

## COMMERCIAL FATTENING OF BUFFALO CALVES FOR ECONOMIC MEAT PRODUCTION

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### ABSTRACT

*An experiment was conducted on buffalo calves at Livestock farm of Regional Agriculture Research Station, Khajura, Nepal aiming to strengthen practice of commercial fattening. Experiment was done for a period of 7 months during the year 2015 with the main objective to develop low cost buffalo fattening technology emphasizing feeding management. Sixteen male buffalo calves aged 10-12 months were purchased from livestock haat bazaar at Rambhapur, Banke district and from farmers' field. The experiment was conducted in a Randomized Complete Block Design with 4 treatments each replicated four times. The treatment details were T1: Control- Farmer's practice, T2: Feed 1 + roughage adlib (straw and green at 3:1 ratio), T3: Feed 2 (Urea 2% and molasses 10 % of concentrate) + roughage ad lib (straw and green at 3:1 ratio), T4: Feed 3 (Oil seed cakes 20 %, soybean cake 10 %, urea 1%, Molasses 5 % of concentrate) + roughage ad lib (straw and green at 3:1 ratio). The dry matter requirement was fulfilled at the rate of 3 % of body weight. The concentrate was supplied at the rate of 25 % of total dry matter requirement and rest were fulfilled from roughages i.e straw and green forage at the ratio of 3:1. The buffalo calves were vaccinated against FMD and HS. Drenching was done at the beginning and during middle of the experiment. The results showed that the significantly higher average daily gain (g) was found for T2 (508.34 g) followed by T4 (503.57). Based on economic analysis the net benefit per animal was found highest on T3 i.e urea molasses supplemented group without soybean cake supplementation Rs 2853.*

**Keywords:** fattening, dry matter, buffalo

### INTRODUCTION

Buffalo is one of the important commodities in the Nepalese farming system. Buffalo meat contributes about 58.3 % of total meat production of Nepal (MOAC, 2015). It is the cheap source of animal protein for the people as compared to other meat like goat, sheep, pig and poultry. Buffalo meat demand is higher in Kathmandu, Pokhara and other larger cities of Nepal and supplied to these cities from various parts of Nepal like Banke, Nawalparasi, Siraha, and Bara districts of Nepal. Weekly livestock haatbazar are operated in these districts. Farmers sell their animals on haatbazar and traders purchase male buffaloes. Similarly, buffalo meat processing plants has been established in Bardiya and Bara districts of Nepal. These processed meats have been transported to China via Calcutta, India. There is a huge demand of male buffalo in the country for meat purpose. The demand of buffalo meat is not fulfilled yet (Devkota and Kolachapati, 2008). Buffalo

meat contains low amount of cholesterol so more people are attracted to buffalo meat. Sinclair *et al.*, 1982 reported that cholesterol content in buffalo meat is (46 %), sheep (68%) and goat (58%).

Most of the buffalo meat is produced from aged buffalo which have been used as draft (males) and milking (females). There is demand for the improvement in efficiency of buffalo meat production. The alternative use of young male calves may have advantage over old animals if they can be reared faster by feeding of nutritious diets. Kumagai *et al* 2012 indicated that 0.45 kg/day gain could be provided in crossbred male buffalo calves (Murrah x Nepal native buffalo) supplemented with limited amounts of concentrate at 0.75 % of their body weight (BW) from 128 to 250 Kg and higher daily gain, 0.72 kg, was attained by increasing the concentrate amount at 1.5% of Body weight. Previous studies indicated that average daily gain of buffaloes ranged between 0.433 and 0.780 kg (El-Feel *et al.*, 1993, Gigli *et al.*, 1993, Omar *et al.*, 1993, Sadek *et al.*, 1993 and Mehrez *et al.*, 1993).

Devkota and Kolachapati (2008) reported that 20 buffalo calves reared for a period 6 month and 10 month under two feeding system only forage based and forage plus concentrate 200 gms per head per day. The calf reared for 180 days under two feeding system showed Net profit per animal on forage based is Rs. 716.64 and forage plus concentrate supplementation had Rs 935.98 only. Similarly, on 300 days on two systems showed net profit Rs 539.41 and 547.57 respectively. Therefore, calf rearing for shorter period (180 days) was found profitable under two feeding system.

The Buffalo calf fattening could be one of the income generating activities. Accordingly, small calf with the age of 10-12 months can be purchased from local markets and reared for 6-7 months and could be sold for meat purpose. Despite fattening option, Nepalese farmers have not given any attention to raise buffalo calf. Majority of farmers culled male buffalo calf to increase the milk production. Devkota and Kolachapati (2008) reported buffalo calf fattening using only forage based and little concentrate supplementation on forage based so there is scope of research on growth performance of buffalo calf on increasing concentrate supplementation in their diet. Therefore, this study was conducted to fatten the buffalo calves for economic meat production with development of buffalo fattening technology using low cost feed stuff and identify the effect of concentrate supplementation on growth performance of buffalo calves and its economics.

## **MATERIALS AND METHODS**

An experiment on commercial fattening of Buffalo calves was conducted on livestock Farm of Regional Agriculture Research Station, Khajura, Banke for a period of 7 months from 10 March 2015 to 6 October 2015. Sixteen Buffalo calves aged 10-12 months were purchased from weekly haat bazaar at Rambhapur, Banke and from Farmer's field drenched with Oxanide-L @ 10 mg /kg body wt on 13 March 2015. Prior drenching, the buffalo calves were vaccinated against FMD @ 3 ml subcutaneously on 11 March 2015. Similarly, H.S. and B.Q. combined vaccine was given @ 5 ml sub cutaneously on 17 March 2015. The experiment was conducted in a Randomized Complete Block Design

(RCBD) with 4 treatments and 4 replications. Dry matter requirement was fulfilled @ 3 % of the body weight. The treatment detail is as followed.

- T1: Control- Farmer's Practice (Straw and green forage with little concentrate i.e. rice bran)
- T2: Feed 1 (Maize-40 %, Rice polish- 15%, Soybean cake 20%, Rapeseed meal 18 %, Mineral mixture 1 %, Molasses 5 % and salt 1 %) + Roughage adlib (Straw and green at 3: 1 ratio)
- T3: Feed 2 (Maize-41 %, Rice polish- 20 %, Rapeseed meal 25 %, Mineral mixture 1 %, Molasses 10 %, urea 2 % and salt 1 %) (Urea and molasses) + Roughage adlib (Straw and green at 3:1 ratio)
- T4: Feed 3(Maize-47 %, Rice polish- 15%, Soybean cake 10%, Rape seed meal 20 %, Mineral mixture 1 %, Molasses 5 %, urea 1 % and salt 1 %) (Oil seed cakes) + Roughage adlib (Straw and green at 3:1 ratio).

Concentrate was supplied @ 25 % of total dry matter requirement. The feed compositions in different feeds were as followed. The concentrate mixture having 20% Crude protein level has been formulated.

**Table:** Different composition of feed

<b>Feed 1</b>	<b>Feed 2</b>	<b>Feed 3</b>
Maize: 40 parts	Maize: 41 parts	Maize: 47 parts
Rice Polish: 15 parts	Rice Polish: 20 parts	Rice Polish: 15 parts
Soybean cake: 20 parts	Rape seed meal: 25 parts	Soybean cake: 10 parts
Rape seed: 18 parts	Mineral mix: 1 parts	Rape seed meal: 20 parts
Mineral mix: 1 parts	Molasses: 10 parts	Mineral mix: 1 parts
Molasses: 5 parts	Urea: 2 parts	Molasses: 5 parts
Salt: 1 parts	Salt : 1 parts	Urea: 1 parts

### **Observations**

Animals were adapted for a period of 7 days as a adaptation period before the initiation of experiment. All the animals were weighed at initial and fortnight intervals. The daily feed intake, feed conversion ratio wasnoted, and economic analysis was done at the end of experiment. All the collected data were analyzed using a statistical software MSTAT-C and Microsoft excel program.

## **RESULTS AND DISCUSSION**

### **Chemical composition of Feedstuff**

The samples of feed ingredients, prepared compound feed was sent to the Animal Nutrition Division, Khumaltar, Lalitpur for proximate analysis. Representative samples were analyzed for dry matter (DM), crude protein (CP), crude fibre (CF), and total ash contents (TA). The DM was determined by oven drying at 100°C for 10 hrs. Crude protein of the samples was determined using the Kjeldahl method. Ash content was determined by ashing at 550°C in a muffle furnace for 16 hrs (AOAC, 1980). Crude fibre of the samples

was determined using the Van Soest method (Goering, H.K. and Van Soest, 1970). The detail of chemical composition of feed stuff is presented in (Table1).

**Table 1:** Chemical Composition of feed stuff

S.N.	Name of ingredient	Dry matter (%)	Crude Protein (CP) %	Crude Fiber (CF) %	Total Ash %	Organic matter (OM) %
1	Maize	90.48	7.56	5.31	2.05	97.95
2	Calf feed 1	89.69	18.79	6.58	6.23	93.77
3	Calf feed 2	86.67	17.54	5.46	8.13	91.87
4	Calf feed 3	88.06	16.49	5.59	5.69	94.31
5	Soybean cake	90.27	44.39	8.67	7.45	92.55
6	Mustard cake	91.49	30.16	11.58	8.84	91.16

### Dry Matter Intake

The dry matter intake of buffalo calves in different treatment groups is presented in (Table 2). The dry matter intake through green grass was found highest in treatment 2 and concentrate intake was highest in treatment 2 followed by treatment 4 and treatment 3. The highest dry matter intake was found in treatment 2 followed by T4 and T3 respectively.

**Table 2:** Dry matter intake by different treatment groups

Treatments	Total DM intake (Mean $\pm$ SD)			
	Green grass (Kg)	Straw (Kg)	Concentrate (Kg)	Total
T1				
T2	179.96 $\pm$ 29.53	411.85 $\pm$ 86.67	228.92 $\pm$ 45.9	820.23 $\pm$ 160.43
T3	162.03 $\pm$ 12.79	358.75 $\pm$ 45.7	125.04 $\pm$ 26.0	645.83 $\pm$ 62.78
T4	168.07 $\pm$ 26.64	411.85 $\pm$ 76.68	197.20 $\pm$ 35.86	777.12 $\pm$ 137.31

The average daily dry matter intake in treatment T2, T3 and T4 were 3.9, 3.07 and 3.7 % of body weight.

### Growth rate

There was no significant difference ( $P > 0.05$ ) on initial body weight of animals on different treatments. The significantly difference body weight was found on final body weight ( $P < 0.05$ ). The highest body weight was found for T2 i.e. 221.4 Kg followed by T4 216.43 Kg, where as body weight of T3 and T1 respectively were similar and significantly difference ( $P < 0.01$ ) on average daily weight gain was found highest on T2 (508.34 g /day) followed by T4 (503.57 g/day), T3 (372.15 g/day) , and T1( 285.71 g/day) respectively (Table 3).

**Table 3:** Body weight of animals in different treatment groups

Treatments	Initial weight ( Kg)	Body Final weight (Kg)	Body Average Weight (ADG)	daily gain
T1	112.45	172.45 <sup>b</sup>	285.71 <sup>b</sup>	
T2	114.65	221.4 <sup>a</sup>	508.34 <sup>a</sup>	
T3	113.63	191.78 <sup>ab</sup>	372.15 <sup>b</sup>	
T4	110.68	216.43 <sup>a</sup>	503.57 <sup>a</sup>	
Significance	NS	(P<0.05)	(P<0.01)	
CV	5.34	9.27	14.65	
Grand mean	112.85	200.51	417.44	

**Feed Conversion Ratio**

The feed conversion ratio of male calves during fattening period in different feeding regimes has been presented in (Table 4). The feed conversion ratio in treatment 2, 3, and 4 were 7.68, 8.26 and 7.34 respectively. Better feed conversion ratio was found for treatment (Table 4).

**Table 4:**Feed conversion ratio in fattening male buffalo calves

Treatments	Total DM intake (Kg)	Total Live weight gain (Kg)	Feed conversion ratio (Kg DM/Kg LWG)
T1			
T2	820.23	106.75	7.68
T3	645.83	78.15	8.26
T4	777.12	105.75	7.34

**Economic Analysis**

The cost of fattening calves in different feeding regimes and output has been presented in (Table5). The net benefit (Rs) per animal was found highest in treatment 3 i.e. Rs 2853.53 per animal followed by T4, T1 and T2 i.e 2574.66, 1246 and 598.24 respectively.

**Table 5:** Economic Analysis of fattening male buffalo calves (Mean  $\pm$  S.D.)

S.N.	Treatment groups	Total cost (NRs)	Total output (NRs)	Net benefit (NRs)
1	T1	15998.33 $\pm$ 2355.31	17245 $\pm$ 2396.67	1246 $\pm$ 867.65
2	T2	21541.76 $\pm$ 3726.57	22140 $\pm$ 3261.87	598.24 $\pm$ 772.63
3	T3	16323.98 $\pm$ 1049.61	19178 $\pm$ 1158.23	2853.53 $\pm$ 747.71
4	T4	19506.99 $\pm$ 2879.16	21643 $\pm$ 2832.51	2574.66 $\pm$ 1023.30

Note: concentrate @ Rs 38.3/kg for T2, 30.33/kg for T3, T1 and 34.43/kg for T4, Rice straw @ 1/kg and green grass @ 5/kg on DM basis. The green grass cost also includes

labor cost for calf management. The buffalo calf has been estimated @ Rs 100/kg live weight.

## DISCUSSION

El-Ashry *et al.*, (1972) showed that Feed conversion values for buffalo calves were 11.5, 5.6 and 5.7 Kg for roughages solely supplemented, 50 % concentrate (1: 1 roughages and concentrate supplemented) and 80 % concentrate ration and 20% roughages supplemented group. The FCR Value in 50 %, 80% concentrate supplemented group is less and roughages only has high comparable to present study.

Feeding 20 % less CP than NRC (2001) recommendation for small cattle breeds are adequate for 400 g growth rate of Bhadawari calves and had no adverse effect on feed intake and dietary fiber utilization (Singhet *al.*, 2009). The experiment on fattening of buffalo calves was conducted in three categories of ration i.e (T1) mixed grass and straw adlibitum, (T2) mixed grass and rice straw and concentrate ration (roughage and concentrate ration (70: 30 in DM basis) and (T3) mixed grass and rice straw and concentrate ration (50 : 50 in DM basis). The body weight gain for T1, T2, and T3 were 202, 455 and 618 gm/day. The more economical combination was mixed grass and rice straw, concentrate supplementation (70: 30 in DM basis) (Banstola *et al.*, 2004). The feeding combination of roughage and concentrate (70: 30 in DM basis) growth rate is at par with the present findings.

Devkota and Kolachapati (2008) reported that buffalo calves were reared on on-farm condition using 15 buffalo calves in three treatment groups with three animals in each treatment replicated five times. The treatment combination was urea treated rice straw with 1.5 kg Berseem and little molasses (5 % of dry matter requirement), urea untreated rice straw with little concentrate ( 10 % of total dry matter requirement) and berseem forage ( straw and berseem in the ratio of 1:1), untreated rice straw and berseem ( 1:1 ratio out of which 80 % dry matter from straw and 20 % from berseem) for a period of 150 days found per kg meat production cost was 67.77 on untreated rice straw and berseem supplemented group . The daily weight gains were 360 g, 323 and 305 g respectively. Net profit per kg meat production was found highest Rs 39.61 on urea non-treated and berseem feeding group. The growth rate found better on urea treated cum berseem feeding and molasses supplemented group. On molasses unavailability, condtion straw and berseem could be used for feeding. The growth rates in present findings were greater than reported by Devkota and Kolachayapati (2008).

Response of different level of concentrate feeding on local male buffalo calves was conducted at RARS Lumle for a period of 210 days, the ratio of concentrate to roughages assigned in the three treatments were 40:60, 50:50 and 60: 40. The average daily gain were 645 g, 728 g, 747 g, respectively and the net return per animal were Rs 4528, 4330 and 4630 in three treatment groups respectively ( Jha *et al.*, 2004). The growth rate on present study is 508 g/day in concentrate to roughages ratio (25: 75 %) which is less than (40: 60 concentrate and forage ration)supplementation reported by Jha *et al.*, 2006.

Meat production potential and carcass characteristics of eight local male buffalo calves were studied. A group of 4 calves (treatment group) were kept under concentrate feeding, whereas, another group having similar number of calves (control group) were kept under general village feeding practices. The calves on treatment group received 70 % of total requirement was consisted from concentrate and 30 % from roughage. The animals of treatment group received significantly ( $P < 0.05$ ) higher daily weight gain (719 g) compared to control group (469 gm) (Rana *et al.*, 2000). Increasing the concentrate level increased the weight gain, the weight gain in this treatment group is higher where concentrate had contribution of 70 % dry matter requirement. The present study has 508 gm average daily gain on 25 % dry matter requirement fulfillment from concentrate and rest is from roughages.

The economics of buffalo meat production was compared at veal stage (200 kg body weight) and at beef stage (300 kg weight) under four feeding planes. The calves under 6 hr grazing and concentrate supplementation @ 1 % of body weight and adlib bhusa feeding found to more economical i.e net return per animal was found to be Rs. 1898. Concentrate mixture consisting of barley grains (50%), deoiled rice bran (10%), deoiled sunflower cake (20%), deoiled mustard cake (17%), mineral mixture 2% and common salt 1 %. The fodder to concentrate ratio was maintained at 60: 40 in all these treatments (Kamboj *et al.*, 2007). The present research net return per animal is similar with reported by Kamboj *et al.*, (2007) in urea molasses supplemented group.

Eighteen male calves from native, crossbred (Holstein \*Native) and buffalo (six animals for each group) with an average body weight (BW) of 160 Kg were fatten till 300 kg. Total mixed ration feed (5 % over animal appetite) offered to each animal 3 times daily. The average daily gain (gm/day) found to be 777, 641 and 912 for buffalo, native and crossbred (HN). Similarly, the significant dry matter intakes (Kg/day) were 5.58, 5.31, and 6.3 and feed conversion ratio was 7.2, 8.3 and 6.9 which was found non-significant (Azary *et al.*, 2007). The dry matter intake found higher than present study, but feed conversion efficiency was found similar.

Growth rate of buffalo calves reported by Thapa *et al.*, (1997) was 389 g per day fed on concentrate. Similarly, the growth rate varied from 200 to 550 g per day (Langer *et al.*, 1985; Punia and Sharma 1988; Kakker *et al.*, 1991). However, Pathak *et al.* (1987) observed a daily weight gain of 576 g on high protein and high energy diet. These growth rate are comparable with present findings.

## CONCLUSION

The highest average daily gain was found in soybean cake supplemented group, but the economical analysis showed that urea and molasses supplemented group had the highest net benefit, so fattening of buffalo calves could be done using urea, molasses feed mixture without soya cake supplementation meeting 25% dry matter requirement from concentrate and 75% from roughages (straw and green forages in 3:1 ratio). There is still scope of research on soybean cake supplementation in concentrate ration for further verification.

**ACKNOWLEDGEMENTS**

The authors are thankful to Nepal Agriculture Research Council for providing research grant for conducting the research and Regional Director, Regional Agriculture Research Station, Khajura, Banke for facilitating the conduction of research.

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