

Man-Power Requirements for Management of Animals in An Organized Swine Farm

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How to cite this paper

Poreddy, G., Reddy, Y. R., Rangamma, B., Punya Kumari, B., & Rao, K. N. (2025). Man-Power Requirements for Management of Animals in An Organized Swine Farm. *International Journal of Livestock Research*, 15(5), 34–40.

Received : Apr 01, 2025

Accepted : Apr 21, 2025

Published : May 31, 2025

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Abstract

The present study was conducted to know the amount of labour force required for various activities involved in management of animals such as routine operations like cleaning of pens and feeding, and periodic operations like breeding, new born management, weighing of adult stock, vaccination etc. at the centre of the ICAR - All India Coordinated Research Project on Pigs at Tirupati, Andhra Pradesh. The total time spent on cleaning operations was 1.68 ± 0.03 , 1.52 ± 0.03 , 0.32 ± 0.01 and 1.59 ± 0.03 man-min./animal, while that on feeding operations was 0.88 ± 0.04 , 0.59 ± 0.01 , 0.11 ± 0.00 and 0.59 ± 0.01 man-min./animal/day in the farrowing, boar, grower and dry sow/gilt pens, respectively. The routine operations took 2.56 ± 0.07 , 2.11 ± 0.04 , 0.43 ± 0.01 , 2.18 ± 0.04 man-min./animal/day, respectively in the case of farrowing, boar, grower and dry sow/gilt pens. The labour time spent on hand mating and Artificial Insemination was 32.75 ± 2.51 and 47.60 ± 1.49 man-min./mating, respectively. The newborn management activities as a whole required 61.07 ± 3.76 man-min./litter or 7.63 ± 0.47 man-min./piglet in the farm. The total time utilized for weighing activity of adult pigs was 9.59 ± 0.28 man-min./animal, and that for vaccination was 1.24 ± 0.26 man-min./animal. Performing the periodic activities required about 95.06 ± 6.53 man-min./litter. Based on the results, it was concluded that 2 labourers working 8 hours per day are sufficient for smooth running of a 100 + 5 swine unit.

Keywords: Labour, Man-Minute, Periodic Operations, Routine Operations.

Introduction

Pig rearing plays a prominent role in rural economy in supplementing the income of rural households particularly the landless, small and marginal farmers. Pig farming is a successful enterprise because of its numerous advantageous economic characteristics, such as high prolificacy, quick growth, shorter generation intervals, low cost of rearing, high dressing percentage, and superior feed conversion efficiency (Reddy *et al.*, 2024; David, 2012). The Indian subcontinent had a swine population of 9.06 million, which comprises 1.69 % of its total livestock population (Anonymous, 2019).

Land, labour and capital are the three primary resources in any farm. Labour is the most critical resource, and cost of the labour is second to the cost of feeding in case of variable expenditure (Chand *et al.*, 2017). Assessing the manual labour needed for various piggery operations helps in cutting down labour costs. The returns from pig farming could be higher when labour efficiency is increased. The layout of the pig farm's buildings, labour force's productivity, breed and number of pigs, feeding habits, cleaning practices, and the level of farm mechanisation all play a significant role in labour utilization. In the current cutthroat market, effective labour management is essential for piggery farming to be profitable. There is a dearth of data on labour management in swine farms, which makes it challenging for accurate planning of swine farms. The current study was aimed at estimating the amount of labour force required for management of different categories of pigs in an organized swine farm.

Materials and Methods

The present study was conducted at the centre of ICAR - All India Coordinated Research Project on Pigs present at Tirupati, Andhra Pradesh to know about labour requirements for various activities involved in management of animals such as routine operations like cleaning of pens and feeding, and periodic operations like breeding, new born management, weighing of adult stock, vaccination etc. Around 200 SVVU T17 (75% LWY inheritance) pigs were maintained in the farm. The total labour strength on the farm was eight including a supervisor.

The breeding boars, dry sows/gilts and advanced pregnant sows were housed in individual pens, and the growers were kept in groups of 10 animals per pen. The pig sties were concrete structures having different pens. Each pen had covered and open areas of concrete floor, feed and water troughs. The weaning age followed in the farm was 6 weeks, and the new born piglets were kept in farrowing pens along with dam till the weaning day.

The cleaning of pens (Figure 1) was the first activity performed at farm in a day. It was performed once daily during morning hours except the farrowing shed in which this activity was done twice a day during the farrowing season. The activity of cleaning a pen involved washing of animal, flushing of water trough, washing of the floor, flushing of faeces which is then drained through the drainage channel. It was done by a hose pipe having adequate water pressure.

Mash form of feed comprising of Maize, Soybean, DORB, Lysine, Mineral mixture and Salt was offered to all the animals twice a day in the morning and evening. Feed mixing was done in the farm itself. The activity of feeding (Figure 2) involved loading of the feed into wheel barrow of 90 kg capacity with a shovel, moving the wheel barrow to the respective shed, distributing the feed to the animals, and moving back the wheel barrow to the feed store room. Clean drinking water was made available in the water troughs throughout the day.

May-June and December-January were the breeding periods, and both natural service (Hand mating) and Artificial Insemination were followed in the farm. Hand mating involved keeping the females in estrous in boar pen for 3 days and taking the females back to their respective pens after completion of natural service. For Artificial insemination, semen was collected from boar using a dummy sow in a sterile beaker. After collection, it was filtered to remove the jelly material and assessed microscopically for sperm motility. After that, the semen was diluted with the Beltsville thawing solution (IMV Technologies, India), loaded in a syringe connected to AI catheter under aseptic conditions, and inseminated to sows in standing heat in the presence of a boar.

The activities of management of newborn piglets included cutting of naval cord and disinfection, clipping of needle teeth (Figure 3), recording of birth weight (Figure 4), administration of intramuscular iron injections (Figure 5) on 4th and 14th days and ear notching (Figure 6). The average litter size in the farm was 8. The piglets were weighed at weekly intervals using an electronic balance in the farrowing pen. Weighing of adult stock was done in a weighing

room on fortnightly basis.

The data collected was subjected to standard statistical techniques such as Mean and Standard Error using SPSS version 22 as per Snedecor and Cochran (1994).



Fig.1: Cleaning of pen



Fig.2: Feeding



Fig.3: Clipping of needle teeth



Fig.4: Recording of birth weight



Fig.5 Intramuscular Iron injection



Fig.6 Ear notching

Results and Discussion

Routine Operations

The cleaning of sties and feeding are the routine operations in an organized swine farm. The results regarding mean time spent on routine operations were presented in Table 1. Washing of floor required 0.07 ± 0.00 , 0.06 ± 0.00 , 0.11 ± 0.00 and 0.07 ± 0.00 man-min./m², or 1.24 ± 0.04 , 1.08 ± 0.03 , 0.23 ± 0.01 and 1.19 ± 0.03 man-min./animal, respectively in the farrowing, boar, grower and dry sow/gilt pens. These findings were almost in agreement with the observations of Mamta (2013), Kaswan *et al.* (2018) and Singh *et al.* (2018). However, Reddy *et al.* (2023) reported higher values of man-min./m² which was probably due to inclusion of sweeping and other activities in their study. It was observed that more time for washing of floor was required for the open area than the covered area as the pigs usually defecate in open area and most of the time was spent in flushing out the faeces. During cleaning, washing of animals took 0.18 ± 0.01 , 0.16 ± 0.01 , 0.06 ± 0.00 and 0.15 ± 0.01 man-min./animal in farrowing, boar, grower and dry sow/gilt pens, respectively. The time taken for flushing of water trough was 0.26 ± 0.01 , 0.27 ± 0.01 , 0.03 ± 0.00 and 0.25 ± 0.01 man-min./animal in farrowing, boar, grower and dry sow/gilt pens, respectively. The time spent on cleaning activity as a whole was 1.68 ± 0.03 , 1.52 ± 0.03 , 0.32 ± 0.01 and 1.59 ± 0.03 man-min./animal in farrowing, boar, grower and dry sow/gilt pens, respectively. Martetschlager (2007), Schick (2008) and Quendler *et al.* (2013) reported higher values of time taken for cleaning than the current study. Less time for cleaning in the present study might be due to non-inclusion of other activities like turning water tap off/on, time required to bring the water pipe into sty, opening and closing gates, sweeping etc. The cleaning of sties contributes around 64.14 % of the total routine work in the farm and it was supported by the findings of Quendler *et al.* (2013). Quendler *et al.* (2007) reported that time spent on cleaning pig sties varies according to the actual number of pigs and also depends upon on the degree of contamination and the size of the surfaces to be cleaned and on efficiency of labourers.

The present study revealed that the time taken for feeding of animals in the morning and evening were almost same, and the total feeding activity required 0.88 ± 0.04 , 0.59 ± 0.01 , 0.11 ± 0.00 and 0.59 ± 0.01 man-min./animal/day, respectively in the case of farrowing, boar, grower and dry sow/gilt pens. Blumauer (2006) supported some of these findings. Riegel and Schick (2006) reported the higher time requirement of 1.9 min per animal per day in farrowing pen, which might be due to variation in labour efficiency.

The time spent on routine operations as a whole was 2.56 ± 0.07 , 2.11 ± 0.04 , 0.43 ± 0.01 , 2.18 ± 0.04 man-min./animal/day in farrowing, boar, grower and dry sow/gilt pens, respectively.

Table 1: Mean time spent on routine operations

Type of pen (N= 100)		Farrowing pen*	Boar pen	Grower pen	Dry sow/Gilt pen
Cleaning					
Washing of floor	(Man-min./m ²)	0.07 ± 0.00	0.06 ± 0.00	0.11 ± 0.00	0.07 ± 0.00
	(Man-min./animal)	1.24 ± 0.04	1.08 ± 0.03	0.23 ± 0.01	1.19 ± 0.03
Washing of animals (Man-min./animal)		0.18 ± 0.01	0.16 ± 0.01	0.06 ± 0.00	0.15 ± 0.01
Flushing of water trough (Man- min./animal)		0.26 ± 0.01	0.27 ± 0.01	0.03 ± 0.00	0.25 ± 0.01
Total (Man-min./animal/day)		1.68 ± 0.03	1.52 ± 0.03	0.32 ± 0.01	1.59 ± 0.03
Feeding					
Morning (Man-min./animal)		0.42 ± 0.02	0.29 ± 0.01	0.05 ± 0.00	0.28 ± 0.01
Evening (Man-min./animal)		0.46 ± 0.02	0.30 ± 0.00	0.06 ± 0.00	0.31 ± 0.01
Total (Man-min./animal/day)		0.88 ± 0.04	0.59 ± 0.01	0.11 ± 0.00	0.59 ± 0.01

*Piglets present along with dam were not taken into account while arriving at values of man-min./animal.

Periodic Operations

The breeding, newborn management, weighing of adult stock, vaccination etc., are the periodic operations in an organized swine farm. The results regarding mean time spent on various periodic operations were given in Table 2. The total labour time spent on hand mating and Artificial Insemination was 32.75 ± 2.51 and 47.60 ± 1.49 man-min./mating, respectively. Ronald *et al.* (2013) reported higher time of 51.2 minutes for natural mating. Lower time requirement for hand mating in our study might be due to less time required for taking female to male pen.

Single time performing of the newborn management activities such as cutting of naval cord and disinfection, clipping of needle teeth, recording of birth weight, administration of iron injections on 4th and 14th days, ear notching and collection of piglets and putting back took 8.86 ± 0.38 , 9.28 ± 0.31 , 3.22 ± 0.06 , 7.46 ± 0.71 , 9.69 ± 0.38 and 5.64 ± 0.48 man-min./litter, or 1.11 ± 0.05 , 1.16 ± 0.04 , 0.40 ± 0.01 , 0.93 ± 0.09 , 1.21 ± 0.05 and 0.71 ± 0.06 man-min./piglet, respectively. Most of these findings coincided with those of Hessel *et al.* (2000), Schick (2008) and Mamta (2013). The newborn management activities as a whole required 61.07 ± 3.76 man-min./litter or 7.63 ± 0.47 man-min./piglet in the farm.

The total time utilized for weighing activity of adult pigs was 9.59 ± 0.28 man-min./animal, and that for vaccination was 1.24 ± 0.26 man-min./animal. These findings were in consonance with the findings of Mamta (2013).

Performing of the periodic activities such as breeding (hand mating), newborn management activities and vaccination required about 95.06 ± 6.53 man-min./litter.

Table 2: Mean time spent on periodic operations

Breeding		
Type of mating	Time spent (Man-min./mating)	
Hand mating	32.75 ± 2.51	
Artificial insemination	47.60 ± 1.49	
Newborn management activities		
Activity	Time spent	
	Man-min./litter	Man-min./piglet
Cutting of naval cord and disinfection	8.86 ± 0.38	1.11 ± 0.05
Clipping of needle teeth	9.28 ± 0.31	1.16 ± 0.04
Recording of birth weight	3.22 ± 0.06	0.40 ± 0.01
Administration of iron injections on 4 th and 14 th days	7.46 ± 0.71	0.93 ± 0.09
Ear notching	9.69 ± 0.38	1.21 ± 0.05
Collection of piglets and putting back (4 times)	22.56 ± 1.92	2.82 ± 0.24
Total	61.07 ± 3.76	7.63 ± 0.47
Weighing of adult stock		
Activity	Time spent (Man-min./animal)	
Taking pig to weighing room	3.98 ± 0.18	
Handling and actual weighing	2.32 ± 0.13	
Taking pig back to its pen	3.29 ± 0.14	
Total	9.59 ± 0.28	
Vaccination		
Activity	Time spent (Man-min./animal)	
Vaccination of pigs	1.24 ± 0.26	

Conclusions

By assuming that a 100 + 5 swine unit had 50, 50, 400 and 5 animals in the farrowing, dry sow, grower and boar pens respectively, and by summing the values of time spent on both routine (6.99 man-hours per day) and periodic operations (6.34 man-hours per four litters per day) from the results of the present study, it can be concluded that 2 labourers working 8 hours per day are sufficient for smooth running of the unit.

Acknowledgments

The research facilities provided by Sri Venkateswara Veterinary University, Tirupati, Andhra Pradesh are acknowledged.

Contribution by Authors

All the authors contributed equally to writing the manuscript. The final manuscript was read by all authors and consented to publication.

Conflict of Interests

There is no conflict of interest.

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