



*Original Research*

## Effect of Weaning Management on Economics of Piglet Production under Farm Condition of Assam

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### Abstract

The present study was carried out on 20 T&D (Tamworth x Desi) sows and their piglets (182 piglets), with an objective to compare the economics of piglet production under early weaning (at 28, 35 and 42 days) age with the traditional weaning practice at 56 days of age. Piglets weaned at 28, 35 and 42 days of age were fed prestarter and starter rations with skim milk powder from 2 to 3 weeks and 4 to 6 weeks respectively, whereas similar rations without skim milk powder were fed to the piglets weaned at 56 days of age. Piglets of all the weaning groups were identified and reared up to 13 weeks of age. The economic analysis of piglet production was done on the basis of one sow unit and for calculation of inputs; the cost of feed consumed by one sow during the production cycle and by the piglets of one litter from birth to 13<sup>th</sup> weeks were combined. Output value was estimated on the basis of the total live weight produced from one sow unit. Economic analysis in terms of Net profit, Net profit /piglet, Input Output Ratio and Benefit Cost Ratio (BCR) were significantly better in pigs under early weaning (28 and 35 days) management compared to late weaning age (42 days or traditional weaning age of 56 days). From the study it is concluded that early weaning of piglets at 28 or 35 days with proper care and feeding management is economical over late weaning (42 or 56 days).

**Key words:** Assam, Economics, Tamworth x Desi, Piglet Production, Weaning Age

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### Introduction

Production cycle in pig consist of gestation period, lactation period, grace period (7 days after weaning) and loss period (sows not pregnant beyond 7 days after weaning). To improve the litter index (number of



litter production per sow per year), one must try to reduce the lactation length or loss period, as gestation length and grace period are more or less constant. Biologically, sow becomes ready for next pregnancy in an around 24 days after farrowing (Whitemore, 1998). Body weight loss of sow during lactation beyond 10% have negative impact in subsequent reproductive health (Thaker and Bikei, 2005), which may raised up to 20-25% in 50-56 days lactation length (Bhatia *et al.*, 1985) depending upon the adopted managerial practices and weaning of piglets between 21-28 days is quite helpful in preventing the lactational body weight loss in sows. The gap between demand and supply of nutrients in nursing piglets started as early as 8-10 days of age and the gap is further widened when sow milk production started to decline from 21-24 days of lactation (Harrell *et al.*, 1993). Presence of milk, may be in less amount, also inhibits intake of solid feed by the piglets during nursing stage. On the other hand, young piglets have very high growth potential under ad libitum nutrition and suitable microenvironment, which is exploited only up to 50% of their potential in high health commercial farms (Mavromichalis, 2006). That way, early weaning of piglets with proper feeding, housing and health coverage also provides the opportunity to exploit the higher growth potential of young piglets.

Considering the beneficial side of early weaning, weaning of piglets between 21 to 28 days of age is a well adopted practice in most of the developed countries in the world. However in India, weaning is still mostly practiced at 50-56 days of age, which may cause considerable losses in terms of sow body weight loss, higher feed requirement (Ravi *et al.*, 2013) as well as loss in pre and post weaning growth rates of piglets. Few workers have already studied the effect of early weaning management on performance of sow and piglets under Indian farming condition. However, information's on relative economics of early weaning of pigs are not much available (Ravi *et al.*, 2013; Jayashree *et al.*, 2013). The present work was therefore undertaken to study the economics of piglet production under different weaning age (28, 35, 42 and 56 days) in farm condition of Assam, India.

### Materials and Methods

The experiment was carried out on 20 T&D (Tamworth x Desi) sows and their piglets (182 piglets) maintained at All India Coordinated Research Project on Pig and Mega Seed Project, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati-781022, Assam, during 2010 to 2012. Pregnant sows were individually housed and were fed restricted diet during the gestation period. After farrowing, 20 sows along with their piglets were divided into following four groups in such a manner that each group was represented by almost similar litter size at birth and of similar parity sows. Piglets under treatment groups T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> were weaned at 28, 35 and 42 days of age respectively and were fed prestarter (2-3 weeks of age) and starter rations (4-6 weeks of age) with skim milk powder and sugar, whereas normal

diet without skim milk powder and sugar were fed to the piglets under control group C, which were weaned at 56 days of age (Table 1).

**Table 1:** Composition of different rations used in the experiment

Rations→		Prestarter with SMP & S	Prestarter without SMP & S	Starter with SMP & S	Starter without SMP & S	Grower I	Grower II	Finisher II/Gestation Feed	Lactation Feed	
Age in weeks rations were fed→		3-Feb	3-Feb	6-Apr	6-Apr	10-Jul	17-Nov	28-34and Gestation	In lactation	
A.	Ingredients	Cost/kg	Parts (%)	Parts (%)	Parts (%)	Parts (%)	Parts (%)	Parts (%)	Parts (%)	
	Maize	11.24	36.9	43.9	50.9	53.9	57.2	66.4	75.6	65.4
	SoyBeanMeal	27.97	10	25	15	20	20	10	5	10
	Ground Nut Cake	25.37	5	10	12	10	9	10	6	10
	Wheat Bran	11.95	2	5	2	2	2	3	9	8
	Fish meal	21.95	8	10	8	8	7	7	2	4
	Skim milk powder	194.85	30	0	5	0	0	0	0	0
	Sugar	34.5	2	0	1	0	0	0	0	0
	Soybean oil	78.02	2	2	2	2	1.8	1	0	0
	Molasses	36	1	1	1	1	0	0	0	0
	DL_methionine	520	0.15	0.15	0.15	0.15	0.1	0.1	0	0
	L-Lysine	280	0.3	0.3	0.3	0.3	0.25	0.25	0.1	0.1
	Mineral Mixture	90	2	2	2	2	2	2	2	2.25
	Additives	276	0.35	0.35	0.35	0.35	0.35	0	0	0
	salt	5.47	0.3	0.3	0.3	0.3	0.3	0.25	0.3	0.25
<b>Total</b>			100	100	100	100	100	100	100	
B.	<b>Cost of ration per kg (₹)</b>		75.68	23.58	31.37	22.51	21.49	18.51	15.03	16.84
C	<b>Nutrient Contents (calculated)</b>									
	<b>Dry Matter (%)</b>		89.58	86.95	87.47	86.89	86.99	86.79	86.58	86.75
	<b>Energy(DE)(Kcal/kg)</b>		3330.74	3240.74	3299.74	3291.74	3303.02	3310.02	3290.72	3228.72
	<b>Crude Protein (%)</b>		23.17	23.14	21.07	20.84	20.21	17.54	13	16.53
	<b>Crude Fibre (%)</b>		2.55	4.77	4.04	4.21	4.13	3.86	3.8	4.35
	<b>Lysine (%)</b>		1.78	1.53	1.35	1.33	1.24	1.02	0.56	0.8
	<b>Methionine (%)</b>		0.75	0.56	0.55	0.52	0.46	0.43	0.25	0.3
	<b>Calcium (%)</b>		1.3	1.06	1.03	0.99	0.96	0.91	0.77	0.93
	<b>Phosphorus (%)</b>		0.92	0.77	0.76	0.73	0.72	0.72	0.68	0.75
<b>Ether Extract (%)</b>		4.58	5.89	5.41	5.76	5.5	4.57	3.44	3.49	

SMP- Skim Milk Powder, S- Sugar

During lactation sows were fed to their appetite with lactation ration. After weaning, sows were fed on lactation ration (3-4 kg/day depending upon body condition) till onset of first post weaning heat. Piglets of all the groups were fed with Grower I and Grower II ration from 7-11 weeks and 12-13 weeks of age respectively. The daily voluntary feed intake of sows and piglets were estimated after making correction for dry matter in feed as well as in residue. Body weights of piglets were taken at weekly interval from birth to 13<sup>th</sup> weeks of age. All the experimental animals were fed on diet (Table 1) prepared as per the standards given by NRC (1998).

The economic analysis of piglet production was done on the basis of one sow unit and only feed cost was taken into consideration for calculation of inputs, as feed cost alone accounts 67-72% of total production cost (Rocadembosch *et al.*, 2011). For calculation of inputs, the cost of feed consumed by one sow during the production cycle (gestation + lactation + weaning to service) and by the piglets of the litter from birth to 13<sup>th</sup> weeks was combined. Output value was estimated on the basis of the total live weight produced from the litter at the end of 13<sup>th</sup> weeks of age. Cost of the feed ingredients and the value of one kilogram of live weight of pig were based on the market price at Guwahati, Assam, during the experiment period (2010-12). Statistical analysis of data (single factor anova) was done as per Snedecor and Cochran (1994).

### Results and Discussion

The data pertaining to relative economics of piglet production under different weaning management based on single sow unit has been presented in Table 2.

**Table 2:** Economics of piglet production on the basis of one sow unit under different weaning groups

Economic analysis	Weaning Group				
	28 days (T <sub>1</sub> )	35 days (T <sub>2</sub> )	42 days (T <sub>3</sub> )	56 days (C)	
<b>Input</b>					
A	<b>Cost of feed</b>				
	Average cost of feed for one sow during the production cycle ( Gestation+ Lactation+ Weaning to Service) (₹)	5464.43±55.70 <sup>c</sup>	6077.68±65.01 <sup>bc</sup>	6659.04±140.30 <sup>b</sup>	7927.54±454.06 <sup>a</sup>
	Average cost of feed for piglets of one litter up to 91 days of age (₹)	10064.70±893.75 <sup>a</sup>	9585.25±1032.52 <sup>ab</sup>	7059.663±388.11 <sup>bc</sup>	5826.54±692.43 <sup>cd</sup>
	Total cost of feed (₹)	15528.14±925.00	15662.93±1096.60	13718.71±496.58	13754.07±1082.86
<b>Output</b>					
B	Average number of piglet produced/litter	9.00±0.89	8.60±0.51	7.80±0.49	8.20±0.97
	Average litter weight at 13 <sup>th</sup> weeks of age (kg)	219.22±18.93 <sup>a</sup>	206.40±23.87 <sup>ab</sup>	161.78±9.90 <sup>ab</sup>	157.96±22.21 <sup>b</sup>
	Value of live weight produced @ ₹ 110/ kg live weight (₹)	24114.20±2082.24 <sup>a</sup>	22704.00±2626.09 <sup>ab</sup>	17795.80±1088.63 <sup>ab</sup>	17375.60±2442.62 <sup>b</sup>
C	<b>Feed cost per kg live weight produced (₹)</b>	71.69±2.83 <sup>b</sup>	77.59±3.99 <sup>ab</sup>	85.67±4.17 <sup>ab</sup>	91.28±8.09 <sup>a</sup>
D	<b>Feed cost per piglet produced (₹)</b>	1755.95±82.89	1824.22±78.39	1771.63±58.87	1715.94±113.64
E	<b>Ratio of feed cost of sow and piglets</b>	0.56±0.05 <sup>a</sup>	0.66±0.06 <sup>a</sup>	0.95±0.04 <sup>b</sup>	1.43±0.16 <sup>c</sup>
F	<b>Net profit (₹)</b>	8586.06±1220.46 <sup>a</sup>	7041.07±1586.25 <sup>ab</sup>	4077.10±942.40 <sup>b</sup>	3621.53±1411.91 <sup>b</sup>
G	<b>Net profit/Piglet (₹)</b>	946.79±95.84 <sup>a</sup>	794.60±140.63 <sup>ab</sup>	535.82±141.25 <sup>b</sup>	405.56±159.76 <sup>b</sup>
H	<b>Input Output ratio</b>	0.65±0.03 <sup>b</sup>	0.71±0.04 <sup>ab</sup>	0.78±0.04 <sup>ab</sup>	0.83±0.07 <sup>a</sup>
I	<b>Benefit Cost Ratio (BCR)</b>	0.54±0.06 <sup>a</sup>	0.43±0.07 <sup>ab</sup>	0.30±0.07 <sup>b</sup>	0.24±0.09 <sup>b</sup>

Means within each row bearing at least one common superscript do not differ significantly ( $P < 0.05$ ).

Significantly lower feed cost was involved in sows weaned at early age ( $T_1$  and  $T_2$ ) compared to their late weaned counterparts ( $T_3$  and C), which is mainly due to variations in quantity of feed consumed by sows during lactation. On the other hand significantly higher feed cost was observed in piglets weaned at early age ( $T_1$  and  $T_2$ ) compared to their late weaned counterparts ( $T_3$  and C). Availability of sow milk during lactation inhibits feed intake in piglets (Mavromichalis, 2006) and piglets weaned early consumed higher amount of feed, which might result in significantly higher cost of piglet feed for early weaned piglets ( $T_1$  and  $T_2$ ). However total cost of feed involved in production piglets were similar for all the weaning groups, which were between (₹) 15528.14 to 13718.71. Similarly non-significant differences in feed cost per piglet produced were observed among the weaning groups which were ranged between ₹1715.94 to 1824.22. Ratio between feed cost of sow and piglets were significantly higher for the late weaning groups ( $T_3$  and C) compared to their early weaned counterparts ( $T_1$  and  $T_2$ ), which indicates that, late weaning may reduce the feed cost of piglets however, it is compensated by the higher feed intake of sow during long lactation period. The study indicated that feed cost does not differ when weaning age is delayed up to 56 days. Rava (1991) recorded lowest feed cost (from 2-13th week) per kg gain in piglets weaned at 5th week compared to weaning at 6th and 8th weeks. On the other hand, Marwein (2008) recorded lowest feed cost per kg gain in piglets weaned at 8th week, followed by weaning at 6th and 7th weeks of age.

As mentioned earlier, sow milk production becomes limiting to the suckling piglet from 8-10 days of age and the difference between need and supply of nutrients progressively increases as lactation proceeds (Harrell *et al.* 1993). The gap further widened, when sow milk production started to decline from 4<sup>th</sup> week of lactation. Contrary, availability of milk even though in limited amount after 4<sup>th</sup> week age, might inhibit the consumption of solid feed which resulted in poor growth of piglets in late weaned groups in the present study. Poor body weight gain of late weaned piglets ( $T_3$  and C) up to 13<sup>th</sup> weeks of age, resulted in significantly lower return in late weaned groups compared to early weaned counterparts. The study revealed significantly better results, in terms of Net profit, Net profit /piglet, Input Output Ratio and Benefit Cost Ratio (BCR) for early weaning groups compared to late weaning ones. There is paucity of literatures on economic analysis of piglet production under Indian rearing system to compare the present findings. Better growth of early weaned piglets might be the main cause of better economic returns in the present study. However, compensatory growth mechanism, of late weaned pigs may compensate the net return at later stage, which was beyond the purview of the present study. Anon (2007) didn't find much difference in average daily gain, feed conversion efficiency at slaughter, which were weaned at 4<sup>th</sup>, 6<sup>th</sup> and 8<sup>th</sup> week. They mentioned that main advantage of early weaning is the early rebreeding of sow, resulting more number of piglet production per sow per year, which facilitate better use of house, feed and other resources. Anon (2007) also reported that, by weaning at 28 days, 4 more numbers of piglets can be produced resulting more

profit/ sow/year compared to weaning at 56 days. The benefits of early weaning at 4<sup>th</sup> weeks have also been demonstrated by Abraham (2001) compared to weaning at 6<sup>th</sup> or 8<sup>th</sup> week of age.

### Conclusion and Implications

From the above mentions results of economics of piglet production, it can be concluded that weaning management at 28 days is most economical followed by weaning management at 35, 42 and 56 days. Better growth rate of early weaned piglets combined with low feed consumption during lactation of early weaned sows might result better economic output over lately weaned sows. Early weaning facilitate, early rebreeding of sow, which improve the production efficiency of sow, resulting better resource use efficiency in pig production system. Study covering lifetime performance of sow and piglets under early weaning management, with larger sample size will be helpful to reaffirm the findings of present study and to find out suitable economical weaning age in the country.

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### References

1. Abraham, J. (2001). Effect of different weaning management systems on the performance of Landrace x Desi pigs. M.V.Sc. Thesis, Indian Veterinary Research Institute, Izatnagar, Bareilly, Uttar Pradesh.
2. Anon (2007). Final Report: IS0212-Sustainable systems for pig weaner management. (AGEWEAN), downloaded from [www: http://randd.defra.gov.uk](http://randd.defra.gov.uk) on 11-03-2012.
3. Bhatia SS, Chhabra AK and Agarwal DK (1985) Effect of age at weaning on sow productivity. *Indian J. Anim. Res.* 19(1):48-50.
4. Harrell, R.J., Thomas, M.J. and Boyd, R.D. (1993). Limitations of sow's milk yield on baby pig growth. *Cornell Nutrition Conference for Feed Manufacturers*. pp 156-164. Cornell University, Ithaca, NY.
5. Jayashree P.C. and Sivakumar T. (2013) Influence of early weaning on productive and reproductive performance in Large White Yorkshire pigs *Tamil Nadu J. Veterinary & Animal Sciences* 9 (3) 207 – 212.
6. Marwein, N. (2008). Performance of crossbred piglets fed de-oiled rice bran based diet during preweaning period. M.V.Sc. thesis, College of Veterinary Science, AAU, Khanapara, Guwahati-22.
7. Mavromichalis, I. (2006). Applied nutrition for young pigs. CABI, Wallingford, Oxfordshire OX10 8DE, United Kingdom, pp 1-154.
8. National Research Council (NRC) (1998). Nutrient requirements of swine, Tenth revised edition, Subcommittee on Animal Nutrition, Board on Agriculture, National Research Council, National Academy Press-2101 Constitution Avenue, NW-Washington, DC. 20418, USA.
9. Ravi P., Pandey H.N., Porteen K. and Selvaraju G. (2013). Effect of early and split weaning performance on crossbred gilts (Landrace x Desi). *Indian J. Vet. Res.* 22 (1):32-37.



10. Rava, S. (1991). Effect of skim milk feeding and early weaning on the growth performance of Hampshire pigs. M.V.Sc. thesis, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati-22, Assam.
11. Rocadembosch J., Amador J., Bernaus J., Font J. and Fraile L. J. (2014). Production parameters and pig production cost: temporal evolution 2010–2014, *Porcine Health Management* 2 (11): 2 – 9.
12. Snedecor, G.W. and Cochran, W.G. (1994). *Statistical methods*. 8<sup>th</sup> edn. Iowa State University Press, USA.

