**A study on awareness of pig farming regulations among entrepreneurs in Kerala**

**ABSTRACT**

The present study was conceptualised to analyse the awareness of pig farming entrepreneurs about rules and regulations for the establishment of their entrepreneurial ventures and constraints faced by them during management of their enterprises in Kerala state. The study was conducted among twenty five pig farming entrepreneurs who selected through key informant technique from three districts (Thiruvananthapuram, Thrissur, Malappuram) of Kerala state. Findings revealed that majority of the pig farming entrepreneurs were male within the middle aged group (25 to 36 years) and were literate with high school education. Majority of respondents were having low herd size with medium experience in pig farming enterprise, low land holding and annual income. Results revealed that 44 per cent of the pig farming entrepreneurs had low level of awareness regarding rules and regulations for the establishing their enterprises, followed by medium (36%) and high (20%) level of awareness. This study revealed significant gaps in entrepreneurs’ awareness regarding regulatory and operational requirements for pig farming, including pig farm categorisation, licensing, inspection protocols, spatial regulations, and waste management. Lack of financial support and subsidies, stringent regulatory requirements for establishing enterprise, less availability of quality animals, high cost of crossbred / improved animals, hostility from neighbours, lack of awareness about government entrepreneurship development schemes, incidence of diseases in animals, lack of access to market linkages and information, non-availability of sufficient land, lack of scientific infrastructure for production, processing and marketing and high rate of interest charge by money lenders were observed as the major constraints perceived by them. The study suggested that there was need for targeted training and information dissemination among pig farming entrepreneurs. Raising awareness about farm classification, licensing, spatial and environmental regulations, and regular compliance procedures is essential for promoting sustainable and legally compliant pig farming.

Keywords**:** Awareness, Constraints, Government regulations, Pig farming

**INTRODUCTION**

Agriculture and allied sectors make up the backbone of India's rural economy. Livestock farming greatly improves household income, food security, and job opportunities. Pig farming has become important farming among livestock species because it doesn't cost much to start, pigs reproduce quickly, and they convert feed into energy more efficiently. People know that pork is a cheap, high-quality source of dietary protein. Asian countries also use pigskin and bristles to make lightweight leather and brushes. They can sell pork for money, turn processed meat into sausage, use pig manure as fertilizer, and use biogas from pig waste to make cooking gas and help microorganisms and plants grow, which feed freshwater fish and ducks (Kumar and Mazhar, 2020). Pig farming gives rural farmers who work seasonally a chance to make more money and improve their quality of life (Ramesh et al,*.* 2014). According to the 20th Livestock Census (2019), India has 9.06 million pigs, most of which are raised by smallholder and tribal farmers in poor areas. The agricultural and dietary transformations observed in the 21st century mark significant deviations from traditional small holder production system, with clear evidence of industry consolidation is clearly visible in the last two decades (Anujet al. 2016, Thomaset al.2021). It should be noted that the industrialisation of pig production is a comparatively recent phenomenon on a global scale. In Kerala, too, the speed and scale of change has been phenomenal, conditioned by policies, investments and the transforming economic system. The pig population in Kerala has increased by 86.19 per cent over the last seven years, from 55,782 in 2012 to 1,03,863 in 2019. Pigs constitute 3.57 per cent of the total livestock population in Kerala (Bhosale, 2024).

Regarding the licensing of pig farms in the Kerala, only 10 per cent of the approximately 12,000 pig farms have received approvals from the local self-government institutions and the Pollution Control Board (Mohan, 2024). Despite a rising in pig population and growing demand for pork and value added pork products in Kerala, the sector continues to received limited attention in terms of institutional support, research focus, and policy consideration. Against this backdrop, a study was undertaken to assess the awareness of regulatory frameworks for pig farming enterprise establishment among pig entrepreneurs and identify the key constraints they face in their entrepreneurial endeavours.

**MATERIALS AND METHODS**

The present study was conducted in three districts of Kerala such as Thiruvananthapuram, Trissur, Malappuram. Data were collected using pretested interview schedule from twenty five pig farming entrepreneurs through key informants technique (Tremblay, 1957). The collected data were scored, compiled, tabulated and analysed through SPSS computer software by using various appropriated statistical tools and techniques such as frequencies, percentages, mean and standard deviation. Garret’s ranking technique (Garrett and Woodworth, 1969) was adopted to analyze the constraints faced by the respondents in the study area.

**RESULTS AND DISCUSSION**

A clear understanding of their profile is essential, as various characteristics influence their awareness level. The data in the Table 1 revealed that 42.5 per cent of the pig farming entrepreneurs belonged to middle aged category and 88 per cent of the respondents were male. Cent per cent of them were educated and 64 per cent of them had high school education. All the respondents were married with 64 percent belonged to nuclear family type with medium (4-6 members) family size (68%) and taken up pig enterprise as primary occupation (60%). They possessed average herd size of 88 no. of pigs with medium (68%) experience of 2 to 9 years. and having low (68%) land holding **(**0.03 to 0.39 acres**)** and low (96%) annul income **(**Rs.52500 to Rs.1453182).

**Socio-demographic profile of pig farming entrepreneurs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Table 1. Socio-personal variables of pig farming entrepreneurs (n=25)** | | | | |
| **S.No.** | **Variables** | **Categories** | **Frequency** | **Percentages (%)** |
| 1. | Age (years) | Young (25 to 36) | 3 | 7.5 |
| Middle (37 to 48) | 17 | 42.5 |
| Old (49 to 60) | 5 | 12.5 |
| 2. | Gender | Male | 22 | 88 |
| Female | 3 | 12 |
| 3. | Education | Illiterate | 0 | 0 |
| Primary school | 2 | 8 |
| Middle school | 0 | 0 |
| High school | 16 | 64 |
| Intermediate | 4 | 16 |
| Graduate and above | 3 | 12 |
| 4. | Religion | Hindu | 13 | 52 |
| Christian | 12 | 48 |
| Muslim | 0 | 0 |
| 5. | Marital status | Married | 25 | 100 |
| Un married | 0 | 0 |
| 6. | Family type | Joint family | 9 | 36 |
| Nuclear family | 16 | 64 |
| 7. | Family size (number of) | Small (1-3) | 5 | 20 |
| Medium (4-6) | 17 | 68 |
| Large (7-9) | 3 | 12 |
| Very large (>9) | 0 | 0 |
| 8. | Occupation | Primary occupation | 15 | 60 |
| Secondary occupation | 10 | 40 |
| 9. | Herd size (no.) | Low (10 to 145) | 18 | 72 |
| Medium (146 to 281) | 6 | 24 |
| High (282 to 417) | 1 | 4 |
| 10. | Experience in swine farming enterprise (years) | Low (2 to 9) | 17 | 68 |
| Medium (10 to 17) | 4 | 16 |
| High (18 to 25) | 4 | 16 |
| 11. | Land holding (acres) | Low (0.03 to 0.39) | 17 | 68 |
| Medium (0.10 to 0.76) | 7 | 28 |
| High (0.77 to 1.13) | 1 | 4 |
| 12. | Annual income | Low (Rs.52500 to Rs.1453182) | 24 | 96 |
| Medium (Rs.1453183 to Rs.2853865) | 0 | 0 |
| High (Rs.2853866 to Rs.4254548) | 1 | 4 |

**Awareness of pig farming entrepreneurs regarding rules and regulations for establishment of their entrepreneurial ventures**

The awareness of swine farming entrepreneurs about rules and regulations for establishment of their entrepreneurial ventures was presented in Table 2, which depicts that most pig farming entrepreneurs were aware that livestock farm owners are responsible for maintaining sanitary conditions (96%). This high level of awareness is consistent with findings from previous studies, which emphasise the importance of biosecurity and sanitation in preventing disease outbreaks and ensuring the sustainability of pig farming operations (Alawneh et al*.,* 2018). Further, 84 per cent of respondents recognised the necessity of taking scientific precautionary measures, reflecting the growing emphasis on evidence-based management practices in modern pig production (Gelaude et al., 2014).

Regarding waste management, 68 per cent of entrepreneurs were aware of the need for proper waste disposal systems such as potholes, collection tanks, compost pits, and biogas plants, as well as the requirement for septic tanks, soak pits, and slurry disposal systems near biogas plants. These findings align with research highlighting the adoption of integrated waste management practices in livestock farms to mitigate environmental pollution and enhance resource recovery (Gerber et al., 2013). Cao et al.(2023) examined methods to mitigate odours arising from livestock farms. These encompassed altering the animals' diets, overseeing the farms' housing, regulating the manure, and purifying the air at the exhaust. These measures will mitigate odours and enable the proximity of livestock farms to residential areas.

Most of entrepreneurs were unaware that pig rearing is categorised under green activities by Kerala State Pollution Control Board (KSPCB) (88%) as well as the classification of pig farms based on herd size (84%) and the associated license fee structure for different farm categories (76%). This lack of awareness is concerning, as farm typology including classification by herd size and legal status is fundamental for regulatory compliance and for tailoring biosecurity and management practices (FAO, 2018). Studies emphasise that clear understanding of farm classification helps in disease control and resource allocation, and is prerequisite for accessing government schemes and maintaining operational transparency (Alawneh et al.,2018). Similarly, 76 per cent of respondents were unaware of the requirement for biannual inspection of farms and submission of reports to the Gram Panchayat by an authorised officer. Regular inspections and reporting are internationally recognized as critical to maintaining animal welfare standards and environmental safety (Gelaude et al.,2014).

A substantial 72 per cent of entrepreneurs did not know about minimum required distances between pig farms and residences (50m for 6–15 pigs, 75m for 16–50 pigs, and 100m for >50 pigs), nor about land requirements and penalties for non-compliance. The appropriate siting of pig farms maintaining adequate distance from residential areas is essential to minimize odor, disease transmission, and community conflict.

Additionally, 68 per cent were unaware of the annual renewal fee charged by the Gram Panchayat, while 56 per cent did not know that a license is required for farms with more than five pigs or that sewage disposal is prohibited near drinking water sources. These regulatory requirements are designed to ensure sustainable waste management and prevent contamination of water resources, which is a major concern in intensive livestock production. So the lack of awareness and enforcement of such regulations can lead to significant environmental and public health risks.

|  |  |  |  |
| --- | --- | --- | --- |
| **Table 2. Distribution of pig farming entrepreneurs based on awareness about rules and regulations for establishment of their entrepreneurial ventures (n=25)** | | | |
| **S.No.** | **Statements** | **Yes** | **No** |
|  | Are you aware of the Kerala Panchayat Raj (Licensing and Regulations of Farm) Act, 2012 ? | 15  (60) | 10  (40) |
|  | The establishment of livestock farm in which more than five number of pigs are being reared shall be required to get a license from Gram Panchayat | 11  (44) | 14  (56) |
|  | Class I, II, III, IV, V & VI livestock farms consists of 6-15, 16-50, 51-100, 101-200, 201-400 and above 400 animals respectively | 4  (16) | 21  (84) |
|  | The total amount of license fee for the establishment of class I, II, III, IV, V and VI farms are Rs.100, Rs.250, Rs.300, Rs.500, Rs.1000 and Rs.2000 respectively | 6  (24) | 19  (76) |
|  | Minimum area of land required for maintenance of two pigs is one cent | 7  (28) | 18  (72) |
|  | Livestock farm shall have regular waste disposal facilities such as pothole, collection tank, compost pit and biogas plant | 17  (68) | 8  (32) |
|  | Adjacent to the biogas plant, there should be a septic tank, soak pit and slurry disposal system | 17  (68) | 8  (32) |
|  | No sewage disposal arrangement shall be established near a water source from which water is drawn for human consumption | 11  (44) | 14  (56) |
|  | The owner of livestock farm shall be responsible for maintaining the premises, buildings and sheds of the livestock farm in a sanitary and environmentally sound manner | 24  (96) | 1  (4) |
|  | The gram panchayat shall charge a fee for the renewal of license for each financial year | 8  (32) | 17  (68) |
|  | The owner of livestock farm shall take scientific precautionary measures against the spread of infectious diseases of animals | 21  (84) | 4  16 |
|  | Carcasses of dead animals shall be disposed of as directed by officers of Dept. of AH | 14  (56) | 11  (44) |
|  | The authorized officer shall inspect the livestock farm once in six months and shall submit his inspection report to the Gram panchayat | 6  (24) | 19  (76) |
|  | If someone runs a livestock farm against these rules, they can be fined up to one thousand rupees and in case of continuing offence, to an additional fine of fifty rupees for each day | 7  (28) | 18  (72) |
|  | The minimum distance to the nearest residence is 50, 75 and 100 meters from pig unit of 6-15, 16-50 and >50 number respectively | 7  (28) | 18  (72) |
|  | According to Kerala State Pollution Control Board guidelines, pig rearing are categorised as green activities | 3  (12) | 22  (88) |
| *Figures in paranthesis indicate percentages* | | | |

Findings from Fig. 1 revealed that majority of pig farming entrepreneurs had low (44%) awareness of rules and regulations for establishing their ventures, 36 per cent of them belong to medium awareness category and only 20 per cent of pig farming entrepreneurs had high awareness. This finding is consistent with the study conducted by Chepkwony et al. (2025) in North America found that knowledge about biosecurity practices and regulatory requirements varied widely, with notable gaps among small-scale and backyard pig farmers. This study also emphasized that while some pig producers are knowledgeable about certain diseases due to targeted education campaigns, overall awareness of comprehensive regulatory frameworks remains limited, especially in less commercial settings. This lack of awareness is significant because it directly impacts the adoption of critical practices necessary for disease prevention and regulatory compliance.

Similarly, a study in China by Li et al.(2023) indicated that government regulations can facilitate the adoption of biosecurity measures by increasing farmers' awareness; however, deficiencies in education and access to information frequently lead to low baseline awareness among numerous pig farmers. Furthermore, South Africa assessing smallholder pig farmers’ awareness of good management practices also identified low levels of knowledge regarding optimal production and regulatory requirements, reinforcing the need for targeted educational programmess (Braaeet al.,2016).

**Fig. 1 Overall awareness of swine farming entrepreneurs about rules and regulations for establishment of their entrepreneurial ventures**

The overall findings underscore a pressing need for targeted training and information dissemination among pig farming entrepreneurs. Raising awareness about farm classification, licensing, spatial and environmental regulations, and regular compliance procedures is essential for promoting sustainable and legally compliant pig farming.

**Constraints faced by pig farming entrepreneurs in the management of their entrepreneurial ventures**

Various constraints faced by pig farming entrepreneurs in the management of their entrepreneurial ventures are mentioned in the table 3. The constraints were categorised as financial constraints, infrastructural constraints, administrative constraints, technical constraints, marketing constraints and personal and social constraints. Under financial constraints, the majority (59.12%) (Rank I) of the pig farming entrepreneurs expressed that high rate of interest charge by money lenders as the major constraint faced by them. The other constraints faced by them were high cost of initial investment (55.32%) (Rank II) and difficulties in getting loan (35.56%) (Rank III). Under infrastructural constraints, the majority (68.08%) (Rank I) of the pig farming entrepreneurs considered non-availability of sufficient land as the major constraint, followed by lack of scientific infrastructure for production, processing and marketing (48.28%) (Rank II), high cost of equipment's (45.56%) (Rank III) and lack of cold chain and storage facilities (39.76%) (Rank IV). Under administrative constraints, the majority (70.96%) (Rank I) of the swine farming entrepreneurs considered lack of financial support and subsidies as the major constraint, followed by stringent regulatory requirements for establishing enterprise (62.20%) (Rank II), delays in obtaining necessary approvals and licenses (51.88%) (Rank III), inadequate slaughter and waste management facilities (50.44%) (Rank IV), high premium amount for insurance of animals (40.72%) (Rank V) and inadequate training facilities (25.16%) (Rank V). Under technical constraints, the majority (78.36%) (Rank I) of the swine farming entrepreneurs considered less availability of quality animals as the major challenge, followed by, high cost of crossbred / improved animals (72.32%) (Rank II), incidence of diseases in animals (61.80%) (Rank III), high cost of veterinary medicines (51.84%) (Rank IV), highly expensive consultancy service of private practitioners (49.12%) (Rank V), high cost of concentrate feed (45.68%) (Rank VI), high cost of farm labour (42.96%) (Rank VII), less availability of skilled labour (42.12%) (Rank VIII), lack of technical support (35.32%) (Rank IX) and lack of veterinary facilities in the village (20.92%) (Rank X). Under marketing constraints, the majority (58.80%) (Rank I) of swine farming entrepreneurs considered lack of access to market information as the major constraint, followed by lack of market linkages (56.40%) (Rank II), high cost of transportation (53.40%) (Rank III), long distance to market (52.80%) (Rank IV) and less remunerative price for livestock produce (28.60%) (Rank V). Under personal and social constraints, the majority (68.44%) (Rank I) of the swine farming entrepreneurs considered hostility from neighbours as the major challenge, followed by lack of awareness about government entrepreneurship development schemes (58.92%) (Rank II), lack of knowledge on management of livestock enterprise (44.96%) (Rank III) and lack of education of entrepreneur (27.68%) (Rank IV).

|  |  |  |  |
| --- | --- | --- | --- |
| **Table 3. Constraints faced by pig farming entrepreneurs in the management of their entrepreneurial ventures** | | | |
| **S.No.** | **Constraints** | **Mean score** | **Rank** |
| **I.** | **Financial constraints** |  |  |
|  | High cost of initial investment | 55.32 | II |
|  | High rate of interest charge by money lenders | 59.12 | I |
|  | Difficulties in getting loan | 35.56 | III |
| **II.** | **Infrastructural constraints** |  |  |
|  | Non-availability of sufficient land | 68.08 | I |
|  | Lack of scientific infrastructure for production, processing and marketing | 48.28 | II |
|  | High cost of equipment's | 45.56 | III |
|  | Lack of cold chain and storage facilities | 39.76 | IV |
| **III.** | **Administrative constraints** |  |  |
|  | Stringent regulatory requirements for establishing enterprise | 62.20 | II |
|  | Delays in obtaining necessary approvals and licenses | 51.88 | III |
|  | Lack of financial support and subsidies | 70.96 | I |
|  | Inadequate slaughter and waste management facilities | 50.44 | IV |
|  | Inadequate training facilities | 25.16 | VI |
|  | High premium amount for insurance of animals | 40.72 | V |
| **IV.** | **Technical constraints** |  |  |
|  | High cost of concentrate feed | 45.68 | VI |
|  | High cost of veterinary medicines | 51.84 | IV |
|  | Less availability of skilled labour | 42.12 | VIII |
|  | High cost of farm labour | 42.96 | VII |
|  | Less availability of quality animals | 78.36 | I |
|  | High cost of crossbred / improved animals | 72.32 | II |
|  | Lack of technical support | 35.32 | IX |
|  | Lack of veterinary facilities in the village | 20.92 | X |
|  | Highly expensive consultancy service of private practitioners | 49.12 | V |
|  | Incidence of diseases in animals | 61.8 | III |
| **V.** | **Marketing constraints** |  |  |
|  | Less remunerative price for livestock produce | 28.6 | V |
|  | Lack of access to market information | 58.8 | I |
|  | High cost of transportation | 53.4 | III |
|  | Long distance to market | 52.8 | IV |
|  | Lack of market linkages | 56.4 | II |
| **VI** | **Personal and social constraints** |  |  |
|  | Lack of education of entrepreneur | 27.68 | IV |
|  | Lack of knowledge on management of livestock enterprise | 44.96 | III |
|  | Lack of awareness about government entrepreneurship development schemes | 58.92 | II |
|  | Hostility from neighbours | 68.44 | I |

The present results align with the findings of Banta et al. (2012), which indicated that piggery farmers faced challenges such as elevated feed costs, expensive veterinary services, inadequate housing, low market prices for pigs, insufficient financing, high transportation costs, and a lack of improved breeds. Mutibvuet al. (2012) identified feed scarcity as the second most significant issue faced by livestock farmers. Islam et al. (2016) identified insufficient credit facilities, inadequate scientific knowledge regarding pig farming, absence of veterinary services, lack of breeding resources, and insufficient marketing facilities as constraints. Pegu (2014) identified several challenges such as inadequate quality breeding stock, insufficient connections with financial institutions, limited time for reform, disease outbreaks, seasonal variability, lack of training, inadequate veterinary support, and absence of effective marketing channels. The primary constraints were inadequate access to extension services and competition for market placement. The absence of structured markets and adequate transportation infrastructure further hinders the commercialization of pig farming in the region (Singh and Kumar, 2016). Shadap (2015) identified the high cost of concentrate feed, limited availability of medicines and vaccines, insufficient government input supply, and economic issues as the primary constraints. Kumar and Mazhar (2020) identified the absence of government schemes and policies as their primary constraint. Concurrently, the additional constraints identified by the piggery farmers included: absence of organized markets (98.6%), insufficient consumer demand (97.2%), limited popularity of pork (94.4%), elevated costs of concentrated and animal feed (93.5%), inadequate relationships with extension agencies (77.7%), lack of veterinary services (68.5%), diminished animal productivity (65%), and increased costs of veterinary services (40.2%). Kumar et al. (2025) identified the significant challenges encountered by pig farmers in the Lalitpur district of Uttar Pradesh in implementing recommended pig rearing management practices, including the high expense of improved breeds, insufficient knowledge, disease vulnerability, feeding issues, vaccination, pest and disease management, marketing, transportation, temperature variability, lack of education, untouchability, and inadequate institutional support.

**CONCLUSION**

The present study concluded that the pig farming entrepreneurs in Kerala were of middle age group and most of them were male. The entrepreneurs had different levels of education and higher numbers of respondents had pig rearing as their primary occupation with low herd size and medium experience. The respondents possessed low land holding and earned low annual income. The study showed that majority of pig farming entrepreneurs had low awareness about rules and regulations for establishment of their entrepreneurial ventures. The present study also highlights the multifaceted constraints faced by pig farming entrepreneurs in management of their ventures. They were lack of financial support and subsidies as the major constraint, stringent regulatory requirements for establishing enterprise, less availability of quality animals, hostility from neighbours, lack of awareness about government entrepreneurship development schemes, high cost of crossbred / improved animals, incidence of diseases in animals, lack of access to market information, lack of market linkages, non-availability of sufficient land, lack of scientific infrastructure for production, processing and marketing, high rate of interest charge by money lenders. The findings clearly indicate the need for targeted interventions, such as enhanced subsidies and financial support from government, availability of good quality boar or gilt for breeding, improve pig farmers awareness on government regulations about pig rearing through scientific training programmes, timely access to market information and stronger marketing infrastructure. Addressing these constraints through a comprehensive, multi-stakeholder approach can significantly improve the productivity, profitability and social acceptance of pig rearing in the region.

REFERENCES

Alawneh, J. I., Barnes, T. S., Parke, C., Lapuz, E., David, E., Basinang, V., & Blackall, P. J. (2018). Description of the practices and factors associated with the biosecurity and disease management on pig farms in the Philippines. *Preventive Veterinary Medicine,* 160:73-79, <https://doi.org/10.1016/j.prevetmed.2018.10.003>

Anuj, C., Patel, B. H. M., Rajveer, M., Sushil, K., Sanjeev, S., & Subodh, K. (2016). Pig production system as a source of livelihood in Indian scenario: an overview. *International journal of Science, Environment and Technology,* 5(4):2089-96.

Banta, A.L., Wamagi T.I., Ayuba A.M., & Olukosi J.O. (2012). Analysis of socio - economic characteristics of pig farmers that influence sustainable development in Kaduna state, Nigeria. *Journal of Agriculture and Veterinary Sciences*, 4.

Bhosale, D. (2024). “An overview of pig farming in Kerala, India”. e feedlink. 5th march, 2024. <https://www.efeedlink.com/contents/03-05-2024/a4e2ea9d-8939-4ebd-802d>15541c75343e-0002.html.

Braae, U. C., Penrith, M. L., Ngowi, H. A., Lekule, F., & Johansen, M. V. (2016). Awareness concerning optimal pig production management and animal welfare among smallholder farmers in Tanzania. *Animal Welfare*, *25*(4), 439-446.

Cao, T., Zheng, Y. & Dong, H. (2023). Control of odor emissions from livestock farms: A review. *Environmental Research*, 225*:*115545.

Chepkwony MC, Makau DN, Yoder C, Corzo C, Culhane M, Perez A., et al. (2025). A scoping review of knowledge, attitudes, and practices in swine farm biosecurity in North America. Front Vet Sci. 3(12):1507704. doi: 10.3389/fvets.2025.1507704.

Department of Animal Husbandry & Dairying. (2019). 20th Livestock Census. New Delhi: Ministry of Fisheries, Animal Husbandry and Dairying, Government of India; 2019.

FAO. (2018). Guidelines for development of a classification system related to farm typology. Food and agricultural organisation of United States. https://openknowledge.fao.org/server/api/core/bitstreams/84c6e0c5-4edf-4fc7-9d14-2c612557f57f/content

Garrett, H.E., & Woodworth, R.S. (1969). *Statistics in Psychology and Education.* Vakils, Feffer and Simons Pvt. Ltd, Bombay, 329p.

Gelaude, P., Schlepers, M., Verlinden, M., Laanen, M., & Dewulf, J. (2014). Biocheck. UGent: a quantitative tool to measure biosecurity at broiler farms and the relationship with technical performances and antimicrobial use. *Poultry science*, *93*(11), 2740-2751.

Gerber, P. J., Steinfeld, H., Henderson, B., Mottet, A., Opio, C., Dijkman, J., Falcucci, A., & Tempio, G. (2013). Tackling climate change through livestock: A global assessment of emissions and mitigation opportunities. Food and Agriculture Organization of the United Nations (FAO).

Islam, R. A. F. I. Q. U. L., Nath, P., & Bharali, A. (2016). Constraints perceived by the small scale pig farmers in Sivasagar district of Assam: An analysis. *The Asian J of Anim Sci*, 11(1), 73-77.

Kumar, S.N.P. & Mazhar S.H. (2020). Constraints Experienced by the Piggery Farmers of West Godavari District of Andhra Pradesh. *International Journal of Current Microbiology and Applied Sciences,* 9(10): 1989-1993. doi: <https://doi.org/10.20546/ijcmas.2020.910.242>

Kumar, N., Singh, D., Kumar, A., Chauhan, M., Kamal, A,, Kumawat, M. & Kerketta P. (2025). Constraints faced by farmers in pig rearing management practices in Lalitpur district of Uttar Pradesh. *International Journal of Agriculture Extension and Social Development*, 8 (SP-Issue 4): 109-112.

Li, J., Yuan, M., Wang, H. & Zhou, K. (2023). Governement regulations, biosecurity awareness and farmers adoption of biosecurity measures: Evidence from pig farmers in Sichuan Province, China. *Frontiers in Sustainable Food Systems*. 7:1106766.

Mohan, S. (2024). “Efforts to classify and license pig farms in Kerala drag on”. The New Indian Express, 12th August 2024. https://www.newindianexpress.com/states/kerala/2024/Aug/12/efforts-to-classify-license-pig-farms-in-kerala-drag-on

Mutibvu, T., Maburutse, B.E., Mbiriri, D.T & Kashangura, M.T. (2012). Constraints and opportunities for increased livestock production in communal areas: A case study of Simbe, Zimbabwe. Department of Animal Science, University of Zimbabwe. Nishi.

Pegu. (2014). Piggery Enterpreneurship in Dhemaji district of Assam. Thesis; College of Veterinary Science, Assam Agricultural University, Guwahati, Assam, India.

Ramesh, J,, Gopinathan, A. & Vijayakumar, M.P. (2014). Evaluation of poultry whole carcass meal as an animal protein source in fattening crossbred pig rations. *Advances in Applied Research,* 6(2):190-193.

Shadap. (2015). Government sponsored piggery development in Meghalaya. M.V.Sc. Thesis, College of Veterinary Science, Assam Agricultural University, Guwahati, Assam, India.

Singh, R. & Kumar, S. (2016). Challenges and opportunities in piggery development in India. *Veterinary World.* 9(4):460-465.

Thomas, R., Singh, V. & Gupta, V. K. (2021). Current status and development prospects of India’s pig industry. *Indian Journal of Animal Science,* 91(4): 255-268.

Tremblay, M.A. (1957). The key informant technique: A non-ethnographic application. *American Anthropologist,* 59: 688-701.