



Available Online at ESci Journals

## International Journal of Agricultural Extension

ISSN: 2311-6110 (Online), 2311-8547 (Print)  
<http://www.escijournals.net/IJAE>

### EFFECT OF SUPPLEMENTARY FEEDING IN OSMANABADI GOATS: A PARTICIPATION ACTION RESEARCH ANALYSIS FROM INDIA

<sup>a</sup>Praveena Kulkarni, <sup>b</sup>Kandenahalli C. Veeranna, <sup>c</sup>Ramachandra. B. Rao, <sup>b</sup>Harisha Mageppa

<sup>a</sup> Veterinary Dispensary, Hire Ullal, Hangal (Tq.), Haveri (Dist.), Karnataka, INDIA Karnataka, India.

<sup>b</sup> Department of Veterinary and Animal Husbandry Extension Education, Veterinary College, Shivamogga, Karnataka, India.

<sup>c</sup> Department of Animal Nutrition, Veterinary College, Bidar, Karnataka, India.

#### ABSTRACT

A participatory action research was designed among goat rearers of Basavakalyantaluk of Bidar district for promotion of supplementary feeding. Ninety recently parturated does were selected from six villages and are distributed into three treatment groups based on the type of supplementation. The results of the on-farm trial revealed that, there was a significant difference ( $P \leq 0.05$ ) between the mean body weight of does in the C group and the F+P group. The supplemented does in F+P group weighed heavier than the other two treatment groups. The average body condition score was highest in does supplemented both during breeding period and during last two months of gestation (F+P group). There was 100 per cent kidding in F+P group and there was no change in the twinning percentage between the F group and F+P group. However, there were comparatively lesser twin births from the does in C group. The birth weight of kids of F+P group does was higher compared to the kids of C group and F group. Thus, the adoption of improved feeding practices by the goat rearers may be improved by creating awareness among goat rearers through on-farm trials and participatory approaches.

**Keywords:** Dissemination, Education, Extension agents, Target group.

#### INTRODUCTION:

Goat production from centuries has been an integral component of farming system and a primary source of livelihood for the poor villagers. Poor people on zero input mostly rear goats in India (Gopala *et al.*, 2010). Majority of the world's goat population is found in the small holding farming system where nutritional conditions are often sub-optimal (Sibanda *et al.*, 1999). The farmers maintain their flock on community grazing land by employing family labour and negligible marketed input/purchased input and marginal output (Chauhan and Moorti 1999). This zero purchased input profession is most popular in the scheduled tribe community and supported them substantially to cater their needs (Deshpande *et al.*, 2009). Goat rearing is one of the major livestock rearing activities practiced by majority of the rural households' especially landless agricultural labourers and small and marginal farmers in

Bidar district of Karnataka state (Gopala *et al.*, 2010). Nutrition is generally regarded as a significant regulator of reproduction. The cost of rearing goats in India is low and the animals are often reared through grazing on wasteland and agricultural by-products, at times on garden and kitchen wastes. Goats depend on the range grasses and browses for almost all of their nutrient supplies. They rarely receive any supplements. Although goats tolerate high temperature and humidity of the tropics, they do experience reproductive problems associated with nutritional deficiencies, particularly from low quality forages. Goats require a relatively small investment and the simple management practices make them an attractive resource for poor farmers especially female headed households (Madibela *et al.*, 2002). It has been argued that a participatory approach to technology development can help to ensure that new technologies are more appropriate to livestock keepers' needs and circumstances, and hence increase in likelihood of adoption. Thus, an attempt was made in the present study by conducting a participatory action research for

\* Corresponding Author:

Email: harisham618@gmail.com

© 2014 ESci Journals Publishing. All rights reserved.

improving the reproductive performance of Osmanabadi goat does through introduction of supplementary feeding prior to mating (flushing) and during last two months of gestation which are often considered to be the critical periods in the reproductive cycle.

#### METHODOLOGY

The study adopted a participatory action oriented approach for promoting scientific goat rearing practices among goat farmers. The study was conducted in 6 villages viz. Ramtirth (K), Ghotala, Jajanmugli, Chowkiwadi, Umapu and Laaheshwar of Basavakalyantaluka of Bidar district in Karnataka state. From six villages, 90 recently parturated does were selected & distributed into three treatment groups

based on the type of supplementation. Further, each goat group had 3 sub groups containing 10 goats in each. Each goat sub group of the three different treatments was put under the three different farmer categories to study the influence of management practices on the effects of supplementary feeding. The goat rearers were demonstrated and advised to feed 250g of concentrate mixture per doe per day in two parts. One part of the concentrate mixture was fed in the morning and the other in the evening in order to avoid the chances of wastage or residue and (Table 1. Nutrient composition) the concentrate mixture approximately consisted of 15 % CP and 65% TDN as per book values.

Table 1. Nutrient composition and feed formulation of supplementary feed.

Sr. No	Ingredients	Quantity for 100 kg	CP%	TDN%
1	Maize	30	10.00	78.00
2	Ground nut Cake	5	40.00	75.00
3	Soya bean	5	41.60	75.00
4	Green gram chuni	10	18.80	56.2
5	Rice polish	5	12.00	75.00
6	Wheat bran	40	14.00	65.00
7	Limestone	2	-	-
8	Mineral mixture	1	-	-
9	Salt	2	-	-
Total		100	14.76	66.27

**Data Collection:** The data were collected over a period of seven months after an initial acclimatization period of 2-3 weeks. Field visits were carried out once in two weeks to monitor the intake of feed, to record body weights, body condition scores, health of the goats, abortions, kid birth weights. The information was collected by Personal interview, Participant observation, Key informant technique and Focused group discussion method. The collected data were subjected to statistical analysis in a completely randomized block design by one way and two way analysis of variance and statistical analysis like mean, Percentage and Standard deviation were also used for interpretation of results accordingly.

#### RESULTS AND DISCUSSION

**Effect of supplementary feeding on doe body weight:** There was a significant difference ( $P \leq 0.05$ ) between the mean body weight of does in the C group and the F+P group. The supplemented does in F+P group weighed heavier than the other two treatment groups. The does in F group weighed higher than the C group however, the

difference was not significant ( $P > 0.05$ ). Also there was no significant difference ( $P > 0.05$ ) in the mean body weights of does between the F group and F+P group. There was a significant difference ( $P \leq 0.05$ ) in the body weight of does over different days of feeding trial in all the treatment groups (Table 2). The does in F+P group received supplementation during the last two months of gestation which is a critical period during pregnancy thus were able to gain more weight than the other two groups. The results are in line with Sahlu *et al.* (1992), Madibela *et al.* (2002), Mathew and Mathew (2002), Salim *et al.* (2002) and Madibela and Segwagwe (2008) who stated that supplemented does had heavier body weight than control at parturition. Karikari and Blasu (2009) stated that the live body weight of does increased following six weeks of nutritional flushing. However, the results are in contrary to the findings of Acero-Camelo *et al.* (2008) who reported that there was no difference in body weight of does supplemented with either low or high level of concentrates during flushing period.

Table 2. Mean body weight of does (Kg) subject to supplementary feeding under different treatment groups over different days of feeding trial.

Days	Treatment groups			Overall Mean± SE
	C group	F group	F+P group	
0	28.92±0.30jk	28.69±0.30k	29.12±0.30ijk	28.91±0.18A
45	30.14±0.30hij	30.62±0.30gh	30.69±0.30fgh	30.49±0.18B
90	31.39±0.30efgh	32.14±0.30de	32.48±0.30cde	32.00±0.18C
AK	32.89±0.30bcd	33.52±0.30bcd	35.31±0.30a	33.90±0.18D
Overall Mean ± SE	30.84±0.151	31.25±0.151	31.90±0.152	

Note: 1)  $P \leq 0.05$

2) Values bearing different superscripts differ significantly within rows or columns.

#### Effect of supplementary feeding on body condition score of does:

The average body condition score was highest in does supplemented both during breeding period and during last two months of gestation (F+P group). However, the BCS of does in F group was also higher compared to that of control group does. The mean BCS of does increased over different days of feeding trial irrespective of different groups but was highest in F+P group followed by F group and C group

(Table 3). This might be attributed to the increased body reserves due to supplementation. The results are in line with Karikari and Blasu (2009) who stated that the body condition score of does increased following 6 weeks of nutritional flushing. The results are not in line with the findings of Acero-Camelo *et al.* (2008) who reported that there was no difference in body condition score of does supplemented with either low or high level of concentrates during flushing period.

Table 3. Mean body condition score of does on different days of supplementary feeding trail, in different treatment groups.

Treatment group	Day of feeding trial			
	0	45	90	After kidding
C group	1.81±0.37	1.83±0.37	2.10±0.43	2.39±0.49
F group	1.73±0.35	1.98±0.41	2.23±0.45	2.5±0.51
F+P group	1.77±0.36	1.91±0.39	2.25±0.46	2.7±0.57

#### Effect of supplementary feeding on kidding percentage:

There was 100% kidding in the F+P group followed by 90% in F group and 80% in C group as in (Table 4). This could be due to non-conceptions and abortions that occurred in the F group and C group does because of Foot Rot outbreak during the study period. The does in F+P group could have sustained the stress caused during the disease outbreak and were successful in giving birth to healthy kids. Taylor *et al.* (1988) stated that does

that were underfed at breeding fail to ovulate and conceive at high levels. IlkerSerin *et al.* (2010) stated that body weight and body condition score were significantly affecting the pregnancy rates and suggested the necessity of using higher energy feeding in goats with lower body weights and BCS before breeding season. However, the results are contrary to the findings of Carneiro *et al.* (2009) who stated that, flushing with bypass lipids had no significant effect on the fertility of does.

Table 4. Kidding percentage, twinning percentage and Mean birth weight of kids born to does subjected to supplementary feeding

Treatment group	C group	F group	F+P group
Total number of does selected	30	30	30
Total does giving birth to live kids	24	27	30
Kidding percentage	80.00	90.00	100.00
Total does with single kid	8(33.33)	5(20.83)	5(20.83)
Total does with two kid	11(45.83)	14(58.33)	14(58.33)
Total does with three kid	5(20.83)	5(20.83)	5(20.83)
Mean ± SE Birth weight of kids (kg)	1.76 ±0.05a	1.79±0.05ab	1.94±0.05b

Note: Number in the parenthesis depicts percentage value  $P \leq 0.05$

Values bearing different superscripts differ significantly within a row or column.

Madibela and Segwagwe (2008) stated that percentage reproductive wastage was lower in supplemented group than control group and concluded that supplementary feeding of pregnant goats grazing natural pasture during the dry season can offset the detrimental effects of maternal nutritional stress and therefore reducing reproductive wastage.

**Effect of supplementary feeding on twinning percentage:** There was no change in the twinning percentage between the F group and F+P group. However, there were comparatively lesser twin births from the does in C group. All the three different treatment groups however had a similar triplet percentage (Table 4). Twinning might be the effect of supplementary feeding prior to mating, which could have improved the incidence of multiple births under F group and F+P group. The results are in line with the findings of Madibela and Segwagwe (2008) who stated that prolificacy was higher for supplemented groups but was not significantly different. The results are in contrary to the findings of Sahlou *et al.* (1992) and Sibanda *et al.* (1999) and Acero-Camelo *et al.* (2008) who reported that there was no significant difference in the litter size between the does supplemented with either low or high concentrate levels during flushing.

**Effect of supplementary feeding on kid birth weight:** The birth weight of kids born from the does in F+P group was higher compared to the birth weights of kids born from C group and F group (Table 4). This may be because of the good nutritional status of the dams in F+P group during the critical period of pregnancy. The results are similar to the findings of Roy *et al.* (1997), Singh *et al.* (2007) and Ng'ambi *et al.* (2008) who stated that birth weight of kids was higher in supplemented does than Control does. However, the results in the present study are not in line with the findings of Singh *et al.* (1994), Sahlou *et al.* (1995), Madibela and Segwagwe (2008) and Madibela *et al.* (2002) who stated that, birth weights were similar between control and supplemented groups.

**Effect of supplementary feeding on kid mortality:**

The kid mortality percentage was highest within one month after birth in the kids generated from C group does followed by kids generated from F group does. The kid mortality percentage was least in the kids generated from F+P group (Table 5). This could be attributed to the lower birth weight of kids in the C group and the less milk production from their dams due to low nutritional status. The results are in line with the findings of Perez-Razo *et al.* (1998), Madibela *et al.* (2002) and Ng'ambi *et al.* (2008) who stated that kids weighing higher at birth had higher survival than those with lesser weights and stated that the survival rates were improved by supplementation during pregnancy. However, the kids born as singles were much healthier compared to the kids born as twins or triplets and kid mortality was higher in twins and triplets than singles. This might be because of the lower birth weights among twins and triplets and also the lack of milk availability from their dams in multiple birth cases. The results are in line with the findings of Malik *et al.* (1990) who found a significant litter size effect on mortality and attributed this to a lower body weight due to multiple births. Sebei *et al.* (2004) and Shreedhar (2009) stated that kid mortality was highest in multiple births than singles. However, Turkson (2003) stated that single died more compared to kids born with siblings. Madibela *et al.* (2002) stated that survival rates were similar between multiples and singles. The mortality of kids born as twins and triplets was however lesser in the kids generated to the does in F+P group which might be because of the higher birth weights and higher milk production from their dams. The results are in line with the findings of Turkson *et al.* (2004).

Ershaduzzaman *et al.* (2007), Kamal-El-Hassan *et al.* (2009) and Shreedhar (2009) who stated that kid birth weight had a significant effect on kid mortality. Ng'ambi *et al.* (2008) and Zahraddeen *et al.* (2009) stated that, partial milk yield was significantly increased with the increase in the Body condition score of does.

Table 5. Percentage of kid mortality in different treatment groups.

Treatment group	Total kids born from 24 does	Total kid mortality within 1 month of birth	Mortality percentage
C group	45	17	37.78
F group	49	10	20.41
F+P group	49	3	6.12

## CONCLUSION AND RECOMMENDATION

The supplemented does weighed heavier than the other two treatment groups. The average body condition score was highest in does supplemented both during breeding period and during last two months of gestation. There was 100 per cent kidding in Flushing and Parturated group of does and there was no change in the twinning percentage between the Flushing group and in Flushing and Parturated group of does. However, there were comparatively lesser twin births from the does in control group. The birth weight of kids of in Flushing and Parturated group of does was higher compared to the kids of control group and flushing group. In all, majority of the goat rearers accepted the practice of supplementary feeding as it economically feasible and further revealed that they would practice it only when the family experiences better income. Thus, the adoption of improved feeding practices by the goat rearers may be improved by creating awareness among goat rearers through on-farm trials and participatory approaches. Future studies on the adoption of supplementary feeding by the goat rearers in the study area can be carried out to assess the impact of on-farm participatory research.

## REFERENCES

- Acero-Camelo, A., E.Valencia., A. Rodriguez & P. F. Randel., (2008). Effects of flushing with two energy levels on goat reproductive performance. *Livestock Research for Rural Development*, 20(9), 10-16
- Carneiro, C., J. M. G. Souza., C. A. A. Torres., W. J. Silva., R. Denadai., J. H. Bruschi & J. F. Fonseca., (2009). Effects of bypass lipid supplementation in the transition period on reproductive parameters in dairy goats after parturition. *Reproduction, Fertility and development*, 22(1),377-378.
- Chauhan, S. K. & T. V. Moorti., (1999). Income and employment pattern, In: *Economics of Sheep farming*, Mittal publications, New Delhi.
- Deshpande, S. B., G. P. Sabapara & V. B. Kharadi., (2009). Socio-economic status of goat keepers in Gujrat region. *Indian Journal of Small Ruminants*,16(1),92-96.
- Ershaduzzaman, M., M. M.Rahman., B. K. Roy & S. A. Chowdhury., (2007). Studies on the diseases and mortality pattern of goats under farm conditions and some factors affecting mortality and survival rates in Black Bengal kids. *Bangladesh Journal of Veterinary Medicine*, 5(1/2), 71-76.
- Gopala, G. T., K. C. Veeranna & K. R. Shivakumar., (2010). Impact of goat rearing among livestock interest groups on empowerment of rural poor- A study in Bidar district. *Veterinary Science Research journal*, 1(2), 89-92.
- IlkerSeri.,G. S., M. Yilmaz, F. Kiral & A. Ceylan., (2010). The effect of body weight, body condition score, age, lactation, serum triglyceride, cholesterol and paraxonase levels on pregnancy rate of Saanen goats in breeding season. *Journal of Animal and Veterinary Advances*, 9(13),1843-1851.
- Kamal-El-Hassan., El-Abid & A.M.A. Abu Nikhaila. (2009). A study on some factors affecting mortality rates in Sudanese Nubian kids. *International Journal of Dairy Science*, 4(2), 74-79.
- Karikari, P, K. & E. Y. Blasu. (2009). Influence of nutritional flushing prior to mating on the performance of West African Dwarf goats mated in the rainy season. *Livestock Research for Rural Development*, 21(7),19-28
- Madibela, O, R. & B. V. Segwagwe. (2008). Nutritional effects of supplementary feeding on maternal blood metabolites, cortisol, thyroid hormone levels & on outcome of pregnancy of dry season kidding Tswana goats. *Livestock Research for Rural Development*, 20(4), 5-11.
- Madibela, O. R., B. M. Mosimanyana., W. S. Boitumelo & T. D. Pelaelo., (2002). Effect of supplementary feeding on reproduction of wet season kidding Tswana goats. *African Journal of Animal Sciences*,32(1),14-22.
- Malik, C. P., A. S. Kanaujia., D.S. Balaine and S. S. Rathi., (1990). Mortality pattern in Beetal and Black Bengal goats and their reciprocal crosses. *Animal Production*, 43(2),178-182.
- Matthew, O, O and O. A. Matthew., 2006. Response of multiparous and primiparous West African Dwarf goats (*Capra hircus*, L.) to concentrate supplementation. *Veterinary Archive*. 72(1) 29-38.
- Ng'ambi, J. W., L. Khitsane., D. Norris and C. A.Mbajiorgu., 2008. Effect of soyabean meal supplementation on pre and post partum productivity of Angora goats in communal rangelands of Molimo- Nthuse in Lesotho. *Livestock Research for Rural Development*. 20(1).
- Perez-Razo, M. A., F. Sanchez and H. C. Meza., 1998. Factors affecting kid survival in five goat breeds. *Can. J. Anim. Sci.* 78(9):407-411.



- Roy, R., S. K. Saxena., S. K. Singh and B. U. Khan., 1997. Genetic analysis of body weight at different ages in Jamunapari goats. *Indian J. Animal. Sci.* 67(4), 337-339.
- Sahlu, T., M. Fernandez., C. D. Lu and M. J. Potchoiba., 1992. Influence of dietary protein performance on dairy goats during pregnancy. *J. Dairy Sci.* 75(1), 220.
- Sahlu, T., S. D. Hart., T. Le-Trong., Z. Jia., L. Dawson., T. Gipson and T. H. The., 1995. Influence of pre-partum protein and energy concentrations for dairy goats during pregnancy and early lactation. *J. Dairy Sci.* 78, 378-387.
- Salim, H. M., M. Sahahjalal., M. M. Tareque and F. Kabir., 2002. Effects of concentrate supplementation on growth and reproductive performance of female sheep and goats under grazing conditions. *Pakistan Journal of Nutrition.* 1(4), 191-193.
- Sebie, D. J., C. M. E. McCrindle and E. C. Webb., 2004. Factors influencing weaning percentages of indigenous goats on communal grazing. *South African Journal of Animal Science.* 34(5), 130.
- Sibanda, L. M., L. R. Ndlovu and M. J. Bryant., 1999. Effects of a low plane of nutrition during pregnancy and lactation on the performance of Matebele does and their kids. *Small Ruminant Research.* 32, 243-250.
- Singh, R, B and R. C. Saha., 1994. Response of native goats to supplementation, West Bengal. On-farm research for testing of appropriate technologies in crop-livestock production systems. Ed: KIRAN SINGH. And SCHEIERE, J. B. ICAR, Technical bulletin Number 3, 46-49.
- Singh., Dharm and N. Ramachandran., 2007. Lactation performance of Sirohi goats under intensive production system. *The Indian J. Small Ruminants.* 13, 2.
- Sreedhar, S. 2009. Factors affecting mortality of kids in Andhra Pradesh. *The Indian Journal of Small Ruminants.* 15 (2), 253-256.
- Taylor, C. A., J. Garza., J. E. Huston., R. A. Moen and T. D. Willingham., 1988. Pre-breeding nutrition effects on ovulation rate in Angora nannies. *Sheep and goat, wool and mohair.* 45(66),: 3-4.
- Turkson, P. K. 2003. Lamb and kid mortality in village flocks in the coastal Savanna zone of Ghana. *Trop Anim Health Prod.* 35(6), 477-490.
- Turkson, P. K., Y. K. Antiri and Baffuor Awuah., 2004. Risk factors for kid mortality in West African Dwarf goats under an intensive management system. *Trop Animal Health Prod.* 36(4), 353-364.
- Zahradeen, D., I. S. R. Butswat and S. T. Map., 2009. A note on factors affecting milk yield of local goats under semi- intensive system in Sudan Savannah ecological zone of Nigeria. *Livestock Research for Rural Development.* 21(3).