Production systems of swine in the rural areas of Rangamati and Khagrachari districts of Bangladesh

ME Hossain[1], S Chakma[2], MM Khatun[3], M Hasanuzzaman[1], MY Miah[4] and MAA Biswas[1]

[1]Department of Animal Science and Nutrition, Chittagong Veterinary and Animal Sciences University, Khulshi, Chittagong-4202, Bangladesh; [2]Technical Officer (Livestock), Trinamul Unnayan Sangstha, Khagrachari; [3]MS student, American International University of Bangladesh; [4]Department of Dairy and Poultry Sciences, Sylhet Agricultural University, Sylhet

Abstract

The study was undertaken for a period of 60 days to investigate the production systems of swine in Rangamati and Khagrachari districts, Bangladesh. Production systems, particularly housing, feeding, breeding, disease prevalence, vaccination, bio-security, marketing, socio-economic condition and constraints of pig production were investigated during the study period. It was found that the propensity of rearing pig differed significantly ($P<0.01$) among the pig owners. Pigs were reared mostly by poor and landless peoples (54.7%) followed by marginal (32.1%), medium (9.4%) and large (3.8%). Rearing systems were also different ($P<0.01$) and the mean figures were 43.4% for free range, 24.5% for tin shed housing , 20.8% for fencing and 11.3% for girth tethering systems. The average litter size, birth weight, post-weaning weight and weaning period were 9.3, 1.72 kg, 9.0 kg and 40.8 days respectively. Prevalence of diseases differed ($P<0.01$) and most prevalent diseases were diarrhea (35.8%), coccidiosis (20.8%), pneumonia (17.0%) and hemorrhagic septicemia (13.2%). The economic benefits generated from farming were selling of piglets.

Key words: Swine, rearing system, productive performance, disease prevalence

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Introduction

Bangladesh is an agricultural country. Livestock is one of its important components which provides protein, solve unemployment and earn foreign exchange (Taylor and Roese, 2006; Cole 1996). Bangladesh is one of the densely populated countries in the world. Most of the rural people of the country are landless and they live below poverty. A large number of peoples are unemployed and about 50% of the people suffer from malnutrition. Pigs are fast growing and one of the most prolific livestock breeds (Durranc 2008; Phookan et al. 2006; Prakash et al. 2008; Taylor and Roese 2006). Pig is considered as the richest source of animal protein at a lower cost for the peoples who consume pork. In most of the areas of Rangamati and Khagrachori districts, rearing of pig is done by poor people who neither have means nor know how to improve production. In global perspective, pigs were used for production of meat and bristles. However, with the advent of nylon, pig bristles have lost its market value (Long et al. 1990). Nevertheless, till date, pork is an important source of protein in western countries. In Bangladesh, domestic breeds of pig are reared on garbage, kitchen waste and human excreta. Productivity of domestic breeds is low. As a result exotic breeds specially, Yorkshire, Landrace, Hampshire and Poland China are gaining popularity due to high growth potential (Johnson et al. 2001). Limited information is available regarding housing, feeding, breeding, disease prevalence, vaccination, bio-security, marketing and constraints of pig production under rural condition (Safranski 1999). Therefore, the current study was undertaken to investigate the production systems of pig in the rural areas of Rangamati and Khagrachari districts.

Materials and Methods

A survey was conducted using structured questionnaire. A study was undertaken at randomly selected 53 sites for a period of 60 days. Rangamati and Khagrachari both are hilly districts with sloppy land and green vegetation. This region has a temperature between 15-36^{0}C and average humidity of 76.6%. The study was conducted in different villages. Villages were

*Corresponding Author: **emrancvasu@yahoo.com**

selected according to density of pig population. All pigs were reared by the tribal people in the study area. Before collection of data, a questionnaire was prepared in accordance with objectives of the study. Later on, the questionnaire was validated against field condition. Before data collection, various households in different villages were visited. Finally, 53 different categories of pig owners from different sites were selected randomly and interviewed. Data related to housing, feeding, breeding, marketing, disease prevalence and major constraints of pig production were collected, compiled and analyzed by using Microsoft excel 2007 and SPSS 19.0 for ANOVA and chi-square test. Means showing significant differences were compared by Duncan's New Multiple Range Test (DMRT).

Results and Discussion

Socioeconomic condition

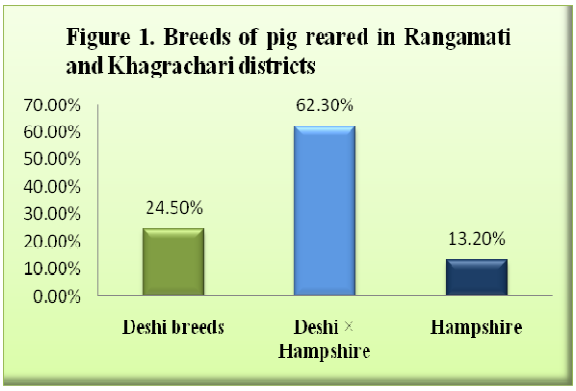
Socio-economic status of the pig owners in study areas has been mentioned in Table 1 and Boxplot 3.1. It was found that pigs were reared mostly by poor and landless peoples (54.7%) followed by marginal (32.1%), medium (9.4%) and large (3.8%) (Table 1). The Arithmetic means of the land holding capacities of 53 pig owners were predicted against the numbers of pig owner. The predictor indicated that farmers holding more than 2.84 acres of land do not hold any pig (Figure 3; y = -18.56x + 52.8). In the same way, it could also be predicted that 52.8 % of the pig owners do no hold any land. In fact, most of the landless people of the hilly areas of Rangamati and Khagrachari rear pigs to support their livelihood. It was evident that, rural people of the study area reared 24.5% Deshi, 62.3% Deshi×Hampshire and 13.2 % Hampshire pig (Figure 1).

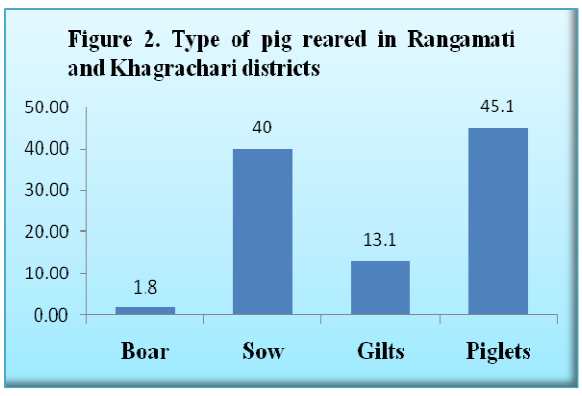
Table 1. Socio-economic condition of the pig owners

Grouping	Freq.	%	Cum. Freq.	χ^2(Sig.)
Age group (year)				
10-20	07	12.3	12.3	
21-30	10	19.1	31.4	56.7(**)
>30	36	68.6	100	
Literacy level				
Illiterate	23	43.4	43.4	
Primary	19	35.8	79.2	35.9(**)
Secondary	07	13.2	92.4	
Higher secondary	04	7.6	100	
Socioeconomic condition*				
Landless	29	54.7	54.7	
Marginal	17	32.1	86.8	65.0(**)
Medium	05	9.4	96.2	
Large	02	3.8	100	
Target products				
Piglets (weaned)	37	69.8	69.8	
Boar (castrated)	11	20.8	90.6	114.0(**)
Boar (breeding)	03	5.7	96.3	
Sow	02	3.7	100	

**Landless, >0-0.5 acr.; Marginal, >0.5-1.0 acr.; Medium, >1.0-1.5 acr.; Large >1.50 acr.; **, P<0.01.*

Irrespective of breed, they had 45.1 % of piglet, 40.0 % sow, 13.1 % gilt and 1.8 % boar (Figure 2). Farmers purchased weaned piglets from market or neighbors and started a family level farming. This is the reason why highest tendency (69.8%) of selling piglet was found among pig rearer. Tendency of marketing castrated boar, breeding boar and sow was 20.8%, 5.7% and 3.7% respectively. Weaning period of the piglet was 35-40 days. Market price of each piglet was 100-150 Tk. Selling of piglet was the main source of income for pig owners.





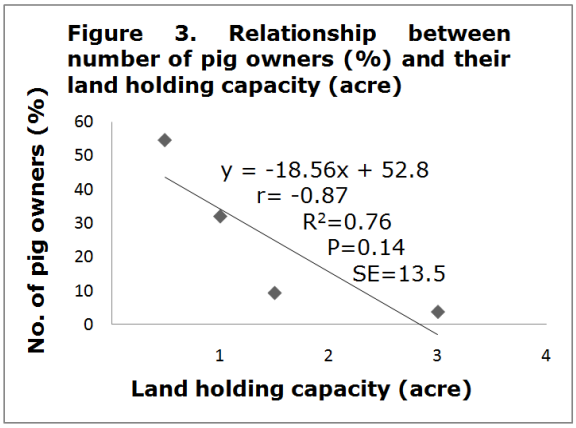


Figure 3. Relationship between number of pig owners (%) and their land holding capacity (acre)

[Y]Response variable (No. pig owner); [r]Pearson's correlation co-efficient; [R2]Coefficient of determination (Proportion of variability); [p]Probability

Rearing systems

In the study area, pigs were reared in free range system (43.4%) followed by tin shed housing (24.5), fencing (20.8%) and girth tethering (11.3%) (Table 2) and the differences among the proportions were significant (P<0.01). It was found that free range was the most popular and widely used housing system where pigs scavenged freely. In backyard farm, no ideal measurement was followed. The roofs of the sheds were made of chawn and tin. Heat stress was reduced by spraying water. Pigs were allowed to wallow in nearby clay area during summer. The piggery was sited to take full advantage of prevailing winds by keeping both sides open. In winter, pigs were protected from cold by using thick cloths and gunny bags.

Table 2. Rearing systems of pigs in Rangamati and Khagrachari districts under backyard farming system

System of rearing	Freq.	Percent	Cum. Freq.	χ^2(Sig.)
Free ranging system	23	43.4	43.4	21.8(**)
Tin shed housing	13	24.5	67.9	
Fencing system	11	20.8	88.7	
Girth tethering system	06	11.3	100	
Total	53	100		

[**]Significant at 1% level (P<0.01)

In fact, pigs are natural browsers and grazers who gain much from spending as much time as possible in an outdoor environment. All the rare and other traditional breeds of British pig were bred as hardy outdoor animals. Nevertheless, if provided with suitable housing, they produce good healthy litters. An outdoor pig will not dirty its living and sleeping area for contrary to popular belief that the pig is a dirty animal (Long et al. 1990; Taylor, 2006; Smith). Similar to outdoor, pigs can be housed indoors in individual stalls, pens or in barns.

A pig needs a warm and dry home in which to sleep and rest. Protection against the wind and rain is important but pigs also need shade. Pigs need good ventilation but don't like draughts. Cold isn't a problem so long as there's a good straw bed and the pigs can huddle for warmth. Pigs like to nest, so a good straw bed is the order of the day. Pigs don't usually dung or urinate in their sleeping area, so cleaning out the house is never unpleasant. The used straw can simply be swept out of the house to the ground in front. This helps to keep the new straw clean by giving the pigs somewhere to wipe their trotters before going to bed (Durranc, 2008; Hubert and McGlone 2007). Pigs cannot regulate their body temperature well. Therefore, a metal house could be like an oven in summer and a fridge in winter. Wood is better and there are now plastic and similar houses, some with insulation to keep them cool in summer and warm in winter. Setting the house in a sheltered, shaded area will also help (Morris and Hurnik 1993).

Sanitation procedure

After birth, mucous from mouth and nostrils of piglets were dipped and navel cord was cut by the owner. They used Bioclean®, Dettol® and Bleaching powder for cleaning the floor. The farrowing room was kept clean and warm with gunny bags, cloths and dry straw. They used to rub small and weak piglets with disinfectant. There was easy access of fresh air in the sheds and floor was dry. Sanitation is important to keep the pigs disease-free. A mechanism for easy cleaning and removal of waste is necessary for any type of pig housing. Some use slotted pen floors to make waste collection easy. Housing in a barn and removal of manure daily are recommended to keep the floor dry to reduce odor. Proper ventilation is required to remove ammonia (NH_3), methane (CH_4) and hydrogen sulfide (H_2S) gases (King et al. 1998; Moore, 2002; Johnson et al. 2001).

For sanitation of pig house disinfectant should be used that are active against a wide range of

viruses, bacteria and fungi, safe to handle, active in the presence of dust or organic matter, has a long period of activity, non-irritant, non-staining, non-toxic, non-corrosive, colored, safe and effective when used in water systems and capable of use through pressure washers. There are six classes of chemicals that could be used for disinfection i.e., phenols, chlorine based compounds, iodine based compounds, quaternary ammonia substances, aldehydes and peroxygen formulations (Smith 2005).

Immediate before disinfection, it's important to remove all slurry channels and tanks. Isolate electricity supply, disconnect all moveable equipment, feeders and lamps. Brush down and sweep out the house. Building and roof to floor need to be cleaned completely with a farm detergent or water, for 24 hours if possible. All moveable equipments should be removed and clean down. Water system, bowls, nipples, water tanks etc should be drained and flushed with a detergent sterilizer. Finally the whole building should be pressure washed using hot water or a steam cleaner (Taylor and Roese 2006).

Feeding and watering system

There was little provision for concentrate supplementation in family level farming. The pig owners used to supply rice polish, boiled rice and some unconventional feeds like cauliflowers, arum and hilly grass. Occasionally they supplied vegetables like sweet guard, bottle guard, sweet potato and arum to the adult pigs at the rate of 1.0 kg per head and 750-800 g/head for the growers. Natural reservoir was the source of water for pig.

Pigs rely on both grains and meat. They can also be fed with cooked table scraps and vegetables. Corn is their most common food, but they could benefit from having a diet with protein from soybeans or cooked meat. Further, they grow faster with vitamins and other supplements. Piglets have higher protein requirements than mature ones. Feeds can be bought packaged and in bulk. Pigs must also have adequate supply of drinking water daily, about two to four gallons. Water may be provided through a tub or automatic nipple waterer (Britt 1998; Walker 2003; Niemann 2006; Cole et al. 2000; Baker et al. 1968).

Pigs are normally fed twice a day. The amount of feed depends on the age and the reproductive state of the pig. A foraging pig will obtain some of its food from natural sources as long as the foraging area is able to provide it. This would include grass, brambles, acorns, apples, and even earth worms. It is important to supplement this with a balanced compound feed, to ensure that the pig receives all the nutrients it requires. Potatoes, carrots and other fruit and vegetables can also be fed, as long as these are not catering waste, from your own or a commercial kitchen or anywhere that sells meat (Berschauer et al. 1998; Walker 2003).

It is not wise to feed any household waste of any sort or in any form to pigs. Pigs prefer their feed wet, so adding water or surplus goat's milk to their feed will be appreciated. The gilt requires about 2.5 kg per day. This should be kept up until farrowing. Once the pig has produced her litter she must take enough food to keep herself healthy and to provide enough good milk for the piglets. If the sow is suckling more than six piglets then she should be fed an extra 0.5kg per day per additional piglet. This can be reduced to 1.5-2kg after weaning (Cole et al. 2000).

Reproductive performance

Average age of sexual maturity in boar and sow were 8 months and 6 months respectively. Length of estrus cycle was 18-24 days. Sows moved into estrus 3-10 days after weaning of litter. The signs of heat included restlessness, lie down and get up, swelling and reddening of the vulva, appearance of mucous, clear vaginal discharge and attempt to mount other sows and boars or to be mounted. When the gilts were in heat, they were allowed to the boar in open place in close proximity within sight, sound and smell of the boar for natural mating.

Reproductive performances of indigenous pigs have been studied by different researchers (Christenson, 1986; Nandakumar et al. 2003; Nandakumar et al. 2004; Nath et al. 2002; Phookan et al., 2006; Prakash et al. 2008; English et al. 1984; Kumari et al. 2008; Young et al. 1976 and Tummaruk et al. 2004). Least squares mean gestation period obtained by Nath et al. (2002) and Prakash et al. (2008) in their study were 111.49±0.34 days. Mean litter sizes were 6.78±0.11 at birth and 6.22±0.11 at weaning while the corresponding mean litter weights were 7.53±0.12 and 60.77±1.00 kg at weaning. Sows farrowing during rainy season had larger and heavier litters than those farrowing in other seasons.

In current study, average litter size was 9.5, 9.8, 8.3, 9.3 and 9.7 for category I, II, III, IV and V respectively (Table 3). Maximum litter size was 9.8 and minimum 8.3. Maximum birth weight of litter was 1.8 and minimum 1.6. Maximum weaning period of piglet was 42 days and minimum 35 days. Average post-weaning weight of piglet was 8.7 kg. Maximum post-weaning weight of piglet was 9.7 kg and minimum 8.2 kg (Table 3).

Table 3. Reproductive performance of pigs in Rangamati and Khagrachari districts

Parameter	Category						SEM
	I (1-5)	II (6-10)	III (11-15)	IV (16-20)	V (21-25)	Average	
Birth wt. (kg)	1.8±0.27	1.7±0.26	1.8±0.42	1.7±0.24	1.6±0.27	1.7±0.28	0.26
Litter size (no.)	9.5±0.28	9.8±0.14	8.3±0.40	9.3±0.28	9.7±0.42	9.3±0.30	0.19
Weaning period (d)	40^{b}±2.80	35^{c}±2.20	38^{bc}±2.70	42^{b}±2.10	45^{a}±2.30	40.8±2.6	1.70*
Post-wean. wt. (kg)	8.6^{b}±0.42	8.7^{b}±0.27	9.7^{a}±0.29	9.4^{a}±0.38	8.6^{b}±0.36	9.0±0.38	0.15*

**, P<0.05; SE, standard error; Means with different superscripts in the same row differ significantly*

Diseases prevalence

Reports indicate that abscess, botulism, bovine viral diarrhoea, brucellosis, bursitis, coccidiosis, cystic ovaries, haematoma , lameness, laminitis, listeriosis, mastitis, meningitis, metritis are common diseases for pigs (Peter et al. 2007). In current study, most prevalent diseases were diarrhea (35.8%), coccidiosis (20.8%), pneumonia (17.0%) and hemorrhagic septicemia (13.2%) (Table 4). Diseased pigs were isolated and treated with Renamycin®, SP-vet®, Amoxi-vet®, Anora®, DB-vitamin® etc. They used vaccine against Hemorrhagic Septicemia, Anthrax and Foot and Mouth disease. In case of Hemorrhagic Septicemia, they used a booster dose after 15 days of first dose. The interval of two vaccinations was 15 days. They dewormed all growers and finishers at 5 weeks interval. They used government supplied albendazol for deworming.

Table 4. Disease prevalence of pigs in Rangamati and Khagrachari districts under backyard farming system

Diseases	Freq.	Percent	Cum. Freq.	χ^2(Sig.)
Diarrhea	19	35.8	35.8	17.6(**)
Coccidiosis	11	20.8	56.6	
Pneumonia	09	17.0	73.6	
Hemorrhagic septicemia	07	13.2	86.8	
Others	07	13.2	100	
Total	53	100		

***, P<0.01*

Constraints of pig production

Bangladesh is a Muslim rich country. Pork is prohibited in Islam religion. Muslim peoples are not interested in pig farming. Pigs are omnivorous and voracious animal. They require more feed daily. For the rural pig owner, it is difficult to meet up their demands for feed. As a result, pigs in Rangamati and Khagrachari are suffering from malnutrition. The major feedstuffs of pigs that available are of low quality, which do not meet their productive and reproductive performances. The maximum pig population of the study area was indigenous type which has low productivity in comparison to exotic breed. Moreover, high mortality of piglets was another constraint. Young piglets fail to suckle their mother and gradually become weak and finally die. The farm owners have limitations in the knowledge of vaccination. Pigs in family level farming often face diseases like FMD, HS and anthrax. There is no opportunity for diagnosis of diseases in rural areas due to lack of laboratory. Limited post mortem facilities are available for diagnosis of diseases. As a result, they do not know the causes of disease and preventive measure. There is lack of bio-security particularly in family level farming. Pigs are always exposed to other livestock and migratory birds and affected by diseases. Drugs are quite expensive. Pig owners often refuse to treat their pigs. Maximum farm owner are illiterate. Pigs often die from poor husbandry practices. Due to religious restriction, there is no established pork marketing system which in general, hinders pork production.

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