RESEARCH PAPER

Research Journal of Animal Husbandry and Dairy Science
Volume 3 | Issue 2 | December, 2012 | 57-59

Resource productivity and resource use efficiency in production of young goats

S.A. CHIVARE, B.R. PAWAR, P.U. KAUTHEKAR **AND** A.L. MANE

ABSTRACT : The study was conducted in Osmanabad district of Maharashtra in the year 2010-11. About 60 goat rearers were randomly selected from ten villages of two Tehsils of Osmanabad district of Maharashtra. Cross sectional data were collected from goat rearers with the help of pretested schedule by personal interview method. Data were related to young goats as output and herd size of invested goats, dry fodder, green fodder, concentrate and human labour were used as resources. Cobb-Douglus production function was fitted to the data. The results revealed that, partial regression coefficient of invested goat was 0.419 followed by that of green fodder (0.010) which were positive and significant. Regression coefficient with respect to concentrate (0.150) and human labour (0.390) were positive but non-significant. Marginal product due to invested goat was 0.9530 produced goat followed by that of human labour (0.0274 produced goat), concentrate (0.0161 produced goat), dry fodder (0.0014 produced goat) and green fodder (0.0005 produced goat). MVP to price ratio with respect to concentrate was 2.43 followed by that of invested goat (1.24). Hence, the use of concentrate as well as invested goat could be increased on priority basis. Optimum use of invested goats was found to be 16.65 in numbers.

KEY WORDS : Invested goats, Produced goats, Elasticity, Marginal product, Optimum resource

HOW TO CITE THIS PAPER : Chivare, S.A., Pawar, B.R., Kauthekar, P.U. and Mane, A.L. (2012). Resource productivity and resource use efficiency in production of young goats, *Res. J. Animal Hus. & Dairy Sci.*, **3**(2) : 57-59.

INTRODUCTION

Goat is earliest domesticated animal and long association with human beings. In Maharashtra, Osmanabadi goat breed is popular. Osmanabad is one of the districts where goat rearing business has been practiced by farmers as an important enterprise. Goat flock is known as goat herd which consists with invested goats and produced goats. Invested goat which is female with age ranging from one to eight years is considered as capital goats for further production purpose. Produced goat either male or female with below the age limit of one year is considered as young goat for slaughtering purpose (Pawar and Thombre, 1995). Climate is favourable for Osmanabadi goat rearing in the study area. In goat rearing business, invested goats, dry fodder, green fodder, concentrate and human labour are important resources. Dry fodder includes pods of babul and dry leaves of jowar. Green fodder includes leaves of ber, babul, pipal and neem, shevri branches and other so many plants. In production process, some of the resources are either over utilization or underutilization. By keeping in view the above aspects, the present study had been undertaken in order to determine the optimum utilization of resources in goat rearing business.

MEMBERS OF RESEARCH FORUM

Address for correspondence :
S.A. CHIVARE, Department of Agricultural Economics, College of Agriculture, LATUR (M.S.) INDIA
Email : ukmeel@gmail.com

Associated Authors' :
B.R. Pawar, P.U. Kauthekar and A.L. Mane, Department of Agricultural Economics, College of Agriculture (M.K.V.), LATUR (M.S.) INDIA

MATERIALS AND METHODS

Multistage sampling design was used for the selection of district, Tehsils, villages and goat rearers. In first stage, Osmanabad district was purposely selected because of more goat population. In second stage, Tuljapur and Osmanabad Tehsils of Osmanabad district were selected on the basis of highest goat population. In third stage, from each selected Tehsil, five villages were selected on the basis of highest number of goat rearers. The villages were namely, Bembali, Dhuta, Kangara, Palaswadi and Sarola from Osmanabad Tehsil. The villages were namely Ganjewadi, Jalkotwadi, Kati, Kemwadi and Savargaon from Tuljapur tehsil. In fourth stage, separate

list of goat rearers was taken from each village with invested goats. Thus, from each village, six goat rearers were selected. In this way, from 10 villages of two Tehsils, 60 goat rearers were selected. Then cross sectional data were collected with the help of prestested schedule by personal interview method. The data were collected during the year 2010-11 for the period from 1thJuly, 2010 to 30th June, 2011. The data were related to use of resources namely invested goat, dry fodder, green fodder, concentrate and human labour. Data on produced goats were collected as output in goat rearing business. Cobb-Douglus production function was fitted to the data to estimate the elasticity of production, marginal product and resource use efficiency with respect to each of the explanatory variables. The fitted equation was as follows.

$$Y = a X_1^{b1} . X_2^{b2} . X_3^{b3} ..... X_n^{bn} . e^u$$

In this functional form, 'Y' is dependent variable, 'X_i' are independent resource variables, 'a' is the constant representing intercept of the production function and 'bi' are the regression coefficients of the respective resource variables. The regression coefficients obtained from this function directly represent the elasticities of production, which remain constant throughout the relevant ranges of inputs. The sum of coefficients that is 'b_i' indicates the returns to scale. This function can easily be transformed into a linear form by making logarithmic transformation. After logarithmic transformation of this function is,

$$\log Y = \log a + b_1 \log X_1 + b_2 \log X_2 + ... + b_n \log X_n + u \log e$$

The main consequences of multicollinearity are (a) the sampling variances of the estimate coefficients increases as the degree of collinearity increases between the explanatory variables (b) estimated coefficients may become very sensitive to small changes in data that is addition or deletion of few observations produce a drastic change in some of the estimates of the coefficients. This results in non-significant of regression coefficients sometimes it so happens that more of the regression coefficients are significant but the value of R^2 is very high. The equation was fitted the following formula.

$$Y = a X_1^{b1} . X_2^{b2} . X_3^{b3} . X_4^{b4} . X_5^{b5}$$

where,

Y = Estimated produced goats per annum in number, a = Intercept of production function, bi = Partial regression coefficients of the respective resource variable (i=1, 2,…,5), X_1 = Invested goats in number, X_2= Dry fodder in kg, X_3 = Green fodder in kg, X_4 = Concentrate in kg, X_5 = Human laboures in man day.

The marginal value of product of resource indicates the addition of gross value of production for a unit increase in the 'i'th resource with all resources fixed at their geometric mean levels. The MVP of various inputs was worked out by the following formula.

$$MVP = \frac{b\bar{Y}}{\bar{X}} Py$$

where,

b = Regression coefficient of particular independent variable, $\bar{X}$= Geometric mean of particular independent variable, $\bar{Y}$= Geometric mean of dependent variable, Py = Price of dependent variable (Heady and Dillion, 2002).

RESULTS AND DISCUSSION

Results with respect to elasticity of production, marginal production, resource use efficiency and optimum resource use were obtained and are presented in Table 1.

Elasticity of production:

Regression coefficients with respect to various explanatory variables were calculated and are presented in Table 1. Regression coefficient of invested goat was 0.419 which was positive and highly significant at 1 per cent level. When,

Table 1 : Estimates of Cobb-Douglas production function in production of young goats (produced goats)

Sr. No.	Independent variable	Regression coefficient (bi)	Standard error (SE)	't' value	Geometric mean (Xi)	Marginal product (produced goat)	Marginal value product (Rs.)	Price of input (Rs.)	MVP to price ratio	Optimum resource use (Xi)
1.	Invested goat(No.)	0.419	0.109	3.844**	7.77	0.9530	2884.73	1346.87	1.24	16.65
2.	Dry fodder (kg)	0.009	0.034	2.500*	108.00	0.0014	4.24	3.00	1.41	160.64
3.	Green fodder (kg)	0.010	0.004	1.685	326.03	0.0005	1.51	1.00	1.51	535.48
4.	Concentrate (kg)	0.150	0.089	1.388	164.67	0.0161	48.73	20.00	2.43	422.74
5.	Human labour (man day)	0.390	0.241	0.790	251.76	0.0274	82.93	100	0.82	208.83

Intercept (log a) ---------- 1.512
F-value ---------- 260.23**
R^2 ---------- 0.960
Return to scale(Σbi) ---------- 0.978

Note : Geometric mean of (Y) of produced goats or young goats was 17.69 in number and price was Rs. 3027.00 per young goat

* and ** indicate significance of values at P=0.05 and 0.01, respectively

use of invested goat was increased by one per cent over its geometric mean level that would cause to increase produced goat with 0.419 per cent. Regression coefficient of green fodder was 0.010 which was positive and significant at 5 per cent level. Similarly, use of green fodder was increased by one per cent over its geometric mean that would lead to increase produced goat with 0.010 per cent. Regression coefficient of concentrate (0.150) was positive but non-significant. Similarly, regression coefficient of human labour was positive (0.390) but non-significant. It inferred that there was scope to increase the use of invested goat and green fodder because these two variables were found under utilization significantly in existing condition. Coefficient of multiple determination (R^2) was 0.960 which indicated 96.00 per cent variation in young goat production due to variation in all independent variables. F-value was highly significant (260.23). It was clear that explanatory variable on its own was not very important but together it explained significant part of variation in young goat production. Sum of regression coefficient was 0.978 which indicated decreasing return to scale. The results are in conformity with results obtained by Pawar (1996) in regard to partial regression coefficient of goat (0.004).

Marginal production:

Resource productivity with respect to various explanatory variables was also given in Table 1. It was clear that marginal productivity with respect to invested goat was 0.9530 produced goat followed by marginal product of human labour (0.0274 produced goat), dry fodder (0.0014 produced goat) and concentrate (0.0161 produced goat). It inferred that if invested goat was increased by one goat over its geometric mean level, it would lead to increase production of produced goat with 0.9530 in number. Similarly, additional one unit of dry fodder, green fodder and concentrate would cause to increase the production by 0.0014, 0.0161 and 0.0274 produced goat, respectively. The results are in conformity with results obtained by Padmanabhan (1994) in sheep farming.

Resource use efficiency:

In regards to resource use efficiency, it was also evident from the table that use of concentrate indicated MVP to price ratio as 2.43 followed by that of invested goat (1.24), green fodder (1.51), and dry fodder (1.41). It implied that there was scope to increase concentrate, invested goat, green fodder and dry fodder in production of produced goats. In other words when MVP to price ratio was one, that resource could be fully utilized. Thus, a rupee spent on concentrate and invested goat was not efficiently utilized as compared to that of on green fodder and dry fodder. Hence, the expenditure on concentrate and invested goats could be increased to equalize the MVP to the price ratios. On the contrary, a rupee spent on human labour was inefficiently used because, there was excess use of that resource. Hence, there was need to reduce use of human labour in goat production.

Optimum resource use:

In regard to optimum resource use, it was observed that optimum use of invested goat resource was 16.65 in numbers over its geometric mean. Optimum use of green fodder was 535.48 kg followed by that of dry fodder (160.64 kg) and concentrate (422.74 kg). It was obvious that there was a great scope to increase herd of invested goats. There was a need to increase the concentrate as optimum resource use. There was necessity of reduction in human labour as optimum resource use in goat rearing business.The results are in conformity with results obtained by Jacob *et al.* (1969) regarding to optimum feeding schedule in milk production.

Conclusion:

Elasticity of production with respect to invested goat was highly significant followed by that of dry fodder which was also significant. About 96 per cent variation was in young goat production due to variation in all independent variables. Resource productivity was high due to invested goats followed by that of human labour. Resource use efficiency of dry fodder as well as green fodder was higher as compared to concentrate and invested goats. Hence, use of concentrate and invested goats could be increased on priority basis while use of human labour could be reduced because of inefficient use of that resource. Optimum use of invested goats was 16.65 in numbers.

LITERATURE CITED

Heady, E.O. and Dillion, J.L. (2002). Forms of production function, PP 73-107, In: *Agricultural production functions*, Usha Raj Kumar, Kalyani Publishing, New Delhi, 667 pp.

Jacob, T. R., Amble, N.V., Mathor, M.L. and Subbarao, A. (1969). Milk production function and optimal feeding schedules. *Indian J. Agric. Econ.*, **24** (2): 35-44.

Nichols, W.H. (1948). *Labour productivity functins in meat packing*. University of Chicago Press, Chicago Illinois.

Padmanabhan, N.R. (1994). An analysis of sheep farming in Tamil Nadu with particular resource to economics and resource use efficiency. *Indian J. Anim. Sci.*, **64** (6): 642.

Pawar, B.R. (1996). Economics of dairying in assured rainfall zone of Maharashtra., Ph.D. Thesis, University of Agricultural Sciences, Dharwad, KARNATAKA (INDIA).

Pawar, B.R. and Thombre, B.M. (1995). Economics of goat rearing industry in Maharashtra. *Indian J. Anim. Prod. Mgmt.*, **10** : 48-51.

Received : *21.05.2012;* ***Revised:*** *15.08.2012;* ***Accepted :*** *16.10.2012*