milk is an important component of dairy production in Bangladesh. Buffalo meat is a significant protein source in Bangladesh. Micro entrepreneurs in the buffalo production sector help meet the local

demand for meat, contributing to food security. Buffalo rearing is often more environmentally sustainable than large-scale industrial farming, as it requires fewer resources. Micro entrepreneurs can engage in eco-friendly practices. In summary, micro entrepreneurs play a pivotal role in the buffalo production sector in Bangladesh, contributing to rural development, livelihoods, food security, and the overall economy of the country. Therefore, this study aimed to understand the present business, economic and environment status of microenterprises, entrepreneurs and their enterprises in buffalo farming zones in the coastal region.

Study Areas

The survey was conducted in designed clusters (Table 1) located at Bhola, Barishal, Patuakhali and Noakhali buffalo farming zones of Bangladesh.

Study design and data collection

A qualitative research approach, particularly the field interview method, was employed to collect information from buffalo producers identified as MEs (MEs) within the study areas. Data was gathered using a structured questionnaire, which facilitated individual in-depth interviews conducted through focus group discussions.

After preparation of the interview schedule for appropriate data collection. The questionnaire comprised of 3 sections focusing on specific activities of the survey with closed and open questions. The survey was conducted during August to October 2022. When necessary, secondary and historical data and information were adopted for making logic of any statement or decision.

Data analysis

After checking and cross examination of the datasheets, statistical analysis was performed with broadly used reliable software, SPSS. Results were tabulated in accordance with the objectives of the study.

Marketing skills of micro-enterprises

The survey was conducted to collect data from 190 buffalo producers as micro-enterprises in 4 districts in coastal region. The distribution of enterprises, according to their locations, is depicted in Table 2. Majority of microenterprises are in Bhola (39.47%) followed by Patuakhali (26.31%) and Noakhali (21.05%) and Barishal (13.15%).

As the state-of-the-art study on microentrepreneurial characteristics, the questionnaire was designed carefully to measure individual traits such as risk aversion and entrepreneurial self-efficacy as buffalo producers and to define the need for significant accomplishment, mastering of skills and attaining challenging situations, overall, for achieving the goals.

Results highlight average 16.50% of MEs expressed knowledge of business management and marketing (Table 3). Regarding business and marketing skills, it was observed that very few MEs were able to develop a marketing plan for buffalo products (17.48%), to keep effective financial records (16.50%), to analyze production records for making wise decisions (to analyze production records for making wise decisions%) and were familiar with sources of buffalo-related information (15.53%). Moreover, significant ($P<0.05$) differences among respondent groups according to primary (E2), secondary (E3) and higher secondary (E4) education levels have been revealed (Table 3). However, these results

suggest that more training on-farm and enterprise management in terms of herd health, business, marketing and entrepreneurship should be conducted to improve MEs knowledge. Efforts to bridge the ME's skills, experiences and business performances may prove very fruitful.

Differences in respondent groups based on education levels

The characteristics of MEs (MEs) are presented in Table 4 and illustrated in Figure 1.

The educational levels of the owners are illustrated in Figure 1, showing that most MEs (MEs) (50.49%) completed primary education. In contrast, approximately 5.83% of the respondents were illiterate, while only 4.85% had attained higher secondary education.

Characteristics of micro-enterprises

Characters of micro-enterprises and their performances observed during the survey have been shown in Table 5 and Figures 2 to 6.

The average age of existing microenterprises was 15.94±1.28 years with a range from years 1 to 40 years. Considering the farm age groups, it was found that majority of the respondent running enterprises were below 30 years (Figure 2B).

Farm costs regarding labor, feed and health have been shown in Figure 3. No significant differences among MEs respondents of different groups according to labor and feed cost per day were observed. Significantly higher percentages of MEs showed health costs per month ≤500 BDT.

Housing system in terms of farm infrastructure has been shown in Figure 4. Most of MEs made houses with soil (37.86%) having raw floors (59.80%). Significantly higher percentage of MEs used natural ventilation (55.58%, $P<0.05$) and had no sewerage option (69.61%, $P<0.01$).

Maximum MEs (76.47%) used pond/ river stream for water supply. About 59.41% of MEs use non-grid electricity (Figure 5). An adequate power supply is essential for the machinery, and the storage of farm products and failure in the power supply may make all other reasonable efforts futile, particularly for the MEs.

A significantly large percentage of MEs (69.61%) ($P<0.01$) focused on pasture as a source of feed and 51.96% of MEs had not used feeding though as has been shown in Figure 6. The assessment of variations in housing design and management systems, including feeding, provides an indirect measure of animal welfare. It gives information on how the animals are coping with the environment (EFSA, 2012).

As shown in Table 6, about 32.98% of micro-enterprises were located close to MEs house, 30.85% were closer to consumer markets and 25.53% was established in ME's own land. Around all (99.02%) MEs had permanent full-time employees, and 33.33% of MEs had permanent part-time employees. Most of MEs (58.58%) engaged semi-skilled workers on their farm. Furthermore, 42.62% of MEs reported that they provided in-house training for workers.

It was found that about 65.0% of MEs sold milk as a main product of selling and 23.0% sold culled buffaloes. A majority (58.82%) of MEs decision to sell buffaloes depended on financial needs for the family. About 30.69% of MEs reported wholesaler(s), retail shop(s) in the same area and traders from other regions as primary marketing sources in their areas. This result also reveals that government and cooperatives were not important customers for the MEs businesses surveyed.

A large number of MEs (61.39%) reported that they provided about half of the total income

from their business and 19.80% of MEs provided more than half of the total revenue for their livelihood expenditures. It indicates that the contribution of microenterprises is remarkable in studied areas. As usual, most of the MEs (77.45%) highlighted that they discussed with household members for taking any management decision. In contrast, around 7.0% of MEs discussed with co-members of cooperatives, neighboring farmers and government service providers.

Regarding the final management practiced in the farms, the survey revealed that despite 95.10% of MEs having a bank account. Many MEs reported that they saved for business purposes, although the mode of savings varied. About 65.35% of MEs were members of a savings cooperative/ NGOs, and only 34.65% of MEs saved their money in the bank. Furthermore, 73.53% have no insurance.

Implications of the findings on marketing skills and education levels

Although the microentrepreneurs sector in coastal area has received much attention from the government, they still face challenges. Nieman and Nieuwenhuizen (2009) identified some challenges that are faced by SMMEs in South Africa. The challenges include lack of training and education, limited access to financial resources, inaccessibility to markets, lack of support structures, inaccessibility to appropriate technology and lack of access to other resources like human resources. The challenges have been discussed below.

Lack of training and education

Insufficient education is widely recognized as a significant barrier to entrepreneurial activity in South Africa (Nieman and Nieuwenhuizen, 2009). These authors also emphasize the positive correlation between education and entrepreneurial engagement. Consistently, our survey indicated that over 60% of the MEs (MEs) had attained only primary-level education. This limited educational background, coupled with inadequate training, hindered their ability to effectively manage marketing strategies and overall enterprise operations.

Deficiency in management skills

The lack of management competencies among MEs is closely linked to inadequate education and training. Structured learning and training programs are essential for developing managerial skills necessary for business success. Hellriegel *et al*. (2008) define managerial competencies as a combination of knowledge, skills, behaviors, and attitudes that enhance personal and organizational effectiveness. These competencies are critical not only for business survival but also for sustained growth. In the South African context, Herrington and Wood (2003) note that insufficient education and training have weakened the management capacity of small, medium, and micro-enterprises (SMMEs), contributing to high failure rates among newly established ventures and low levels of entrepreneurial activity.

Limited access to financial resources

Access to adequate financial resources is a fundamental requirement for business initiation and expansion. Fatoki and Garwe (2010) identified financial constraints as the second most significant factor contributing to micro-enterprise failure in South Africa, after deficiencies in education and training. Similarly, Foxcroft *et al.* (2002) reported that approximately 75% of loan applications by SMMEs were rejected, while found that only 2%

of new SMMEs were able to secure financing. Limited access to formal credit is often due to the lack of collateral, insufficient bank deposits, poor credit history, and inadequately prepared business plans. In contrast, within our coastal study area, about 60% of MEs received financial support from NGOs, indicating that access to external funding remains relatively constrained but partially mitigated by non-governmental assistance.

Market inaccessibility

For micro-enterprises to remain viable and competitive, owners and managers must understand market dynamics and cultivate competencies that confer a competitive advantage. This entails systematically monitoring environmental changes, including both current and potential competition, to safeguard enterprise performance. Competitive intensity influences market potential and growth opportunities. Porter's Five Forces framework (Du Toit *et al*., 2009; David, 2007; Hellriegel, 2008) identifies five critical determinants of industry competitiveness: rivalry among existing competitors, the threat of new entrants, the threat of substitute products, and the bargaining power of customers and suppliers. Together, these forces shape market accessibility and ultimately affect the sustainability and growth potential of micro and small enterprises in buffalo production and related sectors.

Lack of support structures

Most SMEs owners and managers believe that they do not get enough support from the government. This may be as a result of lack of information on the available organizations that are established and available to assist them. Most SMEs in South Africa are not aware of government efforts that are in place to assist them.

Inaccessibility of appropriate technology

Investment in technology, including information technology, has become increasingly critical for businesses in today's competitive environment. Technological adoption plays a key role in enhancing business development, expanding opportunities, and boosting sales performance. However, the implementation of modern technology entails significant costs, such as the purchase of computer hardware and the installation of software. Small, medium, and micro-enterprises (SMMEs) that face financial constraints are particularly disadvantaged, as limited access to capital restricts their ability to acquire and utilize modern technological tools effectively.

Limited access to other resources, including human capital

For micro and small enterprises to achieve sustainable growth and high performance, access to skilled, qualified, and motivated human resources is essential. Due to financial limitations, SMMEs often struggle to hire competent personnel, as recruitment is subject to costs and labor regulations, including minimum wage requirements (Fatoki and Garwe, 2010). In addition, inadequate infrastructure-such as unreliable telecommunications, electricity, and transportation networks-further constrain the growth potential of SMEs, particularly in developing countries. These resource limitations collectively impact on the operational efficiency, competitiveness, and overall performance of micro and small enterprises.

Performance of micro-enterprises

The performance of micro and small enterprises (MEs) is a matter of significant interest globally, given their critical contribution to national economic development (Alam *et al*., 2010; Olutunla

and Obamuyi, 2008). Organizational performance refers to the effectiveness and efficiency with which a business delivers products and services (Naude, 2007). While there is no universally accepted measure of SME performance, growth indicators-such as increases in sales, profits, and employment-are commonly used due to their accessibility and reliability (Barreira, 2004; Olutunla and Obamuyi, 2008). Performance is inherently multidimensional; financial outcomes and growth metrics represent complementary perspectives that together provide a more comprehensive understanding of enterprise performance (Barreira, 2004).

Prior studies indicate that enhanced entrepreneurial education and training improve the managerial skills of SMME owners and managers, thereby positively influencing enterprise performance (Karimi *et al*., 2010; Hisrich *et al*., 2008). Improved skills and competencies contribute to higher profitability, greater sales growth, increased employment, and overall wealth generation for enterprise owners, reinforcing the pivotal role of education in fostering sustainable micro-enterprise development.

The study is also in line with the findings of Mutezo (2005:89) and Nieman and Nieuwenhuizen (2009) who concluded that entrepreneurship education positively impacts on the profitability of SMMEs. Ucbasaran *et al*., (2003); Daroch and Clover (2005) in their models of entrepreneurial performance proved that entrepreneurship education, through the development of entrepreneurial skills and knowledge, has a positive impact on SMME performance However, coastal buffalo farmers face enormous challenges for sustainable and profitable farming.

This study demonstrates that entrepreneurship education has a significant positive effect on the performance of MEs (MEs) involved in buffalo production in coastal regions. It enhances the entrepreneurial knowledge, skills, and competencies of ME owners and managers, thereby contributing to the establishment, sustainability, and growth of their enterprises. The findings indicate a positive correlation between entrepreneurship education and both profitability and business expansion of MEs, highlighting its critical role in ensuring the long-term survival of small and micro-enterprises in buffalo farming.

Based on the study findings, the following recommendations are proposed to promote sustainable productivity and profitability in buffalo farming in Bangladesh:

Policy development

Formulate practical, promotion-oriented policies through consultation with experts, target groups, relevant stakeholders, and government authorities to ensure effective implementation.

Needs assessment

Conduct comprehensive studies to evaluate the requirements, capacities, and compliance potential of MEs prior to policy formulation.

Capacity building and support

In coastal areas, economically disadvantaged populations rely primarily on indigenous knowledge, basic skills, and simple tools to manage micro-enterprises. To enhance their productivity, they require awareness, guidance, effective business strategies, and integrated support from external organizations. A dedicated task force comprising NGOs, microfinance institutions, government agencies, donor organizations, and local community leaders should be established at the regional level to provide coordinated advisory services. This unit should focus on developing

Table 1. The designed clusters for survey located at Bhola, Barishal, Patuakhali and Noakhali buffalo farming zones of Bangladesh.

Survey tools	Bhola	Barishal	Patuakhali	Noakhali	Total completed Survey
*HHS	75	25	50	40	190
*KII	7	6	6	6	25

*HHS = Household Survey (HHS). the structured questionnaire administered directly to individual buffalo-farming households across the four zones.

*KII = stands for Key Informant Interview (KII), a qualitative tool used to gather in-depth information from a smaller number of purposively selected individuals, such as livestock officers, veterinarians, local leaders, or experienced farmers, who have specialized knowledge of the buffalo farming system in their area.

Table 2. Location of the sample microenterprises.

Districts	Numbers of micro-enterprises	% of micro-enterprises
Bhola	75	39.47%
Barishal	25	13.15%
Potuakhali	50	26.31%
Noakhali	40	21.05%

Table 3. Entrepreneur's skill and knowledge as buffalo producers in study areas.

Recommended skill and knowledge	E1 (n=11)	E2 (n=94)	E3 (n=54)	E4 (n=21)	E5 (n=10)	Total (n=190)
Marketing skill of microentrepreneurs						
Be able to develop a marketing plan for buffalo products	18.67	29.81[a]	27.64[a]	11.29[b]	0.00	17.48
Effective financial record-keeping (paper or computer production records) and become familiar with buffalo-based enterprise budgets, balance sheets, and cash flow sheets	0.00	27.45[a]	23.79[b]	11.29[b]	20.00	16.50
Analysis of production records for decision-making	0.00	27.45[a]	23.79[b]	11.29[b]	20.00	16.50
Familiarity of buffalo-related information such as magazines, books, supply catalogues, and websites.	0.00	24.61[a]	21.79[b]	11.29[b]	20.00	15.53
Overall	-	-	-	-	-	16.50

[a,b,c] indicates significant difference at 5% level among columns for education groups E2, E3, E4 (E1-Iliterate, E2-primary level, E3-secondary, E4-higher secondary, E5-Tertiary)

Table 4. Characteristics of MEs.

Parameters	Mean±SEM	Minimum	Maximum
Sex-Male	190		
Age (Years)	45.75±1.01	21	75
Household size (n)	5.84±0.17	2.00	13.00
Monthly income (BDT)	22480.00±1350.00	1200.00	70000.00

Among the MEs (MEs), 64% were male and 36% were female. The mean age of the respondents was 45.75±1.01 years.

Table 5. Characters of micro-enterprises.

Parameters	Mean±SEM	Minimum	Maximum
Farm age (years)	15.94±1.28	1.00	40.00
Herd size (n)	21.95±3.02	2.00	250.00
Labour No.	1.80±0.11	1.00	6.00
Feed cost (BDT)/day	294.80±42.34	50.00	1500.00
Labour cost (BDT)/day	497.80±51.87	150.00	2000.00
Health cost (BDT)/month	1354.00±366.50	100.00	27000.00
Permanent full-time employee (N)	1.465±0.09	1	5
Permanent part-time employees (N)	1.3±0.09	1	3

Table 6. Performances of micro-enterprises described by MEs.

Variables	Respondents	
	Frequency	%
Location of business/farm		
It is close residence	31	32.98
It is homeland	24	25.53
It is closer to consumer markets	29	30.85
Type of employees		
Permanent full time (n)	188	99.02
Permanent part-time	34	33.33
Type of permanent employees		
Professionals and skilled workers	40	18.021
Semi-skilled/unskilled workers	130	58.58
Provide training for farm staff	52	42.62
Main product for selling		
Selling milk %	135	71.05
Culled buffaloes %	32	16.84
Access grass %	23	12.10
Reasons for farmers' decision to sell buffaloes		
Family financial needs	60	58.82
Saving milk for selling and family consumption	39	38.24
Main marketing channels		
Wholesaler(s) + Retail shop(s) in the same area + Traders from other regions	31	30.69
Traders from other regions	30	29.70
Retail shop(s) in the same area	29	28.71
Neighbors + Own shop + Retail shop(s) in the same area + Traders from other regions	11	10.89
The proportion of total income is provided by this business		
Provides less than half of the income	19	18.81
Provides about half of the total income	62	61.39
Provides more than half	20	19.80
Management decisions are discussed with Household members	79	77.45
Saving money		
With cooperative/NGOs	66	65.35
Bank	35	34.65
No insurance for enterprise	75	73.53
Have a bank account	97	95.10

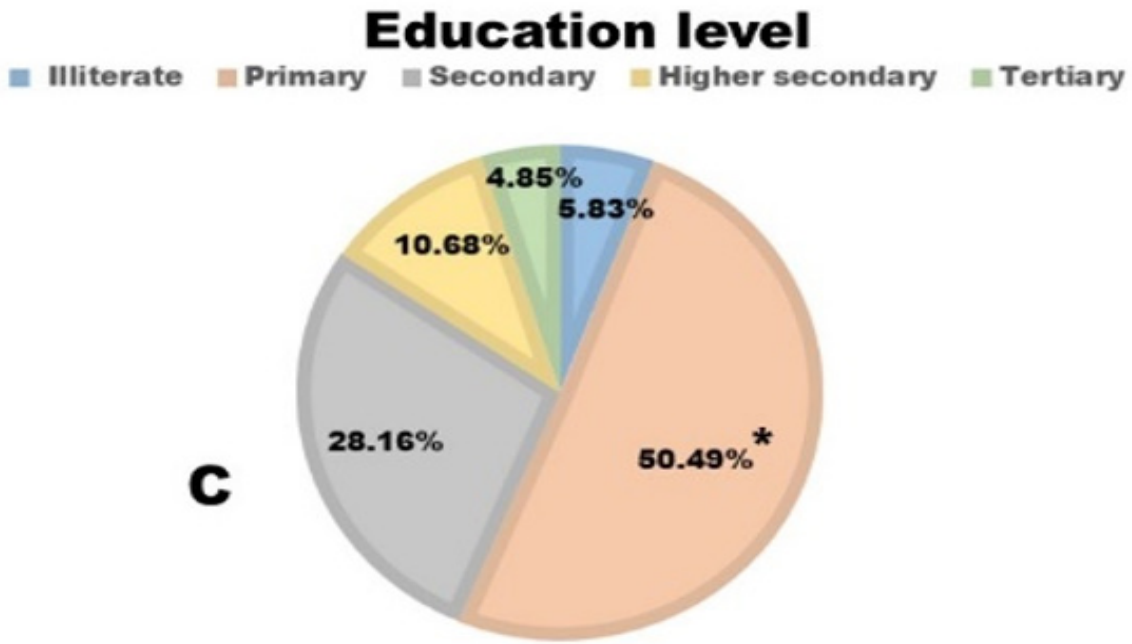


Figure 1. Personal characteristics of Education level.

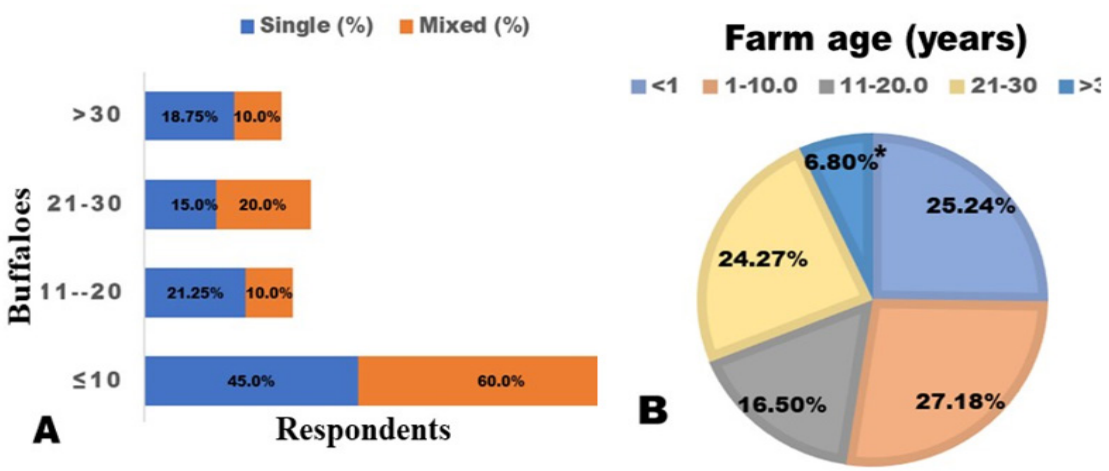


Figure 2. Respondents according to farm type with herd size (A) and farm age (B).
*Indicates difference at 5% level of significance.

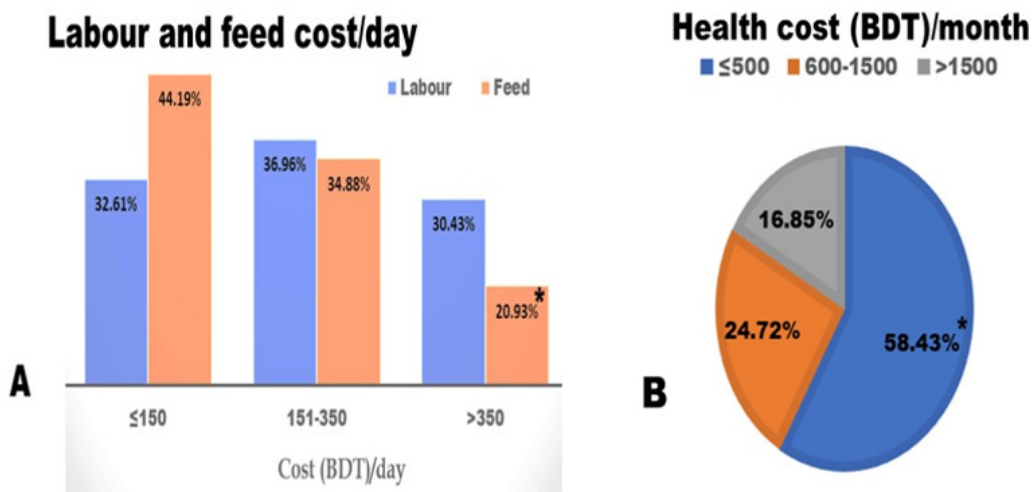


Figure 3. Labor and feed costs/day (A) and health cost/month (B) spend by respondents.
*Indicates difference at 5% level of significance.

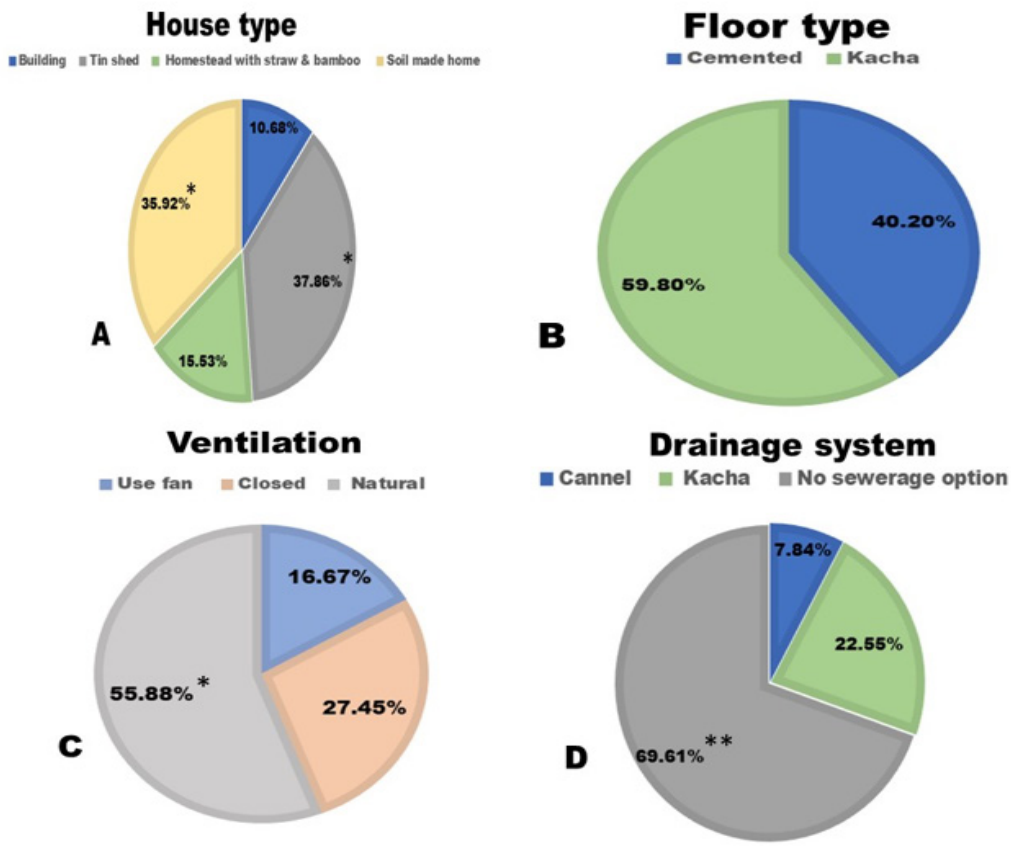


Figure 4. Housing system of the enterprises owned by the respondents.
*Indicates difference at 5% level of significance;
** indicates difference at 1% level of significance.

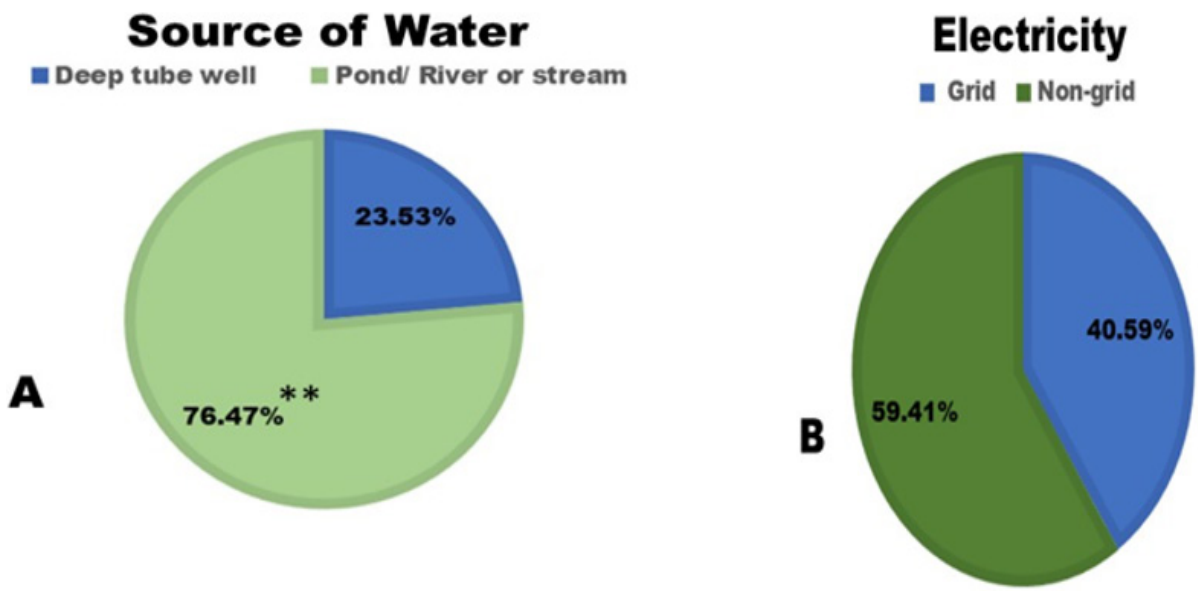


Figure 5. Water (A) and electricity (B) supply of the enterprises.
**Indicates difference at 1% level of significance.

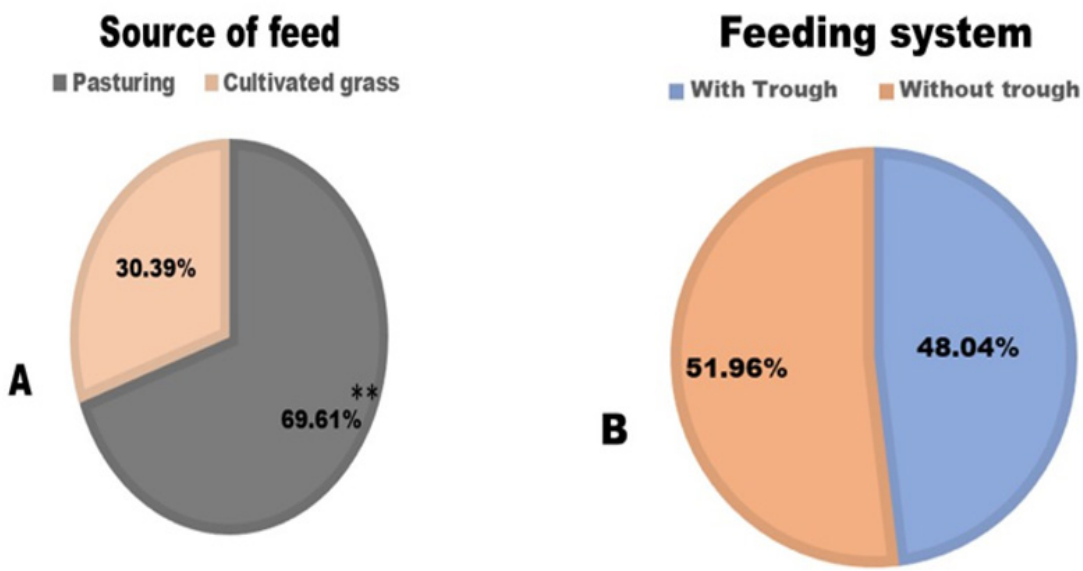


Figure 6. Source of feed (A) and feeding system (B) observed in the studied micro-enterprises.
**Indicates difference at 1% level of significance.

entrepreneurial capacity through targeted education and training, including business start-up planning, marketing strategies, business growth techniques, risk assessment, and management skills. Continuous support, monitoring, and guidance on business strategy and progress will encourage MEs to actively participate and aspire to evolve into small and medium-sized enterprises (SMEs) over the long term. Additionally, fostering a supportive business environment through knowledge-sharing, conferences, seminars, and recognition programs can further enhance the motivation and success of MEs.

ACKNOWLWDGEMENTS

The authors gratefully acknowledge the support and cooperation of the Buffalo farmers of the coastal zone, Grameen Jano Unnayan Sangstha (GJUS and Bangladesh Livestock Research Institute (BLRI). The abstract was presented in the Annual Research Review Workshop during 23 to 24 Dec 2023 at BLRI, Savar, Dhaka.

REFFERENCES

Alam, M.M., R.I. Molla and M.M. Hossain. 2010. *Microentrepreneurship Development in Bangladesh: Achievements and Shortcomings*, LAP Lambert Academic Publishing, Saarbrucken, Germany.

Barreira, J.C.D. 2004. *The influence of business knowledge and work experience, as antecedents to entrepreneurial success*, PhD. Thesis, University of Pretoria, Pretoria, South Africa.

BBS. 2020. *Statistical Pocketbook 2020*, Bangladesh Bureau of Statistics, Dhaka, Bangladesh.

Chakravarty, A.K. 2013. Strategies for genetic improvement of buffaloes through production of quality male germplasm in SAARC countries. *High Yielding Dairy Buffalo Breed Development in SAARC Countries*, SAARC Agriculture Centre, Dhaka, Bangladesh.

Darroch, M. and T.A. Clover. 2005. The effects of entrepreneurial quality on the success of small, medium and micro agri-businesses in KwaZulu-Natal, South Africa. *Agrekon*, **44**(3): 312-343. DOI: 10.1080/03031853.2005.9523715

Das, G.K. and F.A. Khan. 2010. Summer anoestrus in buffalo - A review. *Reproduction in Domestic Animals*, **45**: 483-494. DOI: 10.1111/j.1439-0531.2010.01598.x

David, F.R. 2009. *Strategic Management Concepts and Cases*, 11th ed. Pearson, New Jersey, USA.

Dhanda, O.P. 2013. Changing dynamics in buffalo production systems in South Asian. Region. *Buffalo Bull*., 32(Special Issue 1): 311-331. Available on: https://kukrdb.lib.ku.ac.th/journal/BuffaloBulletin/search_detail/result/286527

Du Toit, G.S., B.J. Erasmus and J.W. Strydom. 2009. *Introduction to Business Management*, 7th ed. Oxford University Press South Africa, Oxford, Southern Africa.

EFSA Panel on Animal Health and Welfare (AHAW). 2012. Scientific opinion on the use of animal-based measures to assess welfare of dairy cows. *EFSA J*., **10**(1): 81. DOI: 10.2903/j.efsa.2012.2554

FAO. 2012. *The State of Food and Agriculture*, Food And Agriculture Organization, Rome,

Italy. Available on: https://www.fao.org/4/i2885e/i2885e00.pdf

Faruque, M.O., M.A. Hasnath and N.U. Siddique. 1990. Present status of buffaloes and their productivity. *Asia-Austral. J. Anim. Sci*., **3**(4): 287-292. DOI: 10.5713/ajas.1990.287

Fatoki, O. and D. Garwe. 2010. Obstacles to the growth of new SMEs in South Africa: A principal component analysis approach. *African Journal of Business Management*, **4**(5): 729-738. DOI: 10.5539/ibr.v4n2p161

Fatoki, O. and A. Odeyemi. 2010. Which new small and medium enterprises in South Africa have access to bank credit. *International Journal of Business and Management*, **5**(10): 128-136. DOI: 10.5539/ijbm.v5n10p128

Faruque, M.O., M.A. Hasnath and N.U. Siddique. 1990. Present status of buffaloes and their productivity in Bangladesh. *Asia-Austral. J. Anim. Sci*., **3**(4): 287-292. DOI: 10.5713/ajas.1990.287

Herrington, M., M.L. Foxcroft, E.J. Wood, J. Kew and N. Segal. 2003. *Global Entrepreneurship Monitor (Gem) - South African Report 2002*. University of Cape Town, Cape Town, South Africa.

Hamid, M.A., M.N.A. Siddiky, M.A. Rahman and K.M. Hossain. 2016. Scopes and opportunities of buffalo farming in Bangladesh: A review. *SAARC Journal of Agriculture*, **14**(2): 63-77. DOI: 10.3329/sja.v14i2.31246

Hellriegel, D., S.E. Jackson, J. Slocum, G. Staude, T. Amos, H.P. Klopper, L. Louw and T. Oosthuizen. 2008. *Management,* 3rd ed. Oxford University Press, New York, USA.

Hisrich, D.R., M.P. Peters and A.S. Dean. 2008. *Entrepreneurship,* 7th ed. McGraw-Hill International Edition, Boston, USA.

Karimi, S., M. Chizari, H.J.A. Biemans and M. Mulder. 2010. Entrepreneurship education in Iranian higher education: The current state and challenges. *European Journal of Scientific Research*, **48**(1): 35-50.

Mutezo, A.T. 2009. *Obstacles in the access to SMME finance: An empirical perspective on Tshwane*. University of South Africa, South Africa.

Naude, W.A. 2007. *Peace, Prosperity, and Pro-growth Entrepreneurship*, United Nations University, World Institute for Development Economics Research, Helsinki, Finland.

Nieman, G. 2001. Training entrepreneurs and small business enterprises in South Africa: A situational analysis. *Education and Training*, **43**(8/9): 445-450. DOI: 10.1108/00400910110411639

Nieman, G. and C. Neuwenhuizen. 2009. *Entrepreneurship: A South African Perspective*, 2rd ed. Van Schaik, Pretoria, Africa.

Nieman, G. and M. Pretorius. 2004. *Managing Growth. A Guide for Entrepreneurs*, Juta and Co. Ltd., Cape Town, South Africa.

Olutunla, G.T. and T.M. Obamuyi. 2008. An empirical analysis of factors associated with the profitability of Small and medium-enterprises in Nigeria. *African Journal of Business Management*, **2**(10): 195-200.

Rahman, M.K., M. Sarkar, M.K.A. Sumon, A. Rahim, R. Nandi and M.M. Hasan. 2020. Socio-economic status of buffalo value chain at Bhola district in Bangladesh. *Bangladesh Veterinary Journal*, **54**: 1-8.

Sohel, M.H.M. 2015. Identification of types of buffaloes available in Kanihari buffalo pocket of Mymensingh district. *Research in Agriculture Livestock and Fisheries*, **2**(1):

109-115. DOI: 10.3329/ralf.v2i1.23042

Talukder, M.H. 2020. Challenges of buffalo health at the coastal regions of Bangladesh, p. 19-29. *In Proceedings The Coastal Vet Society of Bangladesh (CVSBD) 3rd Annual Scientific Conference 2020*, Patuakhali Science and Technology University (Babugonj Campus), Barishal, Bangladesh.

Ucbasaran, D., P. Westhead and M. Wright. 2003. Human capital based determinants of opportunity identification, *Frontiers of Entrepreneurship Research*, **23**: 430-444.