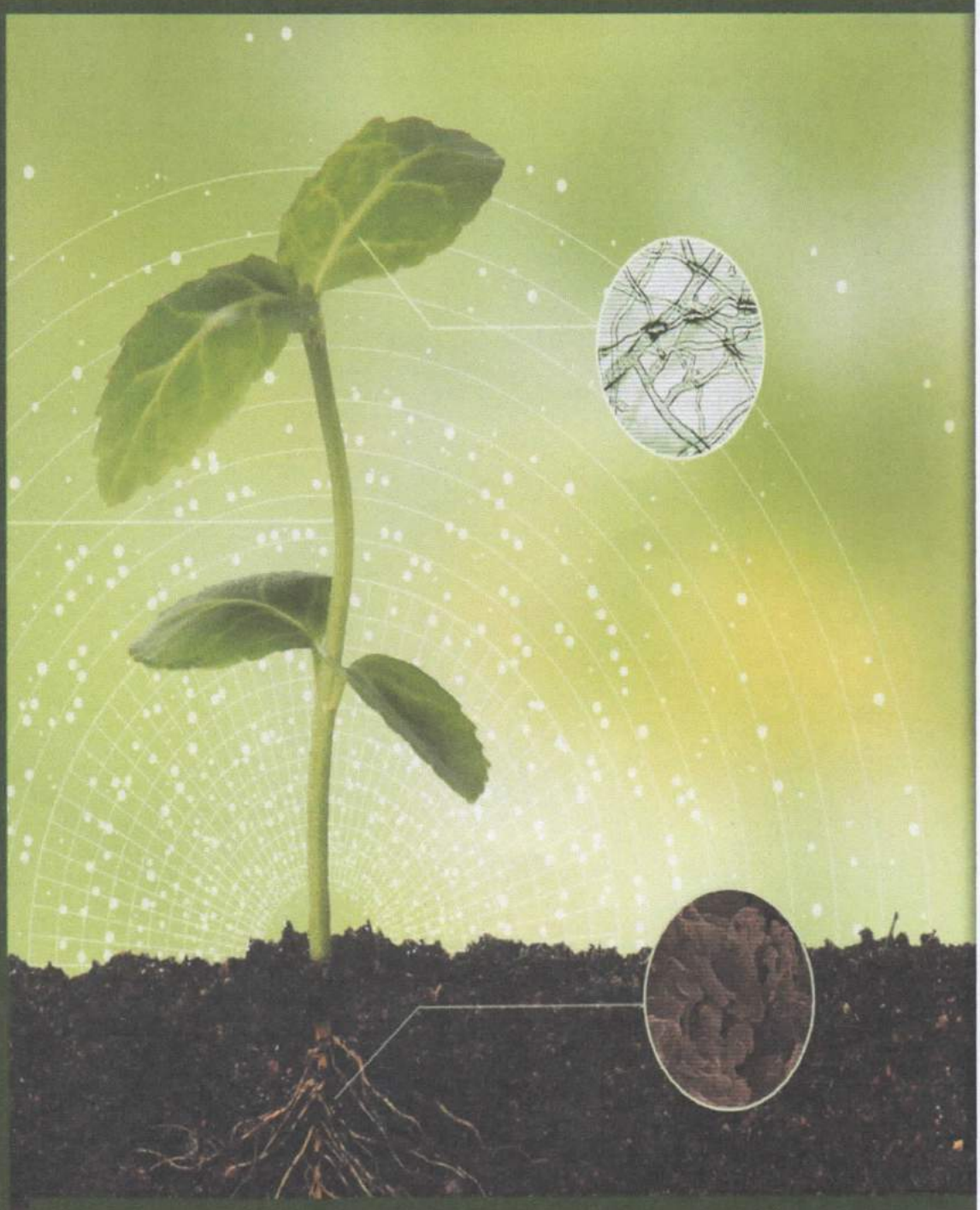
International Journal of Environmental & Agriculture Research

IJOEAR

www.ijoear.com

ISSN
2454-1850



Volume-3, Issue-12, December 2017

Preface

We would like to present, with great pleasure, the inaugural volume-3, Issue-12, December 2017, of a scholarly journal, *International Journal of Environmental & Agriculture Research*. This journal is part of the AD Publications series *in the field of Environmental & Agriculture Research Development*, and is devoted to the gamut of Environmental & Agriculture issues, from theoretical aspects to application-dependent studies and the validation of emerging technologies.

This journal was envisioned and founded to represent the growing needs of Environmental & Agriculture as an emerging and increasingly vital field, now widely recognized as an integral part of scientific and technical investigations. Its mission is to become a voice of the Environmental & Agriculture community, addressing researchers and practitioners in below areas

Environmental Research:

Environmental science and regulation, Ecotoxicology, Environmental health issues, Atmosphere and climate, Terrestric ecosystems, Aquatic ecosystems, Energy and environment, Marine research, Biodiversity, Pharmaceuticals in the environment, Genetically modified organisms, Biotechnology, Risk assessment, Environment society, Agricultural engineering, Animal science, Agronomy, including plant science, theoretical production ecology, horticulture, plant, breeding, plant fertilization, soil science and all field related to Environmental Research.

Agriculture Research:

Agriculture, Biological engineering, including genetic engineering, microbiology, Environmental impacts of agriculture, forestry, Food science, Husbandry, Irrigation and water management, Land use, Waste management and all fields related to Agriculture.

Each article in this issue provides an example of a concrete industrial application or a case study of the presented methodology to amplify the impact of the contribution. We are very thankful to everybody within that community who supported the idea of creating a new Research with *IJOEAR*. We are certain that this issue will be followed by many others, reporting new developments in the Environment and Agriculture Research Science field. This issue would not have been possible without the great support of the Reviewer, Editorial Board members and also with our Advisory Board Members, and we would like to express our sincere thanks to all of them. We would also like to express our gratitude to the editorial staff of AD Publications, who supported us at every stage of the project. It is our hope that this fine collection of articles will be a valuable resource for *IJOEAR* readers and will stimulate further research into the vibrant area of Environmental & Agriculture Research.

Mukesh Arora
(Editor-in Chief)

Dr. Bhagawan Bharali
(Managing Editor)

Fields of Interests

Agricultural Sciences	
Soil Science	Plant Science
Animal Science	Agricultural Economics
Agricultural Chemistry	Basic biology concepts
Sustainable Natural Resource Utilisation	Management of the Environment
Agricultural Management Practices	Agricultural Technology
Natural Resources	Basic Horticulture
Food System	Irrigation and water management
Crop Production	
Cereals or Basic Grains: Oats, Wheat, Barley, Rye, Triticale, Corn, Sorghum, Millet, Quinoa and Amaranth	Oilseeds: Canola, Rapeseed, Flax, Sunflowers, Corn and Hempseed
Pulse Crops: Peas (all types), field beans, faba beans, lentils, soybeans, peanuts and chickpeas.	Hay and Silage (Forage crop) Production
Vegetable crops or Olericulture: Crops utilized fresh or whole (wholefood crop, no or limited processing, i.e., fresh cut salad); (Lettuce, Cabbage, Carrots, Potatoes, Tomatoes, Herbs, etc.)	Tree Fruit crops: apples, oranges, stone fruit (i.e., peaches, plums, cherries)
Tree Nut crops: Hazlenuts. walnuts, almonds, cashews, pecans	Berry crops: strawberries, blueberries, raspberries
Sugar crops: sugarcane. sugar beets, sorghum	Potatoes varieties and production.
Livestock Production	
Animal husbandry	Ranch
Camel	Yak
Pigs	Sheep
Goats	Poultry
Bees	Dogs
Exotic species	Chicken Growth
Aquaculture	
Fish farm	Shrimp farm
Freshwater prawn farm	Integrated Multi-Trophic Aquaculture
Milk Production (Dairy)	
Dairy goat	Dairy cow
Dairy Sheep	Water Buffalo
Moose milk	Dairy product
Forest Products and Forest management	
Forestry/Silviculture	Agroforestry
Silvopasture	Christmas tree cultivation
Maple syrup	Forestry Growth
Mechanical	
General Farm Machinery	Tillage equipment
Harvesting equipment	Processing equipment
Hay & Silage/Forage equipment	Milking equipment
Hand tools & activities	Stock handling & control equipment
Agricultural buildings	Storage

Agricultural Input Products	
Crop Protection Chemicals	Feed supplements
Chemical based (inorganic) fertilizers	Organic fertilizers
Environmental Science	
Environmental science and regulation	Ecotoxicology
Environmental health issues	Atmosphere and climate
Terrestric ecosystems	Aquatic ecosystems
Energy and environment	Marine research
Biodiversity	Pharmaceuticals in the environment
Genetically modified organisms	Biotechnology
Risk assessment	Environment society
Theoretical production ecology	horticulture
Breeding	plant fertilization

Board Members

Dr. V K Joshi

Professor V.K.Joshi is M.Sc., Ph.D. (Microbiology) from Punjab Agricultural University, Ludhiana and Guru Nanak Dev University, Amritsar, respectively with more than 35 years experience in Fruit Fermentation Technology, Indigenous fermented foods, patulin ,biocolour ,Quality Control and Waste Utilization. Presently, heading the dept. of Food Science and Technology in University of Horticulture and Forestry, Nauni-Solan (HP), India.

Mr. Aklilu Bajigo Madalcho

Working at Jigjiga University, Ethiopia, as lecturer and researcher at the College of Dry land Agriculture, department of Natural Resources Management.

Dr. Vijay A. Patil

Working as Assistant Research Scientist in Main Rice Research Centre, Navsari Agricultural University, Navsari. Gujarat- 396 450 (India).

Dr. S. K. Jain

Presently working as Officer Incharge of All India Coordinated Sorghum Improvement Project, S. D. Agricultural University, Deesa, Gujarat.

Dr. Salvinder Singh

Presently working as Associate Professor in the Department of Agricultural Biotechnology in Assam Agricultural University, Jorhat, Assam.

Dr. Salvinder received MacKnight Foundation Fellowship for pre-doc training at WSU, USA – January 2000- March 2002 and DBT oversease Associateship for Post-Doc at WSU, USA – April, 2012 to October, 2012.

Mr. Anil Kumar

Working as Junior Research Officer/Asstt. Prof. in the dept. of Food Science & Technology in Agriculture & Technology, Pantnagar.

Table of Contents

Efficiency Production Cost of Goat Farming in the Lowland and the Highland Areas in Mojo Sub-district of Kediri Regency

Elok Setyorini[1*], Koesnoto Soepranianondo[2], Sri Hidanah[3]

[1]Student of Agribusiness Veterinary Faculty of Veterinary Medicine, Postgraduate School, Airlangga University
[2,3]Department of Animal Science, Faculty of Veterinary, Airlangga University' Kampus C Mulyorejo 60115 Surabaya, Indonesia

Abstract— *This research aims to determine the level of efficiency production cost of goat farming in the lowland and the highland areas in Mojo Sub-district of Kediri Regency. Location determination and 60 respondents based on purposive sampling method from the total of all farmers in Mojo Sub-district of Kediri Regency. Data collection was done by questionnaire technique, interview technique and documentation. To analyzed the data in this research used Data Envelopment Analysis (DEA) approach Measuring the efficiency production cost of goat farming used input variable that consist of the cost of shrinkage of cages, shrinkage tools, seeds, feeds, medicines and labor. Variable output was the revenue from the goats sale. The results showed that the efficiency of production cost of lowland goat farming was varies, farmers who achieve efficiency value equal to 1 was 9 farmers or 30% of the total respondents and 70% inefficient. Farmers in the highland who achieved the same level of efficiency as 1 was 15 farmers or 50% and the remaining 50% was inefficient. The use of input production costs in lowland and highland areas had a slack input value. Farmers in the lowland area could reduce the use of production costs in the form of 18% shrinkage of cages, 13% tool shrinkage, 6% seed, 2% feed, 6% medicine and 1.4% labor whereas breeders in the highland could reduce the use of costs production of 12% shrinkage of cages, 23% tool shrinkage, 11% seed, 10% feed, 12% medicine and 7% labor.*

Keywords— Data Envelopment Analysis, efficiency of production cost, goat farming, highland, lowland.

I. INTRODUCTION

Goats are the most cultivated meat livestock commodities. Meat consumption has increased with population growth and changes in consumption patterns and tastes of the people (Wahyudi *et al.*, 2017). The population of goat in Mojo Sub-districts in 2016 is 11.011 goats. Goat population increase in Mojo Sub-district from 2011 was recorded 8.499, in 2013 was recorded 10.530, and in 2015 was recorded 10.849 goats (Department of animal husbandry Kediri Regency, 2016). Most farmers of goats in Mojo Sub-district are small-scale farms in rural area and have limited control over resources (land, income, innovation and technology).

Goats are animals that have good living ability with various climatic conditions and can live on land with a vary topography. Topography of Mojo Sub-district is hilly covering lowland and highland with the lowest altitude of 74 mean sea level area Ngadi Village and highest altitude 573 mean sea level area Jugo Village (*Central Bureau of Statistics* Mojo Sub-district, 2015).

A livestock business, maintenance sites is one of the main things that must be considered so that the business can operate effectively and efficiently. Lowlands are generally areas with hot air temperature, low humidity and limited feed source condition. The highlands have low temperature, so the livestock tend to consume more feed, while in lowland temperature tend to be high so that the goat will try to maintain their body temperature in a relatively constant state through increased the frequency of respiration, the amount of drinking water consumption, and decreased in feed consumption (Apriliani *et al.*, 2016).

The activity of a goat farming production requires the sacrifice of economic resources such as seeds, feeds, labor, medicines and cages called the cost of production. Production costs are all goods that producers must incur in order to obtain production factor and other supporting materials that can be used for certain products that can be realized properly (Taufik *et al.*, 2013). Production activities in processing goat farming should be able to control production cost. Control of production cost is necessary in order to achieve cost efficiency of production so that it will obtain the optimal profit. Efficiency is the relative ratio between the output (the result in physical size or rupiah) with the input (the cost factor used to obtain the result) to the ratio of output to input at optimal conditions (Kalangi *et al*., 2014).

Based on the problems above, the purpose of this research is to know and analyze the efficiency level of the production cost of goat farming in lowland and highland area in Mojo Sub-district Kediri Regency. This research is expected to be useful for the development and improvement of goat productivity as well as the use of efficient production cost of goat farming based on the location of altitude in Mojo Sub-district Kediri Regency.

II. MATERIAL AND METHOD

The study was conducted at the goat farming in Mojo Sub-district Kediri Regency. This sub-district was determined with the consideration that this sub-district had the largest number of goat population compared to other sub-districts in Kediri Regency that is 11.011 goats in 2016. In addition Mojo Sub-district had a hilly topography so that 6 villages were in the highland and the rest were in the lowland. The research was conducted from September 2017 to October 2017.

Sampling of this research using technique of *purposive sampling*. Samples by selecting one village in the lowland with a population of 1,035 goats that was Ngadi village was 30 farmers and one village in the highland with a population of 1,171 goats that was Jugo village was 30 farmers. Sampling of each farmer's were divided into 3 groups based on goat ownership, group I (1-4 goats) 70% of the farmers, group II (5-8 goats) 20% of the farmers and group III (> 8 goats) 10% of the farmers.

The research method used is a survey method that was research taken sample by using questionnaires as a data collection tool. The data taken consisted of primary data obtained through direct interviews with sample farmers using questionnaires covering the identity of sample farmers (age, number of livestock and the long experience of farming) and costs incurred during production (shrinkage of cages, tools, seeds, feeds, medicines and labor), and the resulting revenue.

The cost efficiency analysis method of the production of goat farming used DEA model developed by Coelli et al. (2005). This model was used to analyze the efficiency production cost of goat farming. An efficiency value equal to one indicates that the cost of producing goat was relatively efficient, while the efficiency values of less than one indicates that the cost of producing goat was relatively inefficient (Gül *et al.*, 2016).

DEA model used is an input-oriented model, because the farmers had more control over the inputs used than the output produced. This research also used *Variable Return Scale* approach because goat farming in the research location was almost impossible to reach optimum scale. Mathematically, the calculation of the efficiency of using the model of *variable returns to scale* was expressed as follows:

$$\text{Min } \Theta, \lambda \Theta,$$

$$st - y_i + Y\lambda \geq 0,$$

$$\Theta x_i - X\lambda \geq 0,$$

$$N1'\lambda = 1$$

$$\lambda \geq 0$$

In which Θ was a scalar, N1' was convexity constraint, λ was N x 1 vector of constants, Y represents output matrix; and X represent input matrix. The value of Θ would be the efficiency score for firm I (Gül *et al.*, 2016).

The model used in this study consists of input and output variables. The input variables used are the cost of shrinkage of cages, tools, seeds, feeds, medicines and labor. Meanwhile, the output variable used in this research was revenue from the sale of the goats. To calculate the value efficiency production cost of goat farming studied, then this research using software STATA version 13.1.

III. RESULT AND DISCUSSION

3.1 Efficiency Production Costs of Folk Goat Farming

The results of data processing used software STATA version 13.1 given efficiency value for each goat farmers. The frequency distribution of efficiency production cost of goat farming of lowland and highland in Mojo Sub-district Kediri Regency could be seen in Table 1. The table shown that the average efficiency of production cost of lowland goat farming was 0.74 and the highland was 0.81, which was less than 1, which means that the production costs incurred inefficient goat farmer. The distribution of the efficient used of production costs in the lowland amount 30% of farmers had been efficient used of production costs and 70% of farmers were inefficient use of production costs. The distribution of the efficient used of

production costs in the highland amount 50% of farmers had been efficient used of costs of production and 50% of farmers were inefficient use of production costs.

TABLE 1
FREQUENCY DISTRIBUTION OF EFFICIENCY PRODUCTION COSTS OF GOAT FARMING IN LOWLAND AND HIGHLAND IN MOJO DISTRICT KEDIRI REGENCY

Efficiency Level	Lowland		Highland	
	Number of farmers (person)	Percentage [a)]%	Number of farmers (person)	Percentage[a)]%
1.00	9	30	15	50
< 1.00	21	70	5	50
Total	30	100	30	100
Minimum	0.04		0.09	
Maximum	1		1	
Average	0.74		0.81	

Calculated from the data on the number of respondent who adopt of by the total number of respondent multiplied by one hundred precent. Number of respondents = 30 farmers

The value of efficiency production cost with *Data Envelopment Analysis* (DEA) approach shown the average value efficiency goat farming in the of 0.74 which means that majority of goat farmers in lowland area were not achieved efficiency production cost. Farmers who had achieved efficiency was 30%, while inefficient farmers in using production cost was 70%, it shown that there were many goat farmers in lowland areas that could not maximize the input used in folk goat farming. Inefficiency of production cost in the form of excess or wasted part of input used. Achievement of an excellent level of efficiency could not be separated from the human resource element. The potential of human resource based on the ownership of knowledge, skills, technology and productivity of labor greatly contribute to the achievement of optimal output (Sugiharto & Syariffudin, 2013). Efficiency of production cost of goat farming lowland area could be achieved if farmers had ability and skill used of inputs used. While the average value of efficiency of goat farming in highland area of 0.81, which means that the majority of goat farmers in highland area had also not reached the efficiency production cost yet. Some 50% of farmers in the highland were efficient in managing production cost and 50% of farmers were not efficient in using production cost. Inefficiency of production cost in the form of excess or wasted part of input used. *Input* that was wasted if they could be streamlined would reduce production cost for farmers and could increase profits. According to Kalangi (2014) the opportunities of farmers in improving efficiency in the highland could be shown by the potential of natural resources and human resources. Natural resources such as agricultural land and large plantations in the highlands were potentials that need to be utilized optimally by utilizing the skill of human resources to take advantage of the abundant feed processed using the latest feed technology so that the expenses of feed production cost could be reduced.

3.2 Input Slack Production Cost of Folk Goat Farming

The average value *input slack* production cost of all goat farmers in the lowland and the highland could be seen in Table 2. *Input slack* was the level of inefficiency in the respondent farmer who was inefficient because the performance was not optimal from the input, output or both. Input slack was a number of inputs that could be reduce by the respondent farmer to produce the same level of output. The assumption of DEA model used in this research was oriented to input, so the calculation was only focused on input slack.

TABLE 2
THE AVERAGE VALUES INPUT SLACK PRODUCTION COST OF ALL FARMER IN THE LOWLAND AND HIGHLAND

Variable	Average value input slack (%) and number of respondents (%)			
	Lowland		Highland	
	input slack	respondents	*input slack*	respondents
Shrinkage of cage	18	56	12	50
Shrinkage of tools	13	50	23	43
Seed	6	30	11	47
Feed	2	13	10	43
Medicines	6	20	12	30
Labor	1.4	10	7	23

The used of excess input in input production cost in lowland areas was quite large. 56% of farmers were inefficient at the cost of shrinkage of cages. The cost was wasted 18% of the cost incurred. The excess value of input from the cost of shrinkage of the cages was inseparable from investment cost of the enclosure. Farmers could not plan for good enclosures, the capacity of the enclosures made mostly in exceeds the need of the existing livestock so that it made the cost of cages inefficient and excess costs incurred. Farmers should make a cage with a spacious enclosure for the need of the number of goats that were kept so that the cost of shrinkage of the cage issued as needed.

The majority of goat cages owned by lowland made of bamboo, asbestos roofed and wooden floors. Cages made of bamboo only survive in the not too long, especially goats that many moves made quickly broken cages so that the cost to renovate the cages should be issued by the farmer. The efficiency of production cost in the form of shrinkage of cages circumvented by making the cages with stronger construction with cast cement, although the cost of manufacture which was relatively expensive but could survive for decades and strong. The cages should be strong so that it could be worn for a long time, the size according to the number of livestock, clean, get the morning sunlight and the cages ventilation should be enough (Badriyah & Ika, 2011).

Fifty percent of farmers excess the cost of shrinkage of tool, the value of the excess cost in the amount of 13% of the cost incurred, although the average value of expenditure for equipment investment was small enough at Rp.100.000 but by saving 13% of the value would be able to lower production costs, as much as 30% of farmers overage seeds cost, the value of excess cost was 6% of the cost incurred. Excess value occurred because the purchase price would be quite high seedlings and farmers bought seeds with reproductive status ugly so that when expected to give birth 3 times in 2 years, it would not happen. Farmers who bought expensive female goat would be harmed by the current low price to sell.

The used of excess input in input production cost in highland area was quite large. 40% of farmers were inefficient at the cost of shrinkage of cages, seeds and feeds. 50% of farmers were inefficient at the cost of shrinkage of cage. The wasted cost was 12% of the cost incurred. The excess value of input from of shrinkage of cages was inseparable from the investment cost of the enclosure. Farmers could not plan for good enclosures, the capacity of the enclosure were made mostly exceeds the need of the livestock so that it made the cost of cages inefficient and excess cost incurred. Farmers should make a cage with a spacious enclosure for the need of the number of goats that were kept so that the cost of shrinkage of cages issued as needed.

The used of seeds input was still excessive, 47% of farmers inefficiently used the seeds cost. The excess cost of seeds issued by farmers was 11% of the cost incurred seed. The excess costs because farmers buying seeds from village traders. Village traders went around the village to find and sell goats to be bought and sold by farmers. The cost of buying and selling of goat seeds from seed village traders vary, depending on the age and quality of the goat. Village traders bought and sold with the desired price, while farmers had never considered the value and quality of seeds in general they were rather difficult to get the goats were good quality so the price to buy relatively high and sell it at a verily low price because when the farmers need money for urgent needs of families like them for the payment of school fees (Budiarsana *et al.*,2016). Farmers need to get information about the price buying and selling goats in the market, information about buying and selling price an buy goats could be used as reference farmers to optimize other production costs in order to get optimal profit. In addition, farmers could get around the purchase of seeds in groups with other farmers in order to get cheaper seed price. Need to be established and enforced institutional goat farmers were healthier, so that both farmers and traders mutually benefit.

The used of feed was still excessive because of the abundant of forage in the highlands to make farmers take as much feed but not eaten by all the goats or a lot of feed was wasted and scattered in the cage. Feed is one of the input components that determine success of business financially. Livestock feed was one of the important factor in the livestock business that determines the productivity of the livestock itself.

Farmers need to know about fresh forage for goats. According to Wicaksana *et al.,* (2015), fresh forage was given as much as 10-20% of the weight of life. In fact there were still many farmers who feed without regard to the quality, quantity and manner of giving. As a result, the productivity of livestock maintained was not optimal even among many farmers who suffered losses due to inappropriate feeding. Farmers who could take advantage of feed excess amount in the form of feed technology. In addition to utilizing into the form of technology, feed quality would be maintained rather than wasted and feed production cost could be suppressed.

IV. CONCLUSION

The conclusion that could be drawn from the research results entitled "Efficiency Production Cost of Goat Farming in the Lowland and the Highland Areas in Mojo Sub-district of Kediri Regency" is goat farming of lowland and highland in Mojo Sub-district Kediri Regency is inefficient. Thirty percent of farmers of lowland efficiently use production costs and 70% were inefficient. Fifty percent of farmers of highland farmers efficiently use production cost and 50% were inefficient. The use of input production costs in lowland and highland areas had a slack input value. Farmers in the lowland area could reduce the use of production costs in the form of 18% shrinkage of cages, 13% tool shrinkage, 6% seed, 2% feed, 6% medicine and 1.4% labor whereas breeders in the highland could reduce the use of costs production of 12% shrinkage of cages, 23% tool shrinkage, 11% seed, 10% feed, 12% medicine and 7% labor.

REFERENCES

[1] E.D. Apriliani, Dudi, and H. Inrijani. 2016. Morphology analysis of local Ewes in highland. Journal of Padjadjaran University. Available online at http://jurnal.unpad.ac.id/ejournal/article/download/9635/4336

[2] N. Badriyah, and N.F. Ika. 2011. Studi Manajemen Pakan Domba di Peternakan Jaya Mandiri Di Desa Campurejo Kecamatan Panceng Kabupaten Gresik. Jurnal Ternak Vol. 02 No.01

[3] I.G.M.Budiarsana, W. Broto, and P. Dwi. 2016. Productivity and Supply Chain Sheep and Goat A Case Studying Tegal District. Journal of Animal Science. Vol.16, No.2

[4] Central Bureau of Statistics. Mojo Subdistrict 2016. In Figures. Catalog BPS 1102001.3506010

[5] T.J. Coelli, D.S.P. Rao, C.J. O'Donnell, and G.E. Battese. 2005. *An Introduction to Efficiency and Productivity*Analysis,Second Edition, New York: Springer.

[6] Department of animal husbandry Kediri Regency. 2016. Annual Report of Department of animal husbandry Kediri Regency 2016

[7] M. Gül, D. Vecdi, Y. Hasan, and Y. Hilal. 2016. Technical Efficiency of Goat Farming in Turkey: a case study of Isparta province. Revista Brasilleira de Zootecnia. 45 (6): 328-335

[8] L.S. Kalangi, Y. Shaukat, S.U. Kuntjoro, and A. Priyanti. 2014. Technical Efficiency of Beef Cattle Breeding Business in East Java Province. Media Peternakan. 37 (2): 136-142

[9] M. Sugiharto, and N. Syarifuddin. 2013. Pengembangan Potensi Sumberdaya Peternak Sebagai Upaya Peningkatan Daya Saing Peternakan Kambing Skala Mikro di Kabupaten Banyumas. Journal & Proceeding FEB Unsoed. Vol 3 No.1.

[10] D.K. Taufik, Isbandi dan M. Dyah. 2013. Analisis pengaruh sikap peternak terhadap pendapatan pada usaha peternakan itik di kelurahan pesurungan lor Kota Tegal. Fakultas Peternakan. Universitas Dipenegoro. Semarang. Jurnal Ilmu Teknologi Peternakan. 2 (3).

[11] E. Wahyudi, C.Gatot, dan B. Agus. 2017. Studi Kasus Tingkat Pemotongan Kambing Berdasarkan Jenis Kelamin, Kelompok Umur Dan Bobot Karkas Di Tempat Pemotongan Hewan Kota Malang. Jurnal Ternak Tropika Vol. 18, No. 1 : 69-76

[12] K. Wicaksana, Muhtarudin, and W.Joseph. 2015. Nutritional Status of Nuts Goat in Tanjung Bintang District South Lampung Regency.Scientific Journal Integrated LivestockVol 3 (4): 208-211