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Enhancing Tribal Youth's Knowledge and Empowerment in Goat Farming: A Quasi-Experimental Study of Training Impact on Production and Marketing

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ABSTRACT

This study assesses the impact of goat farming training on the knowledge levels of tribal youth of Banswara district in Rajasthan state across nine critical production and marketing. Data was collected from 73 youth participants both before and after their training during the 2019-20 period, utilizing a quasi-experimental "difference-in-differences" approach for comparison. Study findings highlight substantial knowledge enhancement, with production knowledge increasing by an impressive 78.86% and marketing expertise improving by 29.67%, and these changes are statistically significant. Identified knowledge gaps emphasize the need for targeted follow-up support to further enrich their expertise and enable practical application in agriculture. Tribal youth can significantly benefit from comprehensive support systems, leveraging state and central government initiatives, such as those offered by krishi vigyan kendras, state agricultural departments, and non-governmental organizations. Additionally, investing in the expansion of programs like the ARYA scheme across various districts represents a direct and impactful means of promoting self-employment, stimulating rural economic development, and curbing youth migration.

Keywords: Training, Tribal youth, Skill development, Goat farming.

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INTRODUCTION

Approximately 20 million small and marginal farmers in India depend on goat farming. Apart from milk and meat, goats provide quality skins and precious fibre like Pashmina and contributes 8 percent to the livestock gross domestic product (GDP), still we are not able to meet the ever-increasing demand of goat products (DAHD, 2017). Goat farming contributes about 8.4% of the total livestock gross domestic product and generates 4.2% of employment directly and indirectly (Annual Report, Government of India, 2012). Support for goat-keeping can be a useful entrance point into poor communities to alleviate poverty and hunger because the poor are more likely to own goats than cattle (Kaumbata *et al.,* 2020). Goats are manageable and thrive in almost all habitats including severe cold, and desert ones. Goats can be kept by people with little or no land since they need less space and food than cattle (Miller *et al.,* 2012). Local goat enterprises in smallholder farms are profitable and economically viable (Kaumbata *et al.,* 2020). Goats have been instrumental in poverty reduction in tribal and resource-poor communities. There are two main ways of maintaining goats on degraded grazing grounds: tree lopping and extensive natural vegetation. Even these degraded grazing resources are shrinking continuously. In developing nations, very high population growth has been partially accounted for by goats' numerous functions, including being quick breeders, nutritionally less demanding, eager feeders, and having a high market value (Escareno *et al.,* 2012). In the present context, the role of tribal youths could be vital in India's much-anticipated transformation of agriculture. Tribal youths are most vulnerable and active stakeholders in the design of agri-entrepreneurship and they can sustainably transform tribal communities. In India, the migration rate from rural to urban areas is estimated to be around 45% (Sangita, 2014) ; however, about 5% of young people are engaged in agriculture in the Indian context. On the contrary, this scenario is 60% to 90% in developed countries (Singh *et al.,* 2019). Compared to rural and urban counterparts, the lack of desired skills among tribal youth makes them more vulnerable. Many researchers, including Debashis *et al.* (2019), advocated skilling tribal youth. Now, scientific research in goat farming is moving very fast in various ecological regions. Knowledge of youth is a prerequisite for the adoption of goat farming practices. Goat farming has recently emerged as a sustainable income generation and creation of self-employment, especially in India's tribal-dominated and resource-poor peoples. Hence, a skilled training of 21 days was organised under Attracting and Retaining Youth in Agriculture (ARYA) project to assess the youth knowledge level in production and marketing aspects.

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MATERIALS AND METHODS

Training evaluation framework:The Indian Council of Agricultural Research (ICAR), headquartered in New Delhi, has been running a flagship program aimed at attracting and retaining youth in the agricultural sector since the year 2015-16. Initially, the ARYA project was launched in 25 districts across India. In the state of Rajasthan, Banswara, a district predominantly inhabited by tribal communities, was selected as the focal point for ARYA project implementation. As part of this initiative, goat farming has been actively promoted to provide rural youth with sustainable income opportunities and gainful employment. To achieve this goal, self-employment-oriented skill training courses on goat farming were conducted for tribal youth aged between 18 and 35 years in the Banswara district. This effort aimed to encourage the adoption of goat farming as a viable commercial venture. To assess the impact of these training programs, the study employed the difference-in-differences (DiD) method. This method calculated differences to evaluate the change in participants' knowledge levels regarding the production and marketing aspects of goat rearing. A simple pre versus post estimator is given below. Considered first an estimator based on comparing the average difference in outcome Y_i before and after treatment in the treatment group alone

$$\hat{\delta} = \bar{Y}_1^T - \bar{Y}_0^T \qquad \text{(D1)}$$

Taking the expectation of this estimator, we get:

$$E[\hat{\delta}_1] = \mathrm{E}[\bar{Y}_1^T] - E[\bar{Y}_0^T]$$
$$= [\propto + \beta + \gamma + \delta] - [\propto + \beta]$$
$$= \gamma + \delta$$

Which means that this estimator is biased so long as g ¹ 0, i.e., if a time trend exists in the outcome g I, we confound the time trend as part of the treatment effect.

Description of research and characteristics of study areas:
India, primarily an agrarian nation, faces the intricate challenges of climatic variability, frequent droughts, and floods, rendering agriculture a complex and risk-prone endeavor. The nation's youth represent a pivotal and dynamic human resource crucial to its socio-economic development. With their creative minds and capacity to address risk factors like monsoon management, climate change adaptation, and poverty through technology, they hold immense potential. However, many existing farmers are reluctant to see the next generation continue the traditional agricultural profession due to low agricultural income and poor rural living conditions. To address this, the government has undertaken various initiatives, including the ARYA project, to attract and engage youth in agriculture. M.S. Swaminathan, renowned scientist and the driving force behind India's green revolution, asserts that youth will be drawn to and retained in farming only if it becomes economically rewarding and intellectually fulfilling. In response to this need, the Indian Council of Agricultural Research (ICAR) launched the ARYA scheme in 2015-16. This program aims to be implemented nationwide through Krishi Vigyan Kendras (KVKs) in 25 states. Each KVK has set targets to train approximately 200 to 300 young individuals in diverse agricultural and supplementary activities such as poultry farming, dairy, fisheries, goat rearing, mushroom cultivation, beekeeping, and related pursuits. These initiatives are designed to keep rural youth engaged with agriculture, either directly or indirectly. Furthermore, these trained young entrepreneurs receive support in developing project reports to secure bank loans for commercial ventures in these fields. In Rajasthan, the Banswara district was chosen as a focal point for implementing this project. Rajasthan boasts a diverse agro-ecological landscape that lends itself to the cultivation of a wide range of crops, thriving in arid, semi-arid, and rainfed conditions. This is particularly true in the hilly regions of Rajasthan, where population density is lower, and the rural populace's livelihood is intricately linked with the agriculture-livestock farming system. In this context, goats assume a pivotal role in the livestock industry and hold profound significance in the cultural, social, and economic fabric of rural communities. Indigenous goat breeds, especially those inhabiting remote and challenging terrain, have played a substantial socioeconomic role in the lives of impoverished farmers. These roles encompass not only social and cultural dimensions but also extend to their utility as a form of security and asset diversification. Additionally, goats are highly regarded for their production, adaptability, and illness resistance (Daskiran *et al.*, 2018).

The presence of ample grazing facilities in open hilly areas renders goat rearing a particularly viable and well-suited livelihood option. The study area, Banswara district, is situated in the southernmost region of the Rajasthan state and is positioned between latitudes 23°11' to 23°56' N and longitudes 73°58' to 74°49' E (Fig. 1). The Banswara district covers an expanse of 5,037 square kilometers, constituting 1.47% of Rajasthan's total area. The overarching objective of the training program was to enhance knowledge regarding the adoption of scientific practices in goat farming. This initiative was undertaken to address the prevalent trend of youth migration in search of employment during the harvesting season. By transitioning to goat farming

Fig. 1: Locale of the study Banswara district, Rajasthan.

instead of engaging in seasonal migration, households could ultimately experience an augmentation in their income levels.

Sampling and data collection: The selection of Banswara district in Rajasthan for the implementation of the ARYA project was purposeful. Within this district, a total of 73 tribal youth participated in a 21-day skill development program focused on goat farming. To collect data, a pre-tested interview schedule was used, translated into Hindi (the local language). Information on socio-economic variables, including age, education, gender, caste, and farming experience, among others, was gathered. The evaluation of knowledge encompassed nine aspects of goat farming, with a primary focus on production (consisting of 5 statements) and marketing (comprising 4 statements). Individual statements were scored on a scale of 1 to 3, resulting in a maximum achievable score of 27. Data collection occurred at two time points—before and after the training—spanning the period from 2019 to 2020.

Table 1: Socio-economic profile of youth (n=73)

Sl. No.	Variables	Categories	*f*	(%)
1.	Age (in years)	Low (<20.95)	9	12.32
		Medium (21-31)	54	73.98
		High (>31)	10	12.32
2.	Education	up to 8	11	15.07
		up to 10	21	28.77
		up to 12	22	30.14
		up to bachelor	19	26.03
3.	Sex	Male	55	75.34
		Female	18	24.66
4.	Caste	Scheduled tribes	69	94.52
		Scheduled caste	3	4.11
		Minority	1	1.37
5.	Farming experience (in years)	Less (<3.17)	13	17.81
		Medium (3.17 to 7.99)	53	72.60
		High (>7.99)	7	9.59
6.	Landholding (in ha.)	Low (<0.4)	0	0.00
		Medium (1-3)	72	98.63
		High (>3.06)	1	1.37
7.	Annual income (in *Rs.)	Low (<44012.46)	1	1.37
		Medium (44012 to 141795)	68	93.15
		High (>141795.76)	4	5.48
8.	Mass media exposure	Low (<16.82)	27	36.99
		Medium (16-24)	40	54.79
		High (>24.44)	6	8.22
9.	Extension contacts	Low (<15.21)	5	6.85
		Medium (15-20)	68	93.15
		High (>20.05)	0	0

*1 US dollar= Rs.83.32

RESULTS AND DISCUSSION

Socio-economic profiles of youth: Table 1 show the majority of respondents (73.98%) aged between 21 to 31 years. However, 13.70% of youth had more than 31 years of age, while 12.32% were much younger (<21 years). In the study area, 30.14% of respondents educated up to senior secondary level followed by secondary level (28.77%) and graduation level (26.03%). The rest of the youths (15.07%) had the 8th standard of education. The majority of the youth, i.e., 75.34%, were male, where 24.66% were female. As the study area is tribal-dominated, most respondents (94.52%) belonged to Scheduled Tribes (ST) community. Only 4.11% of respondents were from the scheduled caste (SC) category, followed by the minority (1.37%). The majority of respondents (72.60%) have 3 to 8 years of farming experience, whereas 17.81% of youth having less than three years of experience. However, 9.59% of respondents have more than eight years of experience in farming. Most respondents (98.63%) have 1 to 3 hectares of land. The yearly income of the most respondents (93.15%) were ranged from Rs. 44,000 to Rs. 1,41,000. Only 5.48% of respondents have more than Rs.1,41,000 income. A medium to a low level of mass media exposure was observed among youth. More than half (54.79%) of the respondents had a medium level of exposure, while 36.99% lies in the low level of mass media exposure. Only 8.22% of youths had a high level of mass media exposure. Like mass media exposure, mostly youth (93.15%) had a medium level of extension contact.

Knowledge level of tribal youth on production aspect: Knowledge level of tribal youth on production aspect of goat farming is presented in Table 2. The responses in pre-training reflect that they were not aware of the importance of kids of the improved breed. They never purchased kids from the market for rearing. They usually rear their own goats' kid. In post-training response, 13.70% of respondents were become immediately agreed to purchase improved breed' kids. Youths were unaware of the criteria for selection to buy the goats (69.86%) in pre training. Afterthat they (56.16%) realized the selection must be based on the body, perfect shape, and size. Animal husbandry experts provided sufficient information about the best month for getting the kids from goat during training. Later, youths' knowledge was enhanced by 56.16% (December-January) and 38.36% (April-May) are the best months. Reproductive activity of goats begins when females reach puberty. The goats' gestation period is five months. September-October and March–April months are best for the kidding. The study reveals that none of the tribal youths were aware of exact heat periods and gestation periods. In post-training evaluation, 87.67% of youth knew these issues, i.e., gestation period (150 days), and 90.41% of youth knew the duration of heat periods in goats (21hrs).

The study shows that a significant change was seen in post-training on all production issues (Table 3). The significant change in knowledge on production aspects revealed the positive and significant impact of successful conductance of training. The highest change in knowledge were observed on the gestation period of the goat (93.66 %) followed by best month to get the kid from goat (83.66%) which is December-January and April-May.

Table 2: Knowledge on production aspect of goat farming (n=73)

Sl. No.	Particulars	Responses	Pre-training		Post-training	
			f	%	*f*	%
1.	Selection of kids for rearing	Reared	67	91.78	52	71.23
		Purchased	6	8.22	10	13.70
		Both	0	0.00	11	15.07
2.	The base for the selection of milking goat	Unaware	51	69.86	0	0.00
		Performance in exhibition	21	28.77	8	10.96
		Body shape and size	1	1.37	41	56.16
		Udder size	0	0.00	24	32.88
3.	Best breeding month	Unaware	73	100.00	0	0.00
		February-March	0	0.00	4	5.48
		April-May	0	0.00	28	38.36
		December-January	0	0.00	41	56.16
4.	Gestation period	Unaware	73	100.00	0	0.00
		150 days	0	0.00	64	87.67
		130 days	0	0.00	4	5.48
		180 days	0	0.00	5	6.85
5.	Duration of heat period	Unaware	73	100.00	0	0.00
		15 hours	0	0.00	4	5.48
		18 hours	0	0.00	3	4.11
		21 hours	0	0.00	66	90.41

**P<0.01*

Knowledge level of tribal youth on marketing aspects: The development of any field, including the goat sector, depends on marketing. An effective marketing strategy benefit all societal groups and may guarantee that the producer receives a fair price, reduce superfluous expenditures and margins. However, India's most underestimated sectors is the marketing of goats and their products (Vahoniya *et al.,* 2022). In Banswara district, a lack of sufficient market to sell goat and less market demand of goat milk was identified as one of the constraints (Meena *et. al.,* 2022). Therefore, opt knowledge of marketing issues is essential for higher income. Table 4 shows that tribals are not aware of various improved breeds of goat (97.26 %), however in the post-training stage, they (71.24%) agreed to rear the Sirohi breed, which is the most suitable breed for the area. Most respondents (60.27%) were selling the goats whenever they need money for the family's requirement, irrespective of age and weight of goats. In the post-training session, they agreed (61.64%) to get accurate weight (at least 15 months) and age to fetch higher income. A minimum knowledge was noticed in the areas viz. weight of kid at the time of selling was reported by Luthra *et al.,* (2019). Comparatively, minimum knowledge may also be due to their illiteracy, low socio-economic status, and local breeds' rearing. Kumar *et al.,* (2010) reported that farmers, especially in Rajasthan, wanted to sell the male kids soon after weaning because the kids retained after weaning did not gain proper weight due to insufficient feeding and fulfill family financial requirements. A place of high marketing demand is one of the major pre-requisites for enhancing income. Instead of the local market, the city market will provide a better price. Initially, respondents did not know the demand-supply effect on price, hence, they sold them in the local market (91.78%). After that most youths were agreed (56.16%) to sell the goats in the city market, but it was not feasible for them due to distance and transportation issues.

Table 3: Changes in knowledge of youth in production aspect of goat farming (n=73)

Sl. No.	Particulars	Pre-training		Post-training		Change (%)	Z Test
		Mean±SD	Mean score (%)	Mean±SD	Mean score (%)		
1.	Kids for goat rearing	0.92±0.92	30.66	1.44±0.74	48	17.34	5.59*
2.	Selection of breed for milk	0.32±0.31	10.66	2.22±0.62	74	63.34	20.32*
3.	Best month to get the kid from goat	0.00±0.00	0	2.51±0.60	83.66	83.66	33.87*
4.	Gestation periods in goats	0.00±0.00	0	2.81±0.54	93.66	93.66	41.80*
5.	Heat period in goats	0.00±0.00	0	2.85±0.49	95	95	45.42*

**P<0.01*

Table 4: Knowledge on marketing aspect of goat farming (n=73)

Sl. No.	Particulars	Responses	Pre-training		Post-training	
			f	%	f	%
1.	Most suitable goat breed of the area	Unaware	71	97.26	0	0.00
		Sirohi	0	0.00	52	71.24
		Non-descriptive	2	2.74	21	28.77
2.	Preferred time to sell goat	Unaware	2	2.74	0	0.00
		Accurate age/weight	27	36.99	45	61.64
		Money requirement in family	44	60.27	12	16.64
		On holidays/ festivals	0	0.00	16	21.92
3.	The place to sell goats and meat for higher price	City market	6	8.23	41	56.16
		Local market	67	91.78	23	31.51
		At home	0	0.00	9	12.33
4.	Average weight (in kg) of the goat at the time of selling	Unaware	27	36.99	0	0.00
		10 kg	16	21.92	2	2.74
		11-15 kg	29	39.73	39	53.42
		>15 kg	1	1.37	32	43.84

The study shows that a significant change was seen in post-training on all marketing issues (Table 5). The significant change in knowledge revealed the positive and significant impact of successful conductance of training.

Table 5: Changes in knowledge on marketing aspect of goat farming (n=73)

Sl. No.	Pariculars	Pre-training		Post-training		Change (%)	Z Test
		Mean±SD	Mean score (%)	Mean±SD	Mean score (%)		
1.	Most suitable goat breed of the area	1±1	33.33	1.88±0.83	62.66	29.33	8.83*
2.	Preferred time to sell goat	1.34±1.36	44.66	2.05±0.62	68.33	23.67	7.44*
3.	The place to sell goats and meat for higher price	0.95±0.96	31.66	1.56±0.70	52	20.34	6.92*
4.	Average weight (in kg) of the goat at the time of selling	1.05±1.07	35	2.41±0.54	80.33	45.33	10.90*

**P<0.01*

Table 6: Overall change in knowledge level of tribal youths (n=73)

Sl. No.	Particulars	Responses (%)		Change (%)
		Production	Marketing	
1	Pre-training	8.26	36.16	78.86
2	Post-tarining	70.66	65.83	29.67

It is evident from table 6, that the highest differences (pre & post training) were found in the production aspect (70.66%) of goat farming followed by marketing (29.27%).

CONCLUSION

Goat farming offers a crucial avenue for income and employment, particularly benefiting marginalized communities in Rajasthan. Sustainable goat rearing requires a shift from relying solely on grazing resources to adopting semi-intensive or intensive management systems. This study has highlighted a significant improvement in knowledge levels, making goat farming a viable commercial opportunity. Notably, the greatest enhancements were observed in production, with marketing also showing promise. To maximize benefits, it's essential to provide access to online marketing platforms for live-weight goat and buck sales, boosting income. Identified knowledge gaps emphasize the need for targeted training and ongoing support, especially for tribal youths. Converging various government schemes, with an emphasis on skill development, establishing goat units, and connecting to markets through entities like KVKs and state agricultural departments, can substantially benefit these youths. Furthermore, investing in expanding the ARYA scheme represents a meaningful direct investment in rural self-employment, potentially driving robust rural economic development.

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