

*Full length paper*

**PERCEPTION OF BHUTANESE FARMER TOWARDS PIG FARMING IN BHUTAN**

**GYEMBO TSHETEN<sup>1\*</sup>, TENZIN PENJOR<sup>1</sup>, PEMA SHERAB<sup>1</sup> AND TASHI DORJI<sup>2</sup>**

<sup>1</sup>National Piggery Research and Development Centre, Department of Livestock, Ministry of Agriculture & Forests, Gelephu, Bhutan

<sup>2</sup>International Centre for Integrated Mountain Development, Katmandu, Nepal

\*Author for correspondence: gyembotsheten@yahoo.com

Copyright © 2020 Gyembo Tsheten. The original work must be properly cited to permit unrestricted use, distribution, and reproduction of this article in any medium.

**ABSTRACT:** The study was conducted to understand attitude and perceptions of pig rearing farmers towards the future of piggery development. Data were collected from 420 respondents through face-to-face interview using semi-structured questionnaire between October 2018 and April 2019. The data were analyzed using descriptive statistics. Majority of pig farmers were found to practice backyard pig production, and most of them are either illiterate (51%) or with non-formal education (32%). Pigs are reared mainly for income generation and household consumption. The study recoded only 6.2% of the respondents against 93.8% involved in breeding and fattening of pig, respectively. Majority of the respondents reported that the pig farming is profitable, and prefers to rear exotic pig breeds due to faster growth rate. Despite many challenges such as religious disapproval, inadequate and high commercial feeds costs and labour shortage hindering pig development in the country, more than 73% of the respondents reported to continue pig farming as a source of livelihood. Nonetheless, if appropriate policy interventions are not made, the pig farming is likely to decline and local pigs might extinct over the period.

**Keywords:** Attitudes; farmers' perceptions; pig farming; subsidy; sustainable.

## 1. INTRODUCTION

Livestock production is operated either on small or large scale (Walugembe et al. 2014) that alleviate poverty (FAO 2014) through improving access to food particularly as a source of protein (FAO 2012), fibre, income, employment, draught power and fertilizers (Chauhan et al. 2016; Upton 2004). Pigs compete for food with people, but they utilize household wastes and agricultural by-products (Obayelu et al. 2017) and provide food to humans. Thus, pig production plays a vital role beyond pork production and income generation (Ogunniyi and Omoteso 2011). In Bhutan, the piggery sector development started since inception of the first five-year plan in 1960s, yet the growth remained slow despite enabling government policy interventions with introduction of exotic pig breeds. The indigenous pig population has declined at alarming rate with decrease in local pig rearing household from 36.1% (PHCB 2005) to 3.2% (PHCB 2017) over the past decades. The overall pig population has declined at the rate of 2.5% annually over the last decade (DoL 2007-2017). This decrease in pig

population was attributed to increasing religious disapprovals (Nidup et al. 2011). The pig population recorded was 18815 head, with annual domestic pork production of about 1000 metric tons (MT) (DoL 2017) in 2017. This has resulted to huge import of pork at 2127 MT equivalent to Nu. 283 million in term of value (MoAF 2015).

Today, the number of pig rearing households are declining, while on the other hand the demand for pork have had increased due to increase in income, growing population and urbanization in the country. Thus, it was felt necessary to investigate and understand the perceptions of current pig farmers towards piggery development so that the government could make informed policy decisions.

## 2. METHODS AND MATERIALS

### 2.1. Study area

The study was conducted in fourteen dzongkhags (districts) covering 46 gewogs (sub-districts) which are

purposively selected based on existing pig farming households recorded in 2018.

## 2.2 Sample size and respondents

The sample size was calculated using Yamane's formula, with 95% confidence level and  $\pm 5\%$  precision level as per the equation 1 below:

$$\text{Equation 1: } n = \frac{N}{1+N(e^2)}$$

Wherein, n stands for sample size, N is equal to population size and e is equal to level of precision

In total 420 pig rearing households were identified from different pig rearing Dzongkhags in consultation with respective livestock officials working in the dzongkhag and gewog livestock Sector.

## 2.3 Pig farm classifications

The pig farming in this study was classified according to farm size and type as backyard ( $\leq 5$  fattening pigs), breeding farm (female breeding pigs irrespective of size) and fattening farm ( $> 5$  fattening pigs) to comprehend the type of pig production.

## 2.4 Data collection

The data was gathered from October 2018 to April 2019 through face-to-face interview of 420 respondents in total using semi-structured questionnaire. The questionnaire consisted of three parts: i) respondent details, ii) socio-economic background and iii) other information related to pig farming to generate information pertaining to pig farmers' attitude and perception towards piggery farming and development.

## 2.5 Data Analysis

The survey data were compiled in Microsoft Excel sheet with coding of questions and responses. The data were descriptively analysed using SPSS version 23.0. Cross tabulation was carried out to determine farm type and educational level of the participating respondents.

## 3. RESULTS AND DISCUSSION

### 3.1 Characteristics of respondents

The gender ratio of the participating respondents was almost equal with 52% male and 48% female. Similarly, about 50% of the respondents were head of households and the remaining 50% were other household members. The average household member size recorded was five, and more than 50 % of the respondent had family members size more than five in this study. The study recorded five ethnic groups – sharchop (27.86), lhotsham (52.38%), Ngaloop (9.76%), Khengpa (9.52%) and doyap (.48%) from various religious background such as

Buddhism (73.81%), Hindu (16.91%) and others (9.29%) were found rearing pigs.

The age, education level and farming experiences are the internal factor which can affect pig farming effort (Suratiyah 2006 cited in Katagame et al. 2017). The age of majority of the respondents (94%) were between 17-64 years and 6% were 65 years and above. In accordance with PHCB (2017), population between 15-64 years of age are considered to be of productive age while population ages of 65 years and above fall under elderly age group. In this study, about 52% of the respondents were between 17-45 years of age, and more than 79% within this age range were involved in pig farming indicating younger generation preference in pig farming. This is in contrast to Brooks et al. (2013) findings, where they reported younger generation would rather migrate to urban areas in search of salaried jobs not showing interest in farming. The study recorded that people interested to rear pigs are mostly from low income earning group such as people working as national work force (NWF), caretakers for landlords, security guards and cooks in schools/institutions and projects. Interestingly this group of people are actually deprived of subsidy and normal inputs supply supports provided by government.

The policy support on providing subsidy package to these low earning section, mass awareness & motivation through establishment of model farm in their vicinity, sensitizing local leaders & community on import substitution & food security and leasing out government land to educated youths for pig farming would help boost domestic pork production. The pig farming in general are dominated by back yard farming; yet there are few farmers taking up commercial pig farming in the southern belts of the country. The study recorded 51% and 32% of the small pig farmers are illiterate and had either primary or non-formal education, respectively. The average experiences of respondent in pig farming was six years, with about 50 % having involved in pig farming for more than six years.

### 2.2. Pig farm type

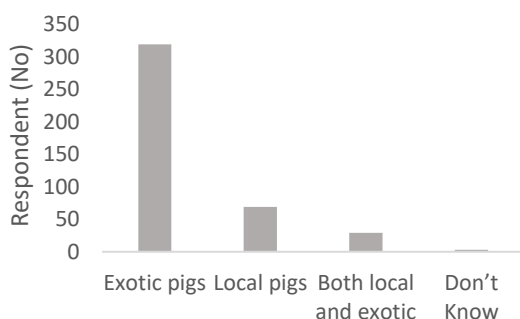
The pig farming was mainly oriented towards the pork production with only 6.2% of the farms operating exclusively for breeding and production of piglets. The study found that about 72.9% of respondents are involved in backyard pig farming for fattening. Others 13.8 % and 13.3 % of respondents were found rearing pigs either for breeding or both breeding and fattening. The study recorded that only about 14% of the fattening farm rears more than five pigs, while the remaining fattening farm rears less than pig pigs for household consumption and to meet various household expenses. The farm rearing 1- 5 pigs is considered back yard in Bhutanese context. The study recorded most back yard farm maintaining two pigs in average. This might be because of involvement of people with low-income in pig farming and also small

farms involve minimum amount of inputs, and needed little time and investment (Muys and Westenbrink 2004). It was reported that to develop small and traditional farms into large scale farms would require diligence and special guidance either from livestock extension officer or relevant agencies (Katagame et al. 2017). However, small holdings of few pigs with low inputs and poor bio-security translates into low output and productivity (Beltran-Alcrudo et al. 2018). It is reported that the backyard farms may not necessarily contribute to national pork self-sufficiency but may help to increase rural livelihood and availability of local protein (Oosting et al. 2014). Small holder farming systems improve livelihood and food security for the poorest people (Dixon et al. 2001; Kumaresan et al. 2009). The policy intervention to these group of pig farmers with supports on subsidy package, government land lease, promoting youth engagement through employment schemes, ensuring access to low interest rate loan and facilitating marketing chains and outlets would help commercialization of pig farming in the country.

### 2.3. Preference for pig breeds

Figure 1 presents the respondents' preference for pig breeds between local and improved. The study recorded that 76% of the respondents preferred to rear exotic pig breeds, while 16.4% of the respondent preferred to rear local pig breeds given various reasons. Similarly, Tenzin et al. (2018) in their recent study reported that 77% of the pig farmers rear exotic pig breeds in Bhutan.

The major reasons reported for the preference of exotic breeds were faster growth rate, higher income and non-availability of local piglets.



**Figure 1:** Preference for pig breeds

With improved management, exotic pigs are marketed as early as six months of age (Mutua et al. 2010). FAO (2011a) reported preference for exotic pig breeds are due to higher carcass output and shorter fattening duration. Similar to the findings in this study Ayizanga et al. (2018) reported that the farmers will resort to rearing other pig breeds if preferred breeds are not available. However, the exotic pig breeds are resource

demanding and difficult to rear. Thus, remaining respondent preferred to rear local pig breeds owing to limited resources and better adaptability of local pigs to varying rearing systems and high demand for local meat. Although the local pigs are comparatively inferior to exotic pigs in terms of performance (Ayizanga et al. 2018), it is well adapted to low input and harsh production systems (Livingston and Fowler 1984). Nonetheless, the population of local pigs is declining at alarming rate, and not much has been done beside conservation efforts to protect our local genetic resources. There are few farmers groups undertaking local pig (Sapha) farming in eastern region supported by National Biodiversity Centre to promote conservation and sustainable utilization.

### 2.4 Reasons for rearing pigs

Pigs as reported by the respondents are reared mainly for income generation and household consumption. The other reasons for pig rearing as reported are to meet expenses for school going children and ritual purpose, loan repayment, conservation, easy market and source of income to invest on other businesses. Majority (87.1%) indicated that the pig farming is a profitable business and could generate reasonable income for their family. They mentioned pigs to provide faster return with low investment particularly under back yard conditions. Pigs are fed with household leftovers and agricultural crop by-products which cannot be consumed by the household members. In olden days, pigs were found to play an important role even in ritual offerings to local deities across many parts of Bhutan (Nidup et al. 2011). However, this practice seemed to have declined as only 1% (n=3) of respondents from across the study area kept pigs for ritual purpose.

### 4.5. Perception on future of pig farming in Bhutan

The study recorded little less than 30% of the respondents perceived that the pig farming is profitable while 1.7% indicated that the pig farming is not profitable. Likewise, 5.7% and 2.4% stated that the pig farming is sinful and difficult to manage, respectively. Other remaining respondents have mixed perceptions about the pig farming such as profitable but difficult to manage (2.9%), profitable but sinful (13.1%), profitable but difficult to manage and sinful as well (37.4%).

The study recorded that 73.6 % of respondent will continue with pig farming as a source of livelihood, while the remaining 26.4% reported to discontinue pig farming. The reasons to discontinue pig farming were religious disapproval, inadequate and high cost of commercial feed and lack of labour, inadequate land, not interested anymore and availability of alternative farming options among others. Few respondents indicated that they would discontinue pig farming once their bank loans are liquidated and school going children completes their education.

#### 4.5.1 Problems and risks of pig farming in Bhutan

Majority (72.4%) of respondent reported that they faced problem and encounter risks in pig farming. One of the main problems was religious disapproval that if not adhered might result to communal criticism and ultimately outcast from the community. Other problems reported, inadequate and non-availability of commercial feeds at affordable price, and labour shortage. In addition, no availability of piglets from government farms on time and supply of low-quality piglets from private firms were raised impacting pig farming.

#### 4.5.2 Priority support for piggery development

Majority (74.1%) of the farmers reported that the subsidy support provided by the government should continue. In addition, the farmers expect to include subsidy support on commercial feed at least for one production cycle or government should control price of commercial feed, piglet buyback subsidy to encourage private breeders, fast track government land leasing processes, and access to low rate interest loan. One farmer even suggested government to support on production of cost-effective feed through feed formulation using local feed resources.

### 5. CONCLUSIONS

Pig is reared by different ethnic groups in southern Bhutan despite religious disapproval. Religious sentiments, inadequate feed and labour shortage were perceived as the key drivers for unsuccessful pig farming in the country. Despite various challenges faced in piggery development, many farmers interviewed were interested to continue piggery farming as a source of livelihood. The government policy interventions should focus on providing additional subsidy supports on feed, piglet buyback, transportation and creating access to low interest rate loans to encourage farmers continue and sustain pig farming in Bhutan. Other supports the government could provide to develop pig sector are educational and capacity development programs focusing on local feed formulation, health, clean pig production and market assurance.

### ACKNOWLEDGEMENT

The authors are thankful to all the pig farmers accepting to participate in the study and provide information. We would also like to thank the Dzongkhag Livestock Officers and Geog Livestock Officers of the study areas for providing necessary logistic supports. The authors remain thankful to Dr. Kesang Wangchuk (PhD), Principal Research Officer, Department Livestock and Dr. Vijay Raika (PhD), Programme Director, National Highland Research and Development Centre, Bumthang for providing necessary technical guidance in particular to reviewing the questionnaire and data analysis.

### REFERENCES

- Ayizanga R, Kayang B, Adomako K and Larbi A (2018). Rural pig production systems and breeding preferences of pig farmers in northern Ghana. *Ghanaian Journal of Animal Science*, 9 (1).
- Brooks K, Zorya S, Gautam A and Goyal A (2013). Agriculture as a sector of opportunity for young people in Africa. The World Bank Policy Research Working Paper 6473, viewed 04 September 2014, from [http://www.ypard.net/sites/ypard.net/files/Agri culture%20opportunity%20youth%20africa.pdf](http://www.ypard.net/sites/ypard.net/files/Agri%20culture%20opportunity%20youth%20africa.pdf)
- Chauhan A, Patel BHM, Rajveer M, Sushil Kumar, Shukla S & Subodh Kumar (2016). Pig production system as a source of livelihood in Indian scenario (an overview). *International Journal of Science*, 5(4):2089-2096.
- Dixon J, Gulliver A, Gibbon D and Hall M (2001). Farming systems and poverty: Improving farmers' livelihoods in a changing world. Rome: FAO, Washington, DC: World Bank.
- DoL (2007-2017). Livestock statistics 2007-2017. Department of Livestock, Ministry of Agriculture & Forests. Thimphu.
- DoL (2017). Livestock statistic 2017. Department of Livestock, Ministry of Agriculture & Forests. Thimphu.
- FAO (2011a). Molecular genetic characterization of animal genetic resources. Health guidelines. No. 9. Rome: Food and Agriculture Organization.
- FAO (2012). Livestock sector development for poverty reduction: An Economic and Policy Perspective – Livestock's many virtues, by J. Otte, A. Costales, J. Dijkman, U. Pica-Ciamarra, T. Robinson, V. Ahuja, C. Ly and D. Roland-Holst. Rome.
- FAO (2014). Impact of mastitis in small scale dairy production systems. FAO Animal Production and Health Working Paper. Food and Agriculture Organization of United Nations. Rome
- Katagame A, Fanani Z and Nugroho BA (2017). Income Contribution of Pig Livestock toward Poverty Reduction and Factors Influencing Pig Farming in Mimika Papua. *IOSR Journal of Agriculture and Veterinary Science*, 10 (1): 11-15. DOI: 10.9790/2380-1001011115
- Kumaresan A, Bujarbaruah KM, Pathak KA, Das A and Bardoloi RK (2009). Integrated resource-driven pig production systems in a mountainous area of Northeast India: production practices and pig performance. *Tropical Animal Health Production*, 41: 1187. <https://doi.org/10.1007/s11250-008-9299-y>
- Livingston RM and Fowler VR (1984). Pig feeding, the future; Back to nature? (Span 93) :108 – 110.

- MoAF (2015). Bhutan RNR Statistics 2015. RNR Statistical Coordination Section Policy and Planning Division, July 2015
- Mutua F, Arimi S, Ogara W, Dewey C and Schelling E (2010). Farmer Perceptions on Indigenous Pig Farming in Kakamega District, Western Kenya. *Nordic Journal of African Studies* 19(1): 43–57.
- Muys, D & Westenbrink, G (2004). Keeping pigs in the Tropics. 4th edn. Agromisa Foundation, Wageningen.  
[http://www.journeytoforever.org/farm\\_library/AD1.pdf](http://www.journeytoforever.org/farm_library/AD1.pdf). Accessed July 7, 2017.
- Nidup K, Tshering D, Wangdi S, Gyeltshen C, Phuntsho T & Moran C (2011). Farming and Biodiversity of pigs in Bhutan. *Animal Genetics Resources*, 48: 47-61.
- Obayelo AE, Ogunmola OO & Sowande OK (2017). Economic Analysis and the Determinants of Pig Production in Ogun State, Nigeria. 2: 61–70. DOI: 10.1515/ats-2017-0007/
- Ogunniyi LT and Omoteso OA (2011). Economic analysis of swine production in Nigeria: A case study of Ibadan zone of Oyo State. *Journal of Human Ecology*, 35(2): 137 – 142.
- Oosting S, Udo HMJ and Viets TC (2014). Development of livestock production in the tropics: Farm and farmers' perspectives. *International Journal of Animal Bioscience*, 8:1-11. 10.1017/S1751731114000548.
- PHCB (2017). Population and Housing Census of Bhutan 2017. National Statistics Bureau of Bhutan, Royal Government of Bhutan, Bhutan.
- Quac NK, Phung TV and Husssain GJ (1996). Study on the physiological characteristics and reproduction of crossbred-sows F1 (Yorkshire x Mong Cai). *Agricultural Tropical University*, 29: 59 – 64.
- Swanepoel F, Strabel A & Moyo S (2010). The role of livestock in developing communities: enhancing multi-functionality. Wageningen University, The Netherlands: The Technical Centre for Agricultural & Rural Cooperative.
- Tenzin P, Tsheten G, Sherab P and Timsina MP (2018). Exotic pigs receive different fattening periods from Bhutanese farmers. *Bhutan Journal of Animal Science*, 2 (1):31-36.
- Upton M (2004). The role of livestock in economic development and poverty reduction. Pro-poor Livestock Policy Initiatives. Rome: FAO.
- Walugembe M, Nadiope G, Stock JD, Stalder KJ, Pezo D and Rothschild MF (2014). Prediction of live body weight using various body measurements in Ugandan village pigs. Department of Animal Science, Iowa State University, Ames, USA.