

Profitability and Problems of Commercial Pig Farming in Punjab

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Abstract

The present study aims to analyse the profitability of commercial piggery enterprises and constraints faced by pig rearers during production and marketing in Punjab. Using semi-structured interview schedules, primary data were collected from a sample of 30 farmers of Ludhiana, Sangrur and Barnala districts. Analysis of data revealed that, cost of shed construction accounted for 65 per cent of the initial outlay of average commercial piggery farm in Punjab. Expenses on feed was observed to be the major cost which accounted for about 81 per cent of annual total costs on the sample farms. Finisher pigs contributed to majority of the sales as well as gross returns. On average farm, a rupee spent in piggery enterprise earned net profit of Rs. 0.28. Costly labour and its shortage, lack of quality breeding stock, low demand, poor market infrastructure, inadequate support from government and lack of local processing units were the most serious problems faced by the pig rearers in the state.

Keywords : Commercial Piggery, Initial Investment, Net Profit, Cost Benefit Ratio

JEL classification : Q12, D61

Introduction

India is endowed with abundant livestock resources and ranks 1st in terms of livestock population all around the world. According to 20th livestock census (2019), India had a livestock population of 535.78 million, which contributed nearly one fourth of the nation's agricultural GDP (GOI 2019a). A significant proportion (62%) of small-scale households is tied to this sector (Das *et al* 2020). In India, the pig population is 9.06 million, which accounts for only 1.69 per cent of total livestock population in country (GOI 2019a). However, it contributed seven per cent of India's total meat production (GOI 2019b). India is the 37th largest pork producer globally (UN 2022). Pigs offer economic advantages like requiring fewer resources, efficient food conversion, larger litter size and quick maturity (Chauhan *et al* 2016). Hence, the pig farming industry is a promising enterprise for India's economic growth. In terms of health benefits, pork is enriched with plethora of micro-nutrients such as zinc, iron, selenium, choline, thiamine, vitamin B₆ and vitamin B₁₂ (Penkert *et al* 2021). Furthermore, regular consumption of fresh lean pork in diet in place of other meat such as chicken and beef, helps in improvement of body composition without negatively affecting risk factors for diabetes and cardiovascular diseases (Murphy *et al* 2012).

Thus, pork can act as an alternative to meet ever increasing demand for protein. For years, pig farming has remained limited to the north-eastern parts of the country. Traditional pig keeping has been in practice in these states where pigs are grown for different purposes such as to meet the socio-religious obligations and emergency requirements (Chauhan *et al* 2016). The commercial pig farming is a relatively budding enterprise in the state of Punjab. During 2019, the state had about 52,000 pigs and the total pork production was 1.09 thousand tonnes. There are more than 200 commercial pig farms in Punjab (Bhadauria *et al* 2019).

Pig farmers face a myriad of issues that obstruct their overall efficiency and growth. Montsho and Moreki (2012) identified high feed costs and inadequate slaughtering facilities as the primary obstacles. On top of these, there are concerns related to import duties, inefficiencies in public services, policies on genetically modified organisms, border regulations, unjust trading methods, informal feed supply systems, stringent environmental regulations, information gap, high costs for medications and vaccinations, strict health and safety standards, and the high cost of adhering to African Swine Fever certifications and labour laws (Mutambara 2013).

Keeping in view the potential of pig rearing as a lucrative business to contribute towards the development of farm households, the present study has been conducted to study

the economics of commercial pig production in Punjab and to analyse the constraints faced by the farmers.

Data Sources and Methodology

The study was carried out in the state of Punjab. The primary data with reference year 2022-23 were collected from 30 sample pig rearing households belonging to Ludhiana, Sangrur and Barnala districts. Specifically, six sample farmers were from Ludhiana, 10 from Sangrur and remaining 14 belonged to Barnala district. The cluster of these districts was purposively chosen as these districts had proportionately high number of commercial pig farmers. Pre-tested semi-structured interview schedules were constructed and personal interview method was employed to collect information regarding different aspects of production systems, cost-return structure and constraints faced in pig rearing and marketing on the sample commercial pig farms.

Descriptive statistics such as frequency, mean and percentages were used to study the economics of commercial rearing system. For constraint analysis, farmers were asked to rank perceived problems on a scale of 1 to 5 in increasing order of severity and based on the weighted average the constraints were classified as severe, moderate and minor. Constraints, for which the weighted average came out to

be more than 4, were considered as of severe nature. The problems with weighted average value of 2 to 4 and less than 2 were ranked as moderate and minor problems, respectively.

Results and Discussions

Classification of Sample Pig Farmers

On the basis of pig herd size, sample farmers were classified into three categories and information in this regard is provided in table 1. Farmer having herd size of less than 100, between 100 and 200 and equal to or more than 200 pigs were classified as small, medium and large farmers respectively. Further, small, medium and large farmers constituted 56.67 per cent, 30.00 per cent and 13.33 per cent of total sample.

Category wise study of experience in commercial piggery revealed that on an average sampled small farmer had 5 years of experience in commercial piggery, whereas medium and large farmers had an experience 6 and 7 years respectively.

Farm Composition

Based on the growth stage and other important characteristics, pigs have been grouped into different classes like weaner, grower, finisher, pregnant sows, non-pregnant

Table 1. Classification of sample farmers on the basis of average herd size , 2022-23

Category	Total herd size	Number of sample farmers	%	Years of experience
Small	<100	17	56.67	5
Medium	100-200	9	30.00	6
Large	≥200	4	13.33	7

Table 2. Pig composition on sample farms, Punjab, 2022-23

(Number)

Particulars	Small Farms	Medium Farms	Large Farms	Overall
Weaner (0-1 months age)	22 (37.29)	26 (21.85)	133 (45.24)	29 (26.61)
Grower (2-6 months age)	24 (40.68)	60 (50.42)	122 (41.50)	46 (42.20)
Finisher (6-12 months age)	20 (33.90)	28 (23.53)	56 (19.05)	20 (18.35)
Pregnant sows	6 (10.17)	10 (8.40)	26 (8.84)	8 (7.34)
Non-pregnant sows	3 (5.08)	5 (4.20)	10 (3.40)	3 (2.75)
Boar	1 (1.69)	2 (1.68)	3 (1.02)	2 (1.83)
Average herd size	59 (100)	119 (100)	294 (100)	109 (100)

Note: Figures in parenthesis indicate percentage to total

sows and boars (table 2). This classification provides insight into the makeup and percentage distribution of each age group within the total pig population of a farm.

On an average sample pig farm, the 'growers' category constituted the largest proportion, accounting for 42.2 per cent of the entire herd. This was followed by weaners (26.61%), finishers (18.35%), pregnant sows (7.34%), non-pregnant sows (2.75%) and boars (1.83%). Panday *et al* (1995) also found that growers constituted major proportion of the total herd strength on the pig farms. Farm category-wise distribution of pigs showed that while growers constituted the largest proportion of herd on small (40.68%) and medium farms (50.42%), on large farms weaners accounted for the majority (45.24%) of the pig population. On average, a sample farm comprised 29 weaners, 46 growers, 20 finishers, 8 pregnant sows, 3 non-pregnant sows, and 2 boars. Total number of pigs on an average sample farm were 109.

Initial Investment

Initial investment for setting up pig farms primarily include costs associated with purchase of animals, construction of shed and procuring equipment and on average sample farms it turned out to be Rs. 12.64 lakh (table 3). The cost of shed on average farm was Rs. 8.24 lakh which accounted for 65.17 per cent of the initial outlay. Cost on account of purchase of pigs was the second important component which accounted for 29.25 per cent (Rs 3.70 lakh) on an average farm. On small, medium, and large farms, the initial cost was Rs.8.51 lakh, Rs.13.02 lakh, and Rs.29.36 lakh, respectively. Initial outlay for establishment of commercial piggery farm on large farms was about 3.5 and 2.25 times more as compared to that on small and medium farms respectively.

Cost Structure

The cost incurred on purchase of feed, payment to labour, electricity and fuel expenses and veterinary expenses were the major components of variable cost on the pig farms. Annual expenses on account of fixed components comprised

of interest on investment and depreciation on building and equipment. The information in this regard has been presented in table 4.

On an average, a sample farm incurred a total expense of Rs.19.00 lakh on piggery annually and 90.84 per cent of this was attributed to the variable costs, whereas fixed cost constituted the remaining 9.16 per cent.

The component-wise, feed expenses contributed the largest proportion (81.16%) of the total cost. Other expenditures like payment to labour, electricity/fuel, and veterinary services contributed 4.84 per cent, 1.37 per cent, and 3.47 per cent to total costs, respectively. Amongst fixed components, interest on investment made up 6.63 per cent of total expenses on an average farm, followed by depreciation of building and equipment which contributed 2.16 per cent and 0.37 per cent to total cost respectively. The results of present study aligns with findings by Pandey *et al* (1995), who reported that in pig farming the highest expenses are on the account of feed of animals.

The category wise, the annual total costs on small, medium, and large farms were Rs.11.51 lakh, Rs.20.08 lakh, and Rs.46.07 lakh, respectively. The proportion of variable cost varied from 90.27 per cent on small farm to 91.13 per cent on medium farm. The proportionate share of fixed costs in total costs ranged from 8.86 per cent on medium to 9.73 per cent on small farms. In absolute terms, all variable expenses were seen to rise with the increase in farm size. However, there was no consistent relation between the proportionate shares of various variable cost components and the farm size. In case of fixed components of annual costs, with the increase in size of pig farm, the percent share of interest on investment in total cost decreased. In contrast, the proportion of cost associated with depreciation of equipment increased with herd size.

Returns

As seen from table 5, gross returns received from average sample pig farm were Rs. 23.91 lakh and the net returns

Table 3. Initial investment of piggery enterprise, sample farmers, Punjab, 2022-23

(Rs. in lakhs/farm)

S. No.	Particulars	Small Farms	Medium Farms	Large Farms	Overall
1.	Animals	3.12 (36.72)	4.43 (33.99)	4.49 (15.30)	3.70 (29.25)
2.	Shed	5.29 (62.17)	7.64 (58.68)	22.18 (75.33)	8.24 (65.17)
3.	Equipment	0.094 (1.10)	0.95 (7.33)	2.75 (9.37)	0.71 (5.59)
4.	Total fixed cost	8.51 (100)	13.02 (100)	29.36 (100)	12.64 (100)

Note: Figures in parenthesis indicate percentage to total

Table 4. Cost structure of piggery enterprise, sample farmers, Punjab, 2022-23

(Rs. in lakhs/year/farm)

S. No.	Particulars	Small Farms	Medium Farms	Large Farms	Overall
A.	Variable cost				
1.	Feed cost	9.43 (81.53)	16.41 (81.72)	38.61 (83.81)	15.42 (81.16)
2.	Labour cost	0.57 (4.95)	1.36 (6.77)	1.42 (3.08)	0.92 (4.84)
3.	Electricity/fuel cost	0.21 (1.82)	0.19 (0.95)	0.63 (1.37)	0.26 (1.37)
4.	Veterinary expenses	0.17 (1.48)	0.34 (1.69)	1.10 (2.39)	0.66 (3.47)
5.	Total variable cost	10.39 (90.27)	18.30 (91.13)	41.75 (90.62)	17.26 (90.84)
B.	Annual fixed cost				
1.	Interest on investment@10% per annum	0.85 (7.38)	1.30 (6.47)	2.94 (6.38)	1.26 (6.63)
2.	Depreciation on building @5% per annum	0.26 (2.26)	0.38 (1.89)	1.10 (2.39)	0.41 (2.16)
3.	Depreciation on equipment @10% per annum	0.0094 (0.082)	0.095 (0.47)	0.27 (0.59)	0.071 (0.37)
4.	Annual fixed cost	1.12 (9.73)	1.78 (8.86)	4.32 (9.38)	1.74 (9.16)
C.	Total cost	11.51 (100)	20.08 (100)	46.07 (100)	19.00 (100)

Note: Figures in parenthesis indicate percentage to total

were Rs. 5.23 lakh. The benefit- cost ratio was observed to be 0.28. Category- wise, gross returns received on a sample small, medium and large farm were Rs. 13.83 lakh, Rs. 24.06 lakh and Rs. 70.03 lakh respectively, however the net returns were Rs. 2.33 lakh, Rs. 3.98 lakh and Rs. 23.96 lakh. Benefit-cost ratio indicated that one rupee spent in piggery farming resulted in net returns of Re. 0.20 on small and medium farms whereas on large farms it turns out to be Re. 0.52.

Farmers primarily sold two types of pigs: live finisher pigs for meat and piglets for breeding and religious purposes. On an average, sample farm sold about 134 finishers per year. Annually small, medium and large farms sold 88, 146 and 302 finishers per farm respectively. Average weight of finisher pig at selling time on different category farms lied between 92 to 99 kg and the selling price was found to be ranging from Rs.132 to 135 per kg live weight. Thus, average revenue from sales of finisher pigs was Rs. 11.25 lakh, Rs. 19.21 lakh and Rs. 37.67 lakh on small, medium and large farms, respectively. Overall, the gross returns from finishers on average sample farms were Rs.17.21 lakh. In addition to

finishers, an average farm sold 151 piglets, each weighing an average of 19.31 kg, at relatively higher price of Rs.230.38 per kg of live weight. This resulted in revenue of Rs.6.70 lakh per farm. Among different farm size categories while the large farms got the highest selling price for finishers, the medium farms secured the highest price for piglets in comparison their other counterparts.

For small and medium-sized farmers, finisher pigs made up the bulk of their sales. Conversely, for large farmers, finishers made up a smaller fraction of sales, while a significant proportion of total sales volume were piglets. Overall, the gross returns received from sales of finishers comprised of around 72 per cent of total sales, whereas piglets contributed only 28 per cent. The proportionate share of finishers in gross returns showed an inverse relation with farm category *i.e.* with increase in size of farm, contribution of finishers in gross returns decreased. In contrast, proportionate share of piglets in gross return increased with increase in size of pig farm.

Table 5. Returns from piggery enterprise, sample farmers, Punjab, 2022-23

	Particulars	Units	Small Farms	Medium Farms	Large Farms	Overall
Finisher	Sales/year	Number	88.1	145.89	301.67	133.91
	Average weight at sales	kg live weight	95.93	99.37	92.5	96.50
	Selling price	Rs./kg	133.11	132.5	135	133.18
	Returns	Lakh Rs.	11.25	19.21	37.67	17.21
Piglet	Sales/year	Number	57.5	121.5	612	150.63
	Average weight at sales	kg live weight	19.92	16.75	22.5	19.31
	Selling price	Rs./kg	225	238.5	235	230.38
	Returns	Rs. in lakhs	2.58	4.85	32.36	6.70
	Gross returns	Rs. in lakhs	13.83	24.06	70.03	23.91
	Net returns	Rs. in lakhs	2.33	3.98	23.96	5.23
	B/C ratio	Ratio	0.2	0.2	0.52	0.26

Problems Faced By Farmers

Production Problems

Pig rearers face numerous problems while production which ultimately affect the farm's performance and returns. These problems have been ranked as of severe, moderate and minor significance on the basis of the seriousness of these issues and the results in this regard are given in table 6.

Labor shortage and costly labour: Farmers identified labour shortage as the most severe production challenge in the pig farming. Misconceptions about pig farming dissuaded many from working on pig farms, forcing many farmers to rely predominantly on family labour. Concerned family members, regardless of their primary occupation and age had to devote certain amount of time per day to accomplish daily farm level chores. As entire responsibility resided in limited hands this sometimes led to delay in certain work. Moreover, as demand for labour exceeded supply, farmers had to offer higher wages to attract labourers.

Lack of good quality sows and boars: All categories of surveyed farmers highlighted shortage of high-quality sows and boars as a severe problem of piggery enterprise. This led to higher prevalence of diseases on farms, high mortality rates, and led to smaller litter sizes, all of which negatively impacted the economic performance on pig farms. Higher rate of disease occurrence increased the expenditure on medicines and treatment, putting greater pressure on farmers. As breeding stock was of sub-quality, feed conversion ratio was also relatively low, litter size was small and the piglets born were not healthy, thus, the mortality rate was high.

Costly feed: Higher cost of feed was perceived as a moderate constraint of production by the sample farmers. Feed cost constituted the majority of total costs per farm and thus this component alone was the major determining factor

of total costs. Most farmers used branded or homemade concentrates, which were relatively expensive due to their unique composition and the costs of preparation. Both branded as well as homemade concentrates contained different components which acted as source of all necessary nutrients. Further, preparation of homemade concentrates demanded time, labour and sometimes specialized equipment, which pushed the total costs upward.

Lack of technical know-how and extension services:

A majority of the farmers expressed that lack of technical expertise was a problem faced during the setup of farm. Modern pig farming requires knowledge about the specific needs of pigs concerning housing, temperature, and feeding. Without this expertise, the welfare of the animals can be compromised, leading to health issues and reduced productivity. Farmers without the necessary technical guidance may experience higher rates of farm failures due to a range of issues, from financial mismanagement to disease outbreaks. Further due to absence of extension services farmers remain unaware of new knowledge and advancements and continued using inefficient methods. These problems hinder both production and marketing activities in piggery. Similar findings have been reported by Montsho and Moreki (2012), who pointed out that gap in extension services affect pig farming negatively.

The limited access to credit and lack of initial capital to invest: Access to financial resources presented moderate challenges. Setting up a modern pig farm requires a substantial investment. This includes costs for land, construction of shed, purchasing initial livestock, and acquiring necessary equipment. Also, pig farming is not a one-time investment. Regular expenses like feed, veterinary services, waste management, and labour wages demand consistent financial inflow. Thus, access to required credit

is an important component determining the success of a piggery farm. Farmers often lacked the necessary capital to invest, and obtaining credit was difficult due to strict eligibility criteria, preventing them from fully benefiting from these interventions.

High price of piglets: The initial setup or breed enhancement required farmers to purchase piglets. When compared to finisher pigs, the price of piglets was around 1.75 times higher. This high cost of these piglets placed a significant financial burden on the pig rearers.

Additional production issues: Other issues, though perceived as less critical or minor problems by farmers, included a high incidence of diseases, space regulations, inadequate access to proper feed, high mortality, costly veterinary services, slow weight gain and social issues.

Marketing Problems

Numerous problems are perceived by pig farmers during marketing of pigs, details of which have been given in table 7. These problems affect net returns, producer's share in

consumer's rupee and hinder the growth of overall piggery sector.

Inadequate support from government, poor market infrastructure and lack of local processing units: Farmers encountered severe difficulties due to inadequate government support during the marketing of pigs. This lack of support led to a knowledge gap among farmers, hindering their ability to navigate the market effectively. Additionally, the absence of robust market infrastructure resulted in a lack of transparency within the marketing system. Moreover, the absence of local processing units forced farmers to sell their pigs in distant markets, where they had little control over selling prices. These issues significantly impeded the performance of farmers.

Low demand: Low demand for pigs and pork was perceived as a severe marketing challenge by pig farmers. Several factors including social taboos and misconceptions surrounding pig farming, limited awareness, perceived lower meat quality, and concerns about swine fever contributed to it. In several cultures and religions, consuming pork is

Table 6. Production problems faced by sample farmers, Punjab, 2022-23

Production Problems	Small Farmer		Medium Farmer		Large Farmer		Overall	
	Severity	Interpretation	Severity	Interpretation	Severity	Interpretation	Severity	Interpretation
High price of piglets	2.24	Moderate	1.78	Minor	2.25	Moderate	2.1	Moderate
High disease incidence	1.88	Minor	1.22	Minor	1.25	Minor	1.6	Minor
Space regulation	1.59	Minor	1.22	Minor	1.25	Minor	1.43	Minor
Inadequate access to appropriate feed	1.41	Minor	1.44	Minor	1.25	Minor	1.4	Minor
Costly feed	3.82	Moderate	4.00	Moderate	2.50	Moderate	3.7	Moderate
Costly labour	4.71	Severe	4.44	Severe	4.50	Severe	4.6	Severe
Labour shortage	4.88	Severe	4.89	Severe	5.00	Severe	4.9	Severe
High mortality rate	2.06	Moderate	2.00	Minor	1.75	Minor	2	Minor
Costly/ inadequate veterinary services	1.59	Minor	2.00	Minor	2.25	Moderate	1.8	Minor
Slow weight gain	1.59	Minor	1.56	Minor	1.25	Minor	1.53	Minor
Social issues	1.29	Minor	1.22	Minor	1.00	Minor	1.23	Minor
Inadequate initial capital to invest	2.47	Moderate	1.89	Minor	2.75	Moderate	2.33	Moderate
Lack of technical/ management know how	2.29	Moderate	2.44	Moderate	2.50	Moderate	2.37	Moderate
Lack of good quality sow/boars	4.53	Severe	5.00	Severe	5.00	Severe	4.67	Severe
Lack of extension services	2.76	Moderate	3.33	Moderate	2.71	Moderate	2.9	Moderate
Limited access to credit	2.59	Moderate	2.44	Moderate	3	Moderate	2.6	Moderate

Table 7. Marketing problems perceived by sample farmers, Punjab, 2022-23

Problems	Small Farmer		Medium Farmer		Large Farmer		Overall	
	Severity	Interpretation	Severity	Interpretation	Severity	Interpretation	Severity	Interpretation
Highly fluctuating prices	2.71	Moderate	2.22	Moderate	2.75	Moderate	2.57	Moderate
Low demand	4.47	Severe	4.33	Severe	5	Severe	4.50	Severe
Seasonal demand	2.88	Moderate	2.78	Moderate	3	Moderate	2.87	Moderate
Poor market infrastructure	3.94	Moderate	4.33	Severe	3.75	Moderate	4.03	Severe
Poor negotiating power	2.41	Moderate	2.22	Moderate	3	Moderate	2.43	Moderate
Inadequate support from government	4.71	Severe	4.67	Severe	4.5	Severe	4.67	Severe
Restrictions imposed by swine fever	3.24	Moderate	3.00	Moderate	2.5	Moderate	3.07	Moderate
Distant market	4.82	Severe	4.67	Severe	4	Moderate	4.67	Severe
Problem of delayed payment	1.82	Minor	1.89	Minor	1.75	Minor	1.83	Minor
Lack of market information	2.47	Moderate	2.56	Moderate	3	Moderate	2.57	Moderate
High marketing charges	1.47	Minor	1.56	Minor	1.75	Minor	1.53	Minor
Malpractices by middlemen	1.82	Minor	1.67	Minor	1.5	Minor	1.73	Minor
Lack of local processing units	4.24	Severe	4.44	Severe	4	Moderate	4.27	Severe

prohibited. Social taboos, rooted in religious or cultural beliefs, lead to a significant portion of the population abstaining from pork, thereby reducing potential market size. Pigs are sometimes viewed as dirty or unhygienic animals. Compared to other meats like chicken or beef, pork is perceived as of lower quality, thus this perception affects buying decisions. Disease outbreaks, like swine fever, raise concerns about the safety of consuming pork.

Distant markets: Distant markets were also identified as a severe problem in marketing. Due to low demand within the state, farmers had no choice but to sell their pigs to interstate traders operating in faraway distant markets particularly in North-eastern states of the country. This lack of proximity meant farmers had limited control over pricing, making them vulnerable to exploitation by traders. Further, without the flexibility to quickly switching to alternative markets, farmers were at the mercy of traders. Without clear visibility into the end pricing of their products in the distant markets, farmers were unable to receive a fair share of price paid by consumers.

Fluctuating prices: Challenges such as highly fluctuating prices, seasonal demand, poor negotiation power, insufficient market information, and restrictions imposed by swine fever were considered moderate constraints. Seasonal demand and fluctuations in the price were identified as factors

influencing pig and pork prices, leading to price volatility. The seasonal nature of pork demand, coupled with frequent market closures due to swine fever outbreaks, created a gap between supply and demand, further contributing to price fluctuations.

Additional marketing issues: Delayed payments, high marketing charges, and malpractices by middlemen during the marketing of pigs were perceived as the minor marketing related issues by the sample farmers.

Conclusion and Policy implications

The results of study revealed that piggery farming is a promising enterprise for commercial pig rearers of Punjab. On sample farms an annual investment of Rs.19 lakh generated net profit of Rs.5.23 lakh. Benefit to cost ratio was found to be 0.26 pig rearers faced numerous problems during production as well as marketing of pigs which negatively affected the performance and profitability of the enterprise. Costly labour and its shortage, lack of superior quality sows and boars, low demand, poor market infrastructure, inadequate support from government and lack of processing units were major production and marketing related issues. To address these problems, there is a need to take necessary measures to create better market infrastructure, provide required capital for investment through improved loan and subsidy programmes.

Extension services need to be strengthened to impart technical knowledge and create awareness among public about pork and related products. Breed improvement programmes should also be initiated and implemented to develop high quality breeds. Also, local processing units should be established so that farms do not have to depend solely on interstate traders and can realise higher profits by selling live pigs to processing plants.

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