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Impact of National Agricultural Innovation Project on socio-economic status of pashmina goat keepers in Himachal Pradesh

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Abstract

Chegu goats have immense utility in the pastoralist based livestock production system of the area and contribute to the subsistence of small holders. These goats are reared on grazing on common village grazing lands and arid pastures. The pashmina production and productivity has remained static since last so many decades. Therefore, study has been conducted under NAIP on socio economic and production parameters of pasmina goats rearing. The mortality rate of kids born per household from given goats was 27%. The production of wool has increased. About 100% of sample beneficiaries' goat keepers of kids shelters reported that there is improvement in mortality, body weight and safe to kids. The feed blocks and other feed supplements and improved grasses for plantation, etc helps to improve productivity and improvement of health of goats. The opinioned by the majority of the pashmina goat keepers about improved combs were better performance than traditional combs as most of the characters are in favour of improved combs. The per cent goats affected and mortality due to diseases was low due to disease management through drugs and vaccination. The pashmina goat keepers were also educated about goat rearing management practices through awareness camps and trainings. The results of above analysis indicate that the project has succeeded in creating awareness among the pashmina goat keepers about the management practices of pashmina goats rearing and improvement in different production parameters.

Key words: Pashmina production, kids shelters, feed supplements, improved combs, disease care

Livestock constitutes an important means of livelihood in the hill and mountainous region. Among the livestock resources goats represent diversity varying the agro climatic condition of their areas. Among the goats a unique breed of mountain goats called 'Chegu', produce high value special fibre "Pasmina" for woolen textile industry. Chegu goats across the Himalayan ranges, contribute to the subsistence of small holders. The natural habitat of these pashmina- yielding goats extends from the Ladhakh plateau of Jammu & Kashmir through high mountain ranges of Pangi, Lahaul & Spiti and Kinnaur valleys in Himachal Pradesh up to Uttarkashi, Pitthoragarh, and Chamoli districts of Uttarakhand. These areas experience harsh climatic condition characterized by wide temperature variation ranging from -40^{o}C (winter) to 40^{o}C (summer) with low precipitation. The agro climatic conditions of these areas had good adaptability for chegu goats. This region later on developed as the breeding tract for Chegu goats in the state. The Chegu goats have immense utility in the pastoralist based livestock production system of the area. These goats are reared on common village grazing lands and arid pastures with scanty vegetation.

The reliable population estimates of chegu goats are not available. The population of Chegu goats in Himachal Pradesh is less than 0.10 lacs (Thakur *et al*. 2005). The flock size is small (2 to 50) and the production system is non- migrating and mixed farming with other livestock and crop production. The pashmina producing goats farming is the main source of income of economically deprived tribes. Pashmina obtained from chegu goats is a legendry fiber and important component of cultural heritage. Pashmina production is more in males than females due to the difference in body size. There is an apparent variation in the fiber length of Pashmina from different body regions in case of both male

and female. The pashmina production and productivity has remained static since last so many decades, although potential do exists up to 900g (Acharya, and Sharma 1980). Demand for pure and quality pashmina both at national and international level is very high. The local production does not meet the requirement and have to depend on import. Therefore, there is a need to increase the production of Pashmina in the state. So, keeping in view the importance of pashmina a project under National Agricultural Innovation Project (NAIP) was started to enhance the production and productivity of pashmina wool. Under the project education and input material were provided to the goat keepers. The present study focused on to analyze impact on socio-economic and production parameters of pasmina goats rearing.

Materials and Methods

The random sampling technique has been used in the present study for the selection of ultimate sampling units in the districts Lahaul & Spiti and Kinnaur. The information related to chegu goats and kids born, kids weight and their mortality rate have been collected from all the adopters. The impact analysis information on wool production, response of households about kid shelter, feed management, improved combing, drugs & vaccination, etc was collected on sample basis. The sample households comprised of 40 pashmina goat keepers ie. the households adopted under NAIP. The primary data on different parameters of adopted pashmina goat keepers were collected on well-designed pre -tested schedule. The secondary data were collected from various offices of the selected districts. Simple mathematical techniques were followed to analyze the data.

Results and Discussion

The results and discussions are divided into two groups. i) Information collected from secondary sources and ii) Information collected from sample farms.

A *General Description of Study Districts*

The true breeding tract of Chegu goats in Himachal Pradesh is confined to the cold desert region of Spiti (Lahaul & Spiti district) and Hangrang valley (Kinnaur) with pockets of distribution in Todd and Miar valleys across the trans-Himalayan mountain ranges. The entire breeding tract extends over a geographical area of approximately 8,000 sq. km in 80 villages of 2 districts *viz.* Lahaul & Spiti and Kinnaur districts. The native tract of distribution lies between 31°5'N to 32°35' N latitude, 77°2 to 78°45' E longitude and from 3000 to 5000 m altitude.

Human population

The human population of the study districts has been presented in Table 1. Total human population and density of population is very low in these two districts of the state. This may be due to very harsh climatic conditions and difficult terrain. The people of these districts migrate within and outside the state. The sex ratio of these districts was noticed very critical and less than state ratio. The literacy rate was very near to the state literacy rate. These districts has about one per cent of net sown area of the net sown area of the state (Anonymous 2009).

Livestock population

The livestock population plays an important role in the livelihood pattern of the households. The livestock population in Lahaul & Spiti and Kinnaur was 61998 and 126598 (Anonymous 2003) (Table 2) which was 1 and 3% of the state livestock population, respectively.

Table 1. Human population and net sown area in study districts

Particular	Lahaul & spiti	Kinnaur	Himachal Pradesh
Human population (%)	0.55	1.29	100 (60.78)
Population growth rate (1991-2001)	6.17	9.91	17.54
Density per sq km	2.00	12.00	109.00
Literacy rate (%)	75.10	75.20	76.50
Per cent share of female	44.49	46.16	49.19
Sex ratio (Females/thousand males)	1013	857	968
Net sown area (%)	0.56	1.38	100 (540.52)
Total cropped area (%)	0.33	0.92	100 (955.61)

Figure in brackets indicate the total number

Sheep and goats occupies an important place in these districts. The number of vet institutes was 58 and 62, while, in the state this number was 2133. This was about 3% of state institutions in each district.

B *Analysis of different socio-economic parameters of sample households*

Inventory of Chegu goats

Six goats per households were provided in Lahaul, Spiti and Kinnour study area (Table 3). The Mortality rate varied from about 17 in Kinnour to 31% in Lahaul area, which shows slightly high mortality rate. The overall mortality rate was 24%. The high mortality was noted in non-rearing area (Lahaul area). This indicates the need to educate the farmers about management of rearing goats to reduce the mortality rate. It was observed from the Table that kids born per household from given goats were 4.35, 4.40 and 4.35 in Lahaul, Spiti and Kinnour, respectively. The overall mortality rate of kids was 27%. This indicated a slightly high rate of death of the kids. So, sample households were educated about health care and feeding of kids through trainings.

Wool production

Wool production from goats and kids has been presented in Table 4.

Table 2. Livestock population and veterinary Institutes in study districts (no)

Particular	Lahaul & Spiti	Kinnaur	H .P
Cattle	12289	22502	2264160
Buffalo	0	148	760687
Yak	1290	164	1705
Mithun	2	10	14
Sheep	37004	70333	901540
Goats	8443	30325	1240835
Other	2979	3116	42146
Total	61998	126598	5211087
No of vet institute	58 9 (2.72)	62 (2.20)	2133
Animal treated/ vet. institutes	862	1290	1239

Figure in brackets indicate the percentage

Table 3. Information related to Chegu goats (per farm)

Particular	No.of chegu goats distributed			No. of kids borne from given goats		
	Goat	Death	Mortality (%)	Male	Female	Mortality (%)
Lahaul	6.00	1.86	31.00	1.65	1.50	27.58
Spiti	6.00	1.48	24.66	1.71	1.53	26.36
Kinnour	6.00	1.00	16.67	1.60	1.81	27.64
Overall	6.00	1. 46	23.97	1.67	1.63	27.15

Table 4. Production of pashmina wool on sample households (g/unit)

Particular	Goats				Kids			
	2011		2012		2011		2012	
	Wool	SE	Wool	SE	Wool	SE	Wool	SE
Lahaul	184	0.88	194	0.82	22.40	0.88	36.45	0.84
Spiti	194	0.96	202	0.87	20.10	0.90	38.60	0.92
Kinnour	188	1.02	214	0.96	20.46	1.04	34.37	0.96
Overall	189	0.94	203	0.89	21.00	0.95	36.85	0.92

SE = Standard Error

Pasmina wool is harvested annually from March to June. April is reported to be the most appropriate time of wool harvesting by sample households **(**Darokhan & Tomar. 1983**)**. But due to busy in crop farming, the sample households were unable to harvest wool in time. The early wool harvesting was giving better quality wool and productivity. It was noted from the table that production of wool from kids varied from 20.10 to 38.60g in the study area. The small quantity of wool was also obtained by the goat keepers from kids. The productivity of wool per animal was 184g in Lahaul to 214g in Kinnour area. The production of wool of goats and kids was observed higher during 2012 than 2011 in all the study area. On an average there was about 7% increase in wool production in 2012 as compared to 2011.

Similar trend was observed in different study areas. The increase in wool production in 2012 over 2011 may be due to awareness provided to goat keepers by experts during project about the management practices. The production of wool slightly less than potential may be due to high degree of inbreeding, delay and untimely wool harvest, poor management practices followed to rear goats, scanty and poor productivity of grazing lands, inadequate and lack of knowledge of health care of animals. This showed that there is a good potential to increase productivity of wool by educating farmers about the goat rearing management practices. Efforts in this direction have been made in the project to improve these factors.

Shelter management

Shelters of 4 ft x 6 ft were erected in the selected villages (Table 5). Besides these, tarpaulins (15.64 m^2 size) were also given to the selected pashmina goat keepers. It was reported by these pashmina goat keepers that kids mortality was higher before these shelters due to diseases and animals attacks i.e dogs and leopards which has reduced with shelters facility provided during the project. Majority of these farmers were in the opinion that these shelters were safe to kids and improve their body weight. Overall, 74 and 76%, respectively, of the beneficiaries' reported that shelters brought about safety and improvement in body weight of adults as well. In case of kids, 100% respondents believe that shelters reduced risk and increased safety and body weight.

Feed management

The crop by product of peas, potato, barley and local grasses harvested in summer are used by pashmina goats rearers during winter as feed. During summer and rainy season they grazed their goats in pasture lands. The grazing/pasture lands provide different type of plant species to the goats, which help to increase body weight, pashmina wool production and meet their nutritional requirements. It was noted from the Table 6 that majority of the goat keepers before the project used only the crop by products to their animals during winter season. During the NAIP project period the feed supplements were distributed to the adopted goat keepers. Mineral mixture of complete feed blocks and feed was distributed to these goat keepers. It was reported by the goat keepers that minerals blocks and other feed material provided during the project helped to improve goat production and health improvement of animals. These views were supported by 100 per cent of sample farmers. On overall situation, 71 and 72 per cent of sample farmers reported that these feed blocks brought improvement in wool production and improvement in reproductive pattern. These feed supplements are good source of feed especially during scarcity period to meet forage requirement. It was also reported by the respondents that goats not took directly the feed mineral mixture, so they mixed small amount of salt and barley flour and goats relish the mineral mixture. Grazing lands in the study area were degraded and infested with weed growth of bushes and not providing nutritive feed to the animals. So, to improve the pasture lands the seedlings of grasses were distributed during the project period to helps to increase grass lands productivity and provide balance nutritive feed.

Impact analysis of combing

Table 7 gives the comparative views of sample goat keepers about the traditional and improved combs. It was observed from the table that majority (> 80%) of the sample households were of the opinion that introduction of improved combs reduced drudgery, reduced harvest losses, eased removal of wool with uniform fibre length, less guard hair contact, less pressure on wrist, less skin injury, appropriate sharpness etc. compared to traditional combs. It was also noted from the table that improved combs had better performance than traditional combs as most of the characters are in favour of improved combs. Therefore, the improved combs were popularized in the pashmina growing areas.

Impact of drugs & vaccination on mortality rate

Pashmina goats were infested with different types of common intestinal and stomach worms. It was reported that due to reduction in snow fall, threat to disease like PPR (Pestedes petits ruminants), FMD, fever, Diarrhea, etc. have increased. Table 8 shows the response of sample households about the mortality of pashmina goats before and during NAIP. It was noted from the table that mortality due to occurrence of diseases was higher before project.

Table 5. Response (%) of sample pashmina goat keepers about kids shelters

Particular	Mortality before NAIP				Mortality with use of kid shelter			
	Lahaul	Spiti	Kinnour	Overall	Lahaul	Spiti	Kinnour	Overall
Adult								
Higher	91	100	100	96	-	-		
Low	-	-			100	100	100	100
Safe	-	-			76	73	70	74
Improvement of body weight	-	-			72	80	76	76
Young								
Higher	100	100	100	100	-	-		
Low	-	-			100	100	100	100
Safe	-	-			100	100	100	100
Improvement of body weight	-	-			100	100	100	100

Table 6. Impact analysis feed blocks in the study area (%)

Particular	Alternative use before NAIP				Effects of feed blocks given under NAIP			
	Lahaul	Spiti	Kinnour	Overall	Lahaul	Spiti	Kinnour	Overall
Crop by-product	100	100	100	100	100	100	100	100
Scarcity of fodder	100	100	100	100	-	-	-	
Imbalance feed	100	100	100	100	-	-	-	
Health ailments	91	80	90	88	-	-	-	
Feed supplements					100	100	100	100
Improve health					100	100	100	100
Balance feed					100	100	100	100
Improve wool production					72	70	73	71
Improve reproduction					72	70	75	72

During the project implementation, advice through awareness camps and trainings were given to the adopted goat keepers about the disease management. The table revealed that all the respondents in Lahaul and more than 90 per cent in Spiti and Kinnour area reported high mortality rate due to Diarrhea and FMD before the start of the project. The adopter goat keepers of these areas were in view that mortality rate due to diseases given in table has decreased during the project period as reported by more than 80% of sample households. This indicates the impact of drugs and vaccination distributed to the goat keepers and awareness provided during project period.

Marketing and utilization of the pashmina fibre

The organized marketing facilities for pashmina is lacking in the study area. Most of the produce is, therefore utilized locally either in the household or by the local handloom based cottage industry. Due to smaller flock size the pashmina quantity produced by an individual farmer is too small to be marketed directly to the textile industry/wholesaler. Therefore, these goat keepers were not getting reasonable prices for the pashmina wool. So, pashmina wool producers were educated to form co-operative marketing society to manage marketing and processing to earn higher income.

Table 7. Response of sample pashmina goat keepers about improved combing (%)

Comb Character	Lahaul		Spiti		Kinnour		Overall	
	Tradi-tional	Im-proved	Tradi-tional	Im-proved	Tradi-tional	Im-proved	Tradi-tional	Im-proved
Heavy Weight	86		100		100		95	
Light Weight		86		90		90		88
Easiness in handling		100		100		100		100
Sharpness		84		80		84		82
Appropriate width		90		90		88		89
Good performance		100		100		100		100
Easiness in removing inner coat		86		84		82		84
More guard hair content	100		100		100		100	
Less guard hair content		100		100		100		100
More time taken for combing an adult	80		86		90		85	
Less time taken for combing an adult		80		86		90		85
More pressure on wrist	100		100		100		100	
Less pressure on wrist		100		100		100		100
More skin injuries	86		90		86		87	
Less skin injuries		86		90		90		88

Table 8. Response (%) of sample households to introduction of drugs and vaccination on occurrence of diseases of Pashmina goats on sample farms

Diseases	Lahaul		Spiti		Kinnour		Overall	
	Be-fore	NAIP	Before	NAIP	Before	NAIP	Before	NAIP
Diarrhea (Mortality- %)	100	85	94	90	92	90	95	89
Fever/Pneumonia (Mortality- %)	80	60	84	56	80	60	81	58
FMD (Mortality- %)	100	82	94	90	100	80	98	84
PPR (Mortality- %)	92	86	90	80	90	82	91	82

It was concluded from this study that the kid born per household from given goats under NAIP project were 4.52 and their mortality rate was 27%. The production of wool has increased. About 100% of sample beneficiaries' goat keepers of kids shelters reported that there was improvement in survivability, body weight and safety to kids. The feed blocks and other feed supplements and improved grasses for plantation helped to improve goat productivity and improvement of health of goats appreciably. The important benefits of improved combs opinioned by the majority of the pashmina goat keepers were better performance than traditional combs as most of the characters are in favour of improved combs. The per cent goats affected and mortality due to diseases was low due to disease management through drugs and vaccination. The pashmina goat keepers were also educated about goat rearing management practices through awareness camps and trainings. Pashmina wool producers are educated to form co-operative marketing society to manage marketing and processing to earn higher income. The results of above analysis indicated that the project has succeeded in creating awareness among the pashmina goat keepers about the management practices of pashmina goat rearing and improvement in different production parameters.

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