



International Journal of Veterinary Sciences and Animal Husbandry



ISSN: 2456-2912

NAAS Rating (2026): 4.61

VET 2025; SP-11(6): 151-154

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www.veterinarypaper.com

Received: 02-03-2026

Accepted: 08-04-2026

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Cows beyond milk: Economics of cow dung products made from Pulikulam Cattle

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DOI: <https://www.doi.org/10.22271/veterinary.2026.v11.i6Sc.3537>

Abstract

In India, there are many reason for reduction of native cattle population and one of the main reason is less milk production compare to cross bred cattle. But Indigenous cattle has unique characters and the products produced from native cattle dung and urine plays a major role in organic farming. Over 50 large cow urine and dung based products production units are presently operating in various parts of the country based on the training imparted at Dev Sanskriti Vishwavidyalaya, Haridwar. Pulikulam is a native cattle of southern India. The dung produced from this cattle is well used as organic manure in many tea plantations. Apart from selling the dung as manure certain products are produced using Pulikulam cattle dung and urine but presently there is no documentation on economics of the products. Hence, the present study was planned to calculate the cost of production and economics of various products produced using Pulikulam cattle dung and urine.

Keywords: Cow dung products, economics, panchakavya, Pulikulam cattle, vermicompost

1. Introduction

India is a country where cows are reared as a holy animal especially in Hinduism native cows are held in high respect. The use of Cow dung, urine, milk, ghee and curd are well described in detail in ancient Ayurvedic scriptures such as Charaka samhita, Shushruta samhita and BrahmadWagbhatt (Kaushik *et al.*, 2016) ^[1]. India is the largest producer of milk having 190.9 million cattle and so for 55 registered native cattle breeds (NBAGR, 2025) ^[2]. There is a decrease of 4.10% native cattle population but cross bred population increased by 20.18% compared to 19th livestock census (Srivastava *et al.*, 2019) ^[3]. There are many reasons for the reduction of native cattle population one of the main reason is less economic compare to cross breed. But Indigenous cattle breed has unique characteristics. Even though milk production is less, the by products from cow dung, urine and products from dung and urine are play a major role in organic farming. Pulikulam cattle breed is a native cattle breed of southern Tamil Nadu, mostly reared in Sivaganga, Madurai and Virudhunagar districts long (Srinivasan and Sathiamoorthy, 2020) ^[4]. The average milk production of Pulikulam cattle is 1-2 liters per day (Srinivasan *et al.*, 2021) ^[5]. Majority of Pulikulam cattle are reared as nomadic system of management. The major source of revenue for the Pulikulam cattle rearers is selling of manure. Apart from selling cow dung directly as manure, lot of value products can be prepared from cow urine and dung. Vermi compost, Panchakavya diya, dhoop sticks, Vibhuti bhasma, cow dung powder, cow dung cake, pest repellent and natural beauty products. By selling this products farmers can earn more compare to traditional method of selling cow dung as manure. But there is no documentation on economics of various by products made from cow dung. Hence, the present study was conducted to calculate the cost of production and economics of various products viz., Panchakavya diya, readymade dhoop, cow dung powder and vermi compost produced from Pulikulam cattle dung.

2. Materials and Methods

The work was conducted in Pulikulam Cattle Research Station, Manamadurai, India unit of Tamil Nadu Veterinary and Animal Sciences University during June to July 2025.

2.1 Vermi compost

Cattle dung was spread for a period of 20 days for air-drying, so that excess heat and gases were removed which may cause harm to earthworms. The dung will become dry and decomposed state. The decomposed manure is filled in readily available vermicompost bag size of 12 feet X 4 feet X 2 feet. It will carry approximately 1000 kg of manure. After filling manure water will be sprayed completely to make the manure cool and to make suitable environment for earth worm. The temperature in the vermin compost bag was maintained at $25 \pm 1^\circ\text{C}$ which is the optimum temperature range for *Eisenia fetida* (Reinecke *et al.*, 1992) [6]. *E. foetida* a species of earthworm were randomly picked from the stock culture maintained at this station and approximately 500 g (120 to 150 in numbers) of earthworms, both clitellated and juvenile, were inoculated in the bedding for the acclimatization of the earthworms to the new environment. The moisture content of the manure was maintained by regular spraying of water and earth worm accelerate the rate of decompost of organic matter and vermicompost was produced in the top layer of manure.

2.2 Panchakavya Diya

Panchagavya or Panchakavyam is a concoction prepared by mixing five products of cow and used in traditional Indian rituals. The three direct constituents are cow dung, urine, and milk; the two derived products are curd and ghee. Here, all the products are derived from Pulikulam cattle. Two kg Pulikulam cattle dung allowed to dry in the sunlight powdered and kept ready for mixing. Along with that 50 ml of ghee, 100 ml of Pulikulam cattle milk, 50 ml of Pulikulam cattle curd were added. Finally, depend upon the consistency needed for diya making Pulikulam cattle urine was added. All are mixed together to get binding power. The mixture is a certain consistency is given the shape of Diya using a dye with hand pressing and left to dry in sunlight for two to three days or until the moisture evaporates and they take shape of proper diya. These diyas as they are made of Pulikulam cow dung, can be lighted only once. Because they burn entirely and leave a residue ash that you can put in plants as manure.

2.3 Readymade dhoop

The following herbs and other materials were added along with dried Pulikulamcow dung. Indian screw tree (*Helicteres Isora*), Yellow mustered seeds (*Sinapis Alba*), Aromatic resin- White Dammer (*Vateria indica* Linn), leaves of neem tree (*Azadirachta indica*), seeds of henna tree (*Lawsonia inermis*), dried Bermuda grass (*Cynodon dactylon*), powdered camphor, Powdered Benzoin Resin, rose water or lemon grass oil or synthetic fragrance were added. All the herbs and other materials were grounded to powdered and added to the dried

cow dung. Coconut oil was used as a binding agent to make the mix in to semi solid consistency and allow to pass through the dye to make ready made dhoop.

2.4 Pulikulam Cow dung powder

The Pulikulam cow dung is allowed to dry in sunlight for 2-3 days to make it dry form. This dried dung is grounded in to fine powder by grinding in the grinder. To make cow dung more fragrance 50g of turmeric powder is added to one kg of dried cow dung powder. This cow dung powder is mixed with water and used while cleaning of house premises by the ladies of Tamil Nadu state. Finally cost of production of all the products was calculated.

3. Results and Discussion

Pulikulam cattle is not a milch breed. The main source of income for the Pulikulam cattle farmers is sale of manure. Most of the farmers are selling the cow dung as manure. There is a huge demand for the manure of Pulikulam cattle by the organic farmers. In this study we have documented the cost of production and economics of various value added products produced from or using Pulikulam cattle dung. By making this value added products farmer's income will be increased.

3.1 Vermi compost production

The cost of production of vermin compost is given in Table 1. The economics was worked out for five cycles per year. 10 per cent of the fixed cost was added to each cycle to workout the cost benefit ratio. Construction of shadow net shed, purchase of vermin compost separator and cost of vermi bed incurs in fixed cost. With in the 680 square feet shadow net shed we can embed seven vermi bed and these bags can be used for 5 cycles per year. Total cost of production per kg of vermi compost was Rs. 4.78. Net profit per kg of vermi compost was Rs. 3.22. Patel *et al*, 2021^[7] reported that in Chhattisgarh state in different method of vermi compost production it is commonly produced in 4 to 6 cycles per year. The cost benefit ratio of per cubic meter was 1:1.23 in constructed method and 1:0.26 for vermi bed method. In the present study the cost benefit ratio recorded was 1:2.14 even in vermi bed method. Results of this study similar to the finding of Thiripurasundari and Divya, (2017) [8] reported that cost of production and marketing of Vermicompost was reasonable and the returns realized was higher and the net return per tonne of vermi compost is Rs. 1180.05. The net return or profit in vermi compost production depends on various factors like marketing price, labour, and fixed cost. If we have good demand higher sales price can be fixed and net profit will also increase.

Table 1: Cost of production of vermi compost (Rs.)

Particulars	One year (5 cycle)	
	Physical quantity	Value (Rs.)
Fixed cost		
Construction of shadow net shed	40 feet X17 feet	2000
Cost of vermi compost separator	One	2000
Purchase of tools and Bamboo sticks	30 no	5000
Cost of silpaulin vermi bed	1300/bedX7	9100
Total Fixed cost		41100
Variable cost		
Cost of manure (1000kg)	7X5 times	1500X7 X5 =52500
Cost of earthworm	2.5Kg	1250
Cost of electricity	600x5	3000
Cost of labour two hour per week(Rs 50 per hour)	16hrX5 times = 80 hrs	80X50 X 5 = 20000

Miscellaneous cost	7X200	1400X5=7000
Total cost (B)		83750
Total Vermicompost produced	525.2±1.93 X7	3676.4
Total production	3676.4X5	18382Kg
Total cost of production(Variable cost +10% of fixed cost/year)		87,860
Cost of production/kg		4.78
Sale price of vermicompost Rs8/kg	18382X8	147056
Net Profit		Rs. 59,196
Net Profit per Kg		Rs3.22
Percentage of net profit		67.37
Extra Profit from per kg manure sale as vermicompost		Rs 4.20

3.2 Panchakavya Diya

In Panchakavya diya production out of total cost of production 67 percentage production cost was incurred for labour packing and other expenses and 33 per cent incurred for purchase of raw materials. From two kg manure 36 Panchakavya Diyas were made. If we able to prepare more Panchakavya Diyas then cost of production for other expenses may be reduce. The total profit from making of Panchakavya Diya from two kg manure was 93 per cent. Jayashree Anand, (2017)^[9] got patent for production of eco-friendly lamp based on panchakavya (patent number PCT/IB2018/059663). In this product she described as lamp which get completely burnt leaves ash and this ash can be used in a number of useful application.

Table 2: Cost of production of Panchakavya Diya

Particulars	Quantity	Cost (Rs.)
Cost of Pulikulam cow manure	2kg	3.00
Cost of Pulikulam cow ghee	25g	30.00
Cost of Pulikulam cow urine urine	1litre	2.00
Cost of Pulikulam cow milk	100ml	4.00
Cost of Pulikulam cow curd	100 ml	10.00
Labour, packing and miscellaneous		100.00
Total cost		149.00
Return		
Sale value of 36 Diyas made	36 x 8	288
Total profit		139
Percentage of net profit		93
Extra Profit from per kg manure sale as Panchakavya Diya		Rs 68.00

3.3 Dhoop and Dung powder

Table 3: Cost of production of Dhoop

Particulars	Cost (Rs.)
Cost of manure (2kg)	3
Purchase of herbs and other materials	200
Cost of electricity an labour	150
Cost of packing	70
Total cost of production	423
Return	
Cost of 250 dhoop sticks price (25 paks of 10pieces each). One pack cost Rs. 20	500
Profit	77
Percentage of net profit	18.2
Extra Profit from per kg manure sale as manure dhoop (Rs.)	37.00

The cost of production of making Dhoop is given in table 3. In total cost of production 47.28 per cent was incurred for purchase for herbs and other materials and 35.46 per cent was incurred for the electricity and labour. Production more Dhoop per day will reduce this cost. The total profit for making of Dhoop from two kg manure was 18.20 per cent. In some places there is huge demand for Dhoop made from

native cattle dung. Hence this profit percentage is depends on the selling price of the Dhoop. Lad and Palekar, (2016)^[10] reported that herbal dhoop prepared using cow dung can be used as a potential source for disinfection in various hospitals, hotels, labs. etc. Sagu *et al.*, (2021)^[11] reported that countries like India, most of the spiritual functions start with lighting of lamp and dhoop. So it can be used for both spiritual as well as anti microbial function. They also stated that if a focused approach need to be taken for manufacturing of dhoop by using natural ingredient and cow dung, so there is a potential market available for this product in future. Tyagi *et al.*, (2018)^[12] reported that production of cow dung based products provide employment opportunities for unskilled and semi skilled labours in the rural area.

Table 4: Cost of production of dung powder

Particulars	Cost (Rs.)
Cost of manure(10 kg)	15
Cost of turmeric powder	100
Grinding and labour charges	100
Packing charges	100
Total cost of production	315
Return	
Sale of dung powder 50g pack. Cost of pack is Rs. 10	50X10=500
Profit	185
Percentage of net profit	58.73
Extra Profit from per kg manure sale as dung powder	17.0

In Southern India cow dung powder is mixed with water to clean the house premises. This traditional practice is followed as myth of using cow dung powder as germicidal. There is demand for such product made from cow dung. Hence, cow dung powder was made from the cow dung. The cost of production of cow dung powder is given in table 4. Major cost of production was incurred for purchase of turmeric powder which was mixed with cow dung to give yellow while cleaning, labour and packing cost. When we make huge volume of cow dung powder the average labour cost will decrease also, when we purchase more quantity turmeric powder the cost of turmeric powder will decrease. The total profit for making of cow dung powder from two kg manure was 58.73 per cent. Sastry *et al.*, (2020)^[13] reported that various value added products like cosmetics, medicines, growth promoters and home used products can be produced using cow dung which enhance the income of the livestock farmers in a sustainable manner. Farmers can easily make cow dung powder at home and sell it around their village. In this way they can make addition income from cattle. Apart from the products discussed here plant growth promoters like Panchakavya, Ghana Jeevamirthham, Amudhakaraisal can be prepared using cow dung and urine. Ghana Jeevamrutham is granular form of Jeevamrut which acts as natural fertilizer which improves soil fertility. It is a low-cost product which enriches the soil with beneficial

microfunna. (Sawant *et al*, 2019; Brar *et al*, 2019) ^[14, 15]. In other ways cow dung is considered as a low cost fertilizer which supplements good organic matter and minerals. (Mukhuba *et al*, 2018) ^[16]. The cost of production of these products and their economics in terms of plant growth and improved production are need to be explored in future.

4. Conclusion

This study is a preliminary attempt to study the economics of various cow dung products produced from Pulikulam cattle. From this study we documented the cost of production of various cow dung products and explored the possibility of production of cow dung products in large scale.

Conflict of Interest

Not available

Financial Support

Not available

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How to Cite This Article

Srinivasan G, Sankar V, Ayyappan S, Senthil NR, Kumar G, Palanichamy V. Cows beyond milk: Economics of cow dung products made from Pulikulam Cattle. *International Journal of Veterinary Sciences and Animal Husbandry*. 2026;SP-11(6):151-154.

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