

FEED SUPPLEMENTATION FOR IMPROVING THE PRODUCTIVITY IN GOATS



NATURAL RESOURCES INSTITUTE



BAIF DEVELOPMENT RESEARCH FOUNDATION

BACKGROUND

In the semi-arid regions of the country, mixed farming systems involving crops and livestock have been practiced since long. During the long dry season, the livestock do not get forages in sufficient quantity. The problem becomes more acute during drought, which generally occurs every three or four years. Reduced feed supply adversely affects body condition of the animals and in times of drought, the number of large animals is reduced significantly. Alleviation of these seasonal scarcities of feed would result in improved production and lower mortality to enable the farmer to generate more income from this source.

While a large number of research and development efforts have been undertaken for dairy animals, relatively limited studies have been carried out, involving small ruminants. Small ruminants are used as assets that can be sold for cash requirements on special occasions. Communal lands, which were traditionally used for grazing and as source of tree fodders, have been seriously degraded due to poor management. While studies have been carried out on the utilization of local feed resources for large ruminants, relatively little published information is available on the feeding systems of small ruminants, by the resource poor communities. The project jointly implemented by Natural Resources Institute, UK and BAIF Development Research Foundation, Pune looked into these aspects in a participatory manner in Rajasthan and Karnataka.

CONSTRAINTS

An extensive system of goat management is practiced by goat keepers with hardly any attention paid to supplementary feed of these animals. Goat keepers and researchers jointly identified the reasons for low productivity of goats and the possible remedies to overcome these through Participatory Rural Appraisal.

In Bhilwara district of Rajasthan, there is evidence that feed scarcity in the dry season affects the reproductive performance, particularly conception rates of does belonging to poor people. Goat keepers prefer to breed their does in May or June, as the kids will be born in October or November when

there is plenty of fodder available and less incidence of diseases. However in May or June, feed is scarce. It was therefore assumed that selective supplementation at this time will improve the conception rates and the kidding rates. The project team proposed feeding of *Prosopis juliflora* pods and barley daily to the animals during this period. *Prosopis juliflora* is a shrub abundantly found in most parts of India and has been reported to be used for feeding of calves and lambs. The pods contain 17% protein and are also rich in sugar (25%).

In Karnataka, the main constraints identified were low nutrient availability for pregnant does especially during the early monsoon when goats are generally kept indoors and therefore suffer from inadequate nutrition. This period coincides with the late pregnancy of does resulting in abortions, poor birth weights and survival of kids, poor growth rate and less milk production. The goats also suffered from high parasitic infestation, which further drained out the available nutrients. The weakened animals were also more susceptible to diseases. Hence the recommended solutions included a feed supplement based on the local availability (sorghum and horsegram), *Prosopis juliflora* pods and deworming.

METHODOLOGY

In Rajasthan, the trials were conducted for three years using a mix of barley and pods (1:1). The supplement was fed to the does at 250 grams per day per animal. In the third year of the trial, only pods were used for supplementation. The pods were harvested during April or May and stored for use over a period of 8-10 weeks. The pods are not normally collected and stored although the animals usually consume the fallen pods during browsing. The experimental animals belonged to SC/ST farmers (poorest groups).

In Karnataka, the approach was similar although the details varied. In the first year, a mixture of sorghum and horse gram (3:1) was used as feed supplement while in the second year, *Prosopis* pods were also used. The does were given 250 grams of pods per day while the sorghum and horse gram mixture was given at the rate of 200 grams per day per animal.

Digestion of Prosopis Seeds

The BAIF-NRI project wanted to find out whether goats were able to digest most of the seeds in the *Prosopis juliflora* pods as there was a concern for unintentional spread of the species in the farms. It also tried to assess if the pods needed to be ground before feeding, as although the seeds are highly nutritious, they have a hard outer casing that may prevent them from being digested. If most of them were not being digested, there would be a case for grinding the pods before feeding them to the goats, and the project wanted to find out whether it would be worthwhile conducting an experiment in which the treatment would be ground pods.

To obtain the answer to this question, it was necessary to quantify the number of seeds going into the goats and the number of seeds being expelled; the latter required the collection and analysis of faeces of all the goats. This could only be done in a controlled situation where the animals were stall-fed. Hence the trial was conducted at BAIF's Central Research Station, at Urulikanchan, near Pune. The trial showed that a vast majority of the seeds (85%) was digested by the goats, contrary to the perceptions of field staff.

To enable regular monitoring of the selected does, the names of the does and identification marks of both does and kids were recorded after consultation with the family. The horns of the animals were painted with different colours for easy identification.

A local person was trained to undertake monitoring of trial animals every 15 days during the supplementation period and the kidding season. The breeding parameters (heat, number of services and conceptions), health and body condition of animals, number of kids born and in a few cases, their birth weights (Rajasthan trials) were recorded.

In the Karnataka study, to monitor the weight, a piece of rectangular gunny cloth with four holes and fastened with a piece of rope in all the four corners, was hung on to the weighing balance.

The weight of does was taken every fortnight to monitor the gain or loss in weight before and after kidding. The weight at birth and weekly gain in weight of kids from birth to one month of age were also recorded. The mortality in kids was monitored from birth up to one month of age regularly.



Weighing of animals on a tree

The record keeping was taken up by the goat keepers and researchers to ensure proper monitoring of the trial.

RESULTS

The results of the trials conducted in Rajasthan are summarized below.

Table 1 : Yearwise Performance of Experimental Animals (Rajasthan)

	Treatment Group			Control Group		
	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
Number of does at start	25	56	48	25	63	50
Number of does completing the trial	24	50	37	23	55	35
% of animals conceived	100	78	92	78	61	80
% Incidence of twinning	17	28	29	6	19	17
Kidding rate %	117	100	117	78	69	70

Although there were differences between years, the treatment had desirable effects, with the supplemented does having higher conception rates, twinning and kidding rates. The differences in conception rates and kidding rates were statistically significant (asymptotic chi-squared test). The

incidence of twinning was higher in supplemented does although it was not statistically significant.

The results of the trials conducted in Karnataka are included in the following table.

Table 2 : Yearwise Performance of Experimental Animals (Karnataka)

	Year 1		Year 2		
	SH	Control	PJ pods	SH	Control
Number of does at start	26	26	24	24	24
Number of does completing the trial	17	21	21	22	22
Birth weight (Kg)	2.4	2.1	1.9	2.1	1.8
Weight gain in 4 weeks	3.3	3.0	3.2	3.2	3.0
Kid mortality (%)	12	45	3	1	0

Sorghum+horsegram mixture

The results were affected due to climate. In the first year, monsoon was normal, while in the second year, the rainfall received was 50% below

normal. In the normal year, supplementation brought down the mortality of kids while in the drier year, the mortality in general was low and was not affected due to supplementation (only one kid out of 94 born to the experimental animals, died). The results in terms of birth weights of kids and their growth rates were



Feeding of *Prosopis juliflora* pods

consistent in both the years. The birth weights of kids were 100-300g more in case of supplemented does while the gain in weight in four weeks after birth was also higher by a similar margin for kids of supplemented does.

This indicates that pods of *Prosopis* are as effective a mixture as that of sorghum and horse gram.

COSTS AND BENEFITS

Based on the average kidding rate data from all the three trials in Rajasthan, it can be stated that a goat keeper with 10 does will get 3 extra kids due to treatment. These at the prevailing market prices will ensure an income of Rs. 900. The cost of feeding the mixture was calculated to be Rs. 650 for 10 does, fed for 70 days. The price of barley was assumed to be Rs.4.5/kg and that of pods @ Rs. 3.0/kg. This clearly shows a benefit of Rs. 250 from a herd of 10 does. If only pods were used for supplementation, as done in year



Prosopis juliflora pods stored for feeding

three trial, the cost of extra feeding will be Rs. 265 for 10 does and the benefit will be Rs. 635.

The trials in Karnataka also show similar trends in costs and benefits. In the first year trial, the lowered abortions and mortality of kids would mean 4 d

extra kids per 10 does fed with the supplement. This means an income of Rs. 1200 assuming a price of Rs. 300 per kid. In addition, the higher body weight of kids at marketable age fetched an average of Rs. 50 per kid, which amounted to Rs. 600 for 12 kids. The total income was thus Rs.1800. The additional income due to reduced kidding interval of supplemented does (average 25 days) was not considered. The mixture used in the first year study cost Rs. 6.5/kg and the total feed cost would have been Rs. 975 for 10 does with a net income of Rs. 825. In the second year, the gains were not evident due to low overall mortality. Assuming similar levels as observed in the trial, the benefits can be expected to be larger. Assuming a pod price of Rs. 3/kg, the additional feed cost would be Rs. 562 with a net income of Rs. 1238.

CONCLUSIONS

The use of *Prosopis juliflora* pods as a dry season feed supplement can be a very effective technology for farmers across the country. In areas where the bush is found and where the farmers are facing scarcity of conventional feeds, the pods can be effectively used to overcome the nutritional stress of the animal. A daily supplement of 250 grams per animal per day for a 60-day period would mean collection and storage of 150 kg of pods for every 10 does. This quantity is not difficult for a family to collect.

The problem of kid mortality was not completely addressed by these studies and further investigations would be required for firm conclusions.

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