



# Impact of Adoption of Climatic Resilient Practices in Goat Farming in Kuttanad Region of Kerala

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## ABSTRACT

One hundred and eighty goat farmers, majority being women, in Muttar and Thalavady villages of Kuttanad region of Kerala were trained on scientific and climate resilient practices in goat rearing during the year 2013-15 under the National Innovations in Climate Resilient Agriculture (NICRA) project. Out of these, 36 farmers were provided the materials and technical support for fabrication of climate resilient goat sheds with raised platform to overcome the seasonal water-logging prevalent in the below mean sea level region. A study was conducted during 2018-19 to find out the impact of adoption of these practices. The respondents' profile indicated that 47.2 per cent farmers were above 50 yr of age and 86.1 per cent were women whereas 91.7 per cent of the units were managed with family labour. It was found that farmers started rearing improved breeds of goat (75 %) and changed to balanced feeding (86.1%) from conventional feeding practices. Majority of the farmers bred their animals by Artificial Insemination methods (66.7%) and could identify the heat symptoms (80.6 %), started selling the animals directly (66.7%), started selling the milk (63.9%) and manure (44.4%). Mortality was reduced from 40% to 0% in the adopted units compared to the conventional practice. Sixty-eight such units were replicated by farmers themselves through horizontal spread of the technologies and practices in the district, reflecting on the impact of the interventions.

**Key Words:** Climate, Goat, Labour, Practices, Rearing, Resilient, Shelter, Skill, Woman

## INTRODUCTION

Kuttanad region of Kerala, a unique eco-system which lies up to 2 m below Mean Sea Level (MSL), is often susceptible to submergence during the South-West monsoon period (June–Sept). In addition to the large stretches of paddy in low lands and coconut and other crops in the uplands, animal husbandry is an important enterprise of the farmers of this region. Goat rearing is considered to be a relatively hassle free, economic activity among the farm women here also, like any other parts of Kerala. Most of the households possess 2-3 goats and earn on an average Rs.5000/- per year through the sale of goats. They follow the traditional goat shelters with a flank made of country wood kept at ground level. Whenever flood occurs, the wooden flanks are kept raised using bricks to overcome the water-logging. Some farmers distress dispose off the animals for lower price and retain only one or two animals for

further breeding. Thus, the farmers traditionally get only 7-8 m in a year for goat rearing in the low lying regions prone to water-logging. They are unaware of a permanent structure with raised platform to house goat. During the past 10-15 years, change in climate, disease outbreaks, and losses by predators added further woes, forcing a decline in this activity. To address these problems, improved and climate resilient practices like climate proof housing and scientific management practices for goat rearing were introduced as technology demonstrations in Muttar and Thalavady villages of this region.

## MATERIALS AND METHODS

One hundred and eighty farmers, majority of them farm women, who were engaged in goat rearing in Muttar and Thalavady villages of Kuttanad region were given training during 2013-2015 on scientific goat rearing with emphasis on

**Table 1. Socio-economic characteristics of goat rearing households**

Parameter		Farmers (%) N = 36	Mean $\pm$ SD
Age (Years)	Young (<35years)	4 (11.1%)	19.4
	Middle (36-50years)	16 (44.4)	
	Old(>50years)	17 (47.2)	
Gender	Male	5 (13.9%)	47.9
	Female	31 (86.1%)	
Education	Illiterate	1 (2.8%)	31.4
	Primary	6 (16.7%)	
	Secondary	27 (75.0%)	
	Degree	2 (5.6%)	
Family size	up to 4 members	16 (44.4%)	12.2
	5-6 members	12 (33.3%)	
	>6 members	8 (22.2%)	
Land holding	<10 cents	21 (58.3%)	25.6
	10-20 cents	13 (36.1%)	
	20-50 cents	2 (5.6%)	
	>3ha	0 (0%)	

**Table 2. Distribution of goat farmers with respect to different indicators in goat rearing (N=36)**

Sr. No	Indicator	f	%
1	Goat has been a ready cash riding dependence on high cost private credit	34	94.4
2	Venue for family labour involvement	33	91.7
3	Increased profit/goat/annum	29	80.6
4	Reduced threat from predator	26	72.2
5	Increased access to goat milk for family consumption	25	69.4
6	Increase in employment generation through goat rearing	23	63.9
7	Increased share of income from goat to family's total income	20	55.6
8	Requirement of fodder throughout the year	10	27.8
9	Risk of destroying homestead crop	6	16.7

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climate resilient practices. Orientation was given on breed, rearing, feed, disease, reproductive and marketing management practices with emphasis given on comfortable and durable shelter. From these participants 36 farmers were selected for the demonstration on climate resilient shelters for which materials like durable GI pipes and sheets were provided. Goat sheds of 3m x2m to accommodate 10-15 goats were fabricated under our technical supervision.

Socio-economic impact of adoption of these climate resilient practices including the skill improvement and socio – economic upliftment of the farmers was studied in detail after three years of the interventions. These 36 goat farmers who have fabricated goat shelter with raised platform and adopted scientific climatic resilient management practices were selected for the study. The data on socio economic indicators, improved goat production practices and marketing and general issues were obtained from the goat farmers through personal interview with the help of a structured schedule. The data collected were tabulated and statistical tools like frequency and percentage were worked out for logical conclusion.

### RESULTS AND DISCUSSION

Majority of the goat farmers (47 %) were above 50 years of age and 86.1 per cent were women farmers. Seventy-five per cent farmers were having secondary school education, 44.4 per cent farmers from nuclear family and 58.3 per cent farmers own a land holding of below 10 cents only. Kumar and Deoghare (2003) reported that, goat provided an opportunity for efficient utilization of family labour. Increased profit/annum (80.6%), reduced threat from predator (72.2%), increased access to goat milk for family consumption (69.4%), increase in employment generation through goats (63.9%), increased share of income from goat to family's total income (55.6%) were the other advantages of goat rearing whereas requirement of fodder throughout the year (27.8%) and risk of destroying homestead crop (16.7%) were the difficulties involved.

The data (Table 3) depict the improvement in the knowledge and skill in terms of climate resilient practices in goat farming. Thirty-nine per cent farmers were having non descriptive breeds of goat and only 36.1 per cent had reared improved breed like Malabari goats before the intervention. After the interventions 70.6 per cent farmers started rearing Malabari breed goat which had higher growth rate, milk yield and better twinning rate. Patel (2007) reported that improved animal shelter clearly showed a positive impact on growth performance of young kids, where kids achieved 26.6 per cent higher body weight over kids kept under thatched roof shed in a period of six months during summer. Moreover, the lactating goats maintained under improved animal shelter produced 22 per cent more milk per lactation over goats kept under traditional shelter during winter. As the land holding size is very small in the region, no farmer follows extensive system of rearing. Only 52.8 per cent of the farmers were practicing semi-intensive system of rearing before the interventions but it increased to 69.4 per cent as they realized that it reduces the feed cost. After the interventions 4 units have shifted to intensive system of rearing which were hitherto not practiced by anyone.

Before intervention no one cultivated fodder crops and only 16.7 per cent farmers used to give balanced ration. After the intervention 11.1 per cent farmers started cultivating of fodder crops. This observation was in the line with Tripathi *et al* (2005). It was found that, 86.1 per cent farmers changed to balanced feeding. All the farmers were breeding their animals by natural service and were not aware of all the heat symptoms before the intervention. After intervention 66.7% farmers started resorting to artificial insemination and 80.6% farmers could identify five heat symptoms and the rest of them at least four.

Cold stress (80.6%) followed by ectoparasite infestation (63.9%), worm infestation (47.2%), Mastitis (38.9%) and Tetanus (16.7%) were the major health issues reported by the goat farmers

**Table 3. Distribution of goat farmers according to skill improvement in climate resilient goat production practices (N =36)**

Parameter	Indicator	Farmers (%) N = 36		Mean $\pm$ SD	
		Before	After	Before	After
Breeds reared	Non descriptive	14 (38.9%)	0 (0%)	25 $\pm$ 12.7	25 $\pm$ 35.4
	Malabari	13(36.1%)	27(75%)		
	Malabari $\times$ ND	9 (25.0%)	9(25%)		
	High yielders	0 (0%)	0 (0%)		
Rearing practices	Extensive	0 (0%)	0 (0%)	25 $\pm$ 29.0	25 $\pm$ 30.7
	Semi intensive	19 (52.8%)	25 (69.4%)		
	Intensive	0 (0%)	4 (11.1%)		
	Tethering	17 (47.2%)	7 (19.4%)		
Type of fodder used	Cultivated fodder	0 (0%)	4 (11.1%)	33.3 $\pm$ 30.9	33.3 $\pm$ 27.4
	Jack leaves and other tree fodder	14 (38.9%)	23 (63.9%)		
	Natural grass +wild creepers	22 (61.1%)	9 (25.0%)		
Feeding practices	Balanced goat feed	6 (16.7%)	31 (86.1%)	25 $\pm$ 20.5	25 $\pm$ 40.8
	Cattle feed	20 (55.6%)	3 (8.3%)		
	GNC+wheatbran+Ri	6 (16.7%)	1 2.8%)		
		4 (11.1%)	1 (2.8%)		
Type of breeding	ce			50.0 $\pm$ 70.7	50 $\pm$ 23.6
	House hold waste	36 (100%)	12 (33.3%)		
		0 (0%)	24 (66.7%)		
	Natural Service				
	Artificial Insemination				
Knowledge on identification of heat symptoms	5 signs	0 (0%)	29 (80.6%)	16.7 $\pm$ 18.1	16.7 $\pm$ 32.3
	4 signs	7 (19.4%)	7 (19.4%)		
	3 signs	3 (8.3%)	0 (0%)		
	2 signs	17 (47.2%)	0 (0%)		
	1 signs	9 (25%)	0 (0%)		
Prevalence of disease	FMD	0 (0%)	0 (0%)	30.9 $\pm$ 31.5	2 $\pm$ 5.7
	Mastitis	9 (38.9%)	0 (0%)		
	Tetanus	6 (16.7%)	0 (0%)		
	Worm	0 (0%)	0 (0%)		
	Tryps	0 (0%)	0 (0%)		
		17 (47.2%)	0 (0%)		
	Worm infestation	29 (80.6%)	0 (0%)		
	Cold stress	23 (63.9%)	5 (16.1%)		
Health issues	Ectoparasite infestation	19 (52.8%)	27 (75%)	33.3 $\pm$ 29.0	33.3 $\pm$ 38.2
	Veterinary Assistance for modern medicines	17 (47.2%)	0 (0%)		
	Traditional medicines only	0 (0%)	9 (25%)		
	Traditional medicines +				
	Veterinary modern medicines				

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Parameter	Indicator	Farmers (%)		Mean $\pm$ SD	
		N = 36		Before	After
		Before	After		
Sale of goat	Through middle man	30 (83.3%)	0 (13.9%)	33.3 $\pm$ 43.7	33.3 $\pm$ 29.0
	Direct market	5 (13.9%)	24 (66.7%)		
	Local market	1 (2.8%)	7 (19.4%)		
Sale of milk	Own use only	27 (75%)	13 (36.1%)	33.3 $\pm$ 38.2	33.3 $\pm$ 32.0
	Sale of excess milk	9 (25%)	23 (63.9%)		
	All milk sold	0 (0%)	0 (0%)		
Sale of manure	Own use	33 (91.7%)	15 (41.7%)	33.3 $\pm$ 50.7	33.3 $\pm$ 19.9
	Sell as such	3 (8.3%)	16 (44.4%)		
	Making compost	0 (0%)	5 (13.9%)		

**Table 4. Comparative economic analysis of adoption of climate resilient technologies in goat rearing (for a unit of 10 goats)**

Sr. No	Parameter	Before	After
1	Animal mortality due to flood/disease outbreak (%)	40	0
2	Gross cost (Rs/year)	50850	80080
3	No of kids/year	4	11
4	Gross Income (Rs/year)	54000	137000
5	Net income (Rs/year)	3150	56920

generally. This was in line with the contentions of Mallick *et al* (2004) who reported that in rural goat rearing the major constraints observed were worm infestations, FMD, tympany, ticks and lice. As a result of the interventions incidence of mastitis and worm infestation reduced from 38.9 and 47.2 per cent to 0, respectively. With the improved shelter, the occurrence of udder infection and worm infestations were very less because of maintaining hygienic conditions. FMD was not reported before and after the intervention. Only 52.8 per cent farmers seek veterinary assistance for treatment and remaining farmers were practicing self/traditional treatment before the implementation of the project. After the interventions 75 per cent farmers started seeking advice from veterinary hospitals.

Since woman members were the guardians of the goats in the family in general, exploitation by middle men was more in terms of the prices offered. After getting exposure through the interventions

66.7 per cent farmers sold the animals on weight basis and only 13.9 per cent farmers depended on middlemen for sale of animals. Before intervention most of the farmers couldn't realize the value of milk and manure and their marketability. After the interventions, 63.9 per cent farm women started selling milk for Rs.55/- per litre and 44.4 per cent farmers started selling manure and earn an additional income.

### **Economic advantages**

On assessing the overall economic advantages of adopting climate resilient practices in goat farming, it could be estimated that a net income of Rs. 56920/- could be obtained from a unit of 10 goats annually when the improved shelter and other practices followed. Mortality of animals reduced from 40 to 0 per cent and the no of kids per year increased from 4 to 11. In this context, Braj Mohan *et al* (2007) noted that the socio-economic value of

goat rearing as compared to other livestock species has been immense, for the poor farmers. low input, high fecundity, easy marketing and unprejudiced social acceptance of their products were a few of many advantages of this enterprise that provides assured higher income. Patel *et al* (2007) stated that higher body weight gain was observed in the 6 month old male kids of Marwari breed, when reared under closed type improved animal shelter during summer months. Kids gained 9.52 kg body weight in improved shelter compared to 7.52 kg in traditional shelter during 6 months period of experiment from May to October.

Incessant rains followed by the unprecedented flood occurred in August, 2018 in Kerala had devastating effects in all the low-lying areas including Kuttanad region. Except these goat shelters with raised platform, most of the animal sheds were inundated or destroyed during this flood. After realizing the advantage of this type of shed especially for overcoming such situation, another 68 farmers in the region got this type of goat shed fabricated for their goat units.

### CONCLUSION

This study indicated that by following the climate resilient practices including housing for goat farming, farmers could survive the flood situations and carry forward the enterprise throughout the year. Farmers started to rear improved breeds and practiced scientific breeding. Disease outbreak was reduced by following these practices and improved shelter, reducing the mortality from 40 per cent to

0 per cent. The method of selling of goat has been changed to weight basis from appearance and age and hence could overcome the exploitation by middle man. As a whole, the annual gross income from a unit of 10 goats enhanced from Rs. 54,000/- to Rs.1,37,000/- and the net profit from Rs.3150/- to Rs.56920/-.

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