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An economic analysis of cow-urine based insecticide production and marketing in Gothan under Godhan Nyay Yojana in Rajnandgaon district of Chhattisgarh

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Abstract
This study is based on an economic analysis of cow-urine based insecticide production and marketing in Gothan under Godhan Nyay Yojana in Rajnandgaon district of Chhattisgarh. In this research selected two gothans Vrindavan gothan, Anjora (model) and Kanhadham gothan, Mangata (non-model) for the study. And analyzed the cost and returns and marketing pattern of cow-urine based insecticide in Rajnandgaon district of Chhattisgarh. The cost of cow-urine based insecticide was higher in Kanhadham gothan, Mangata (44.4 Rs/lt) than Vrindavan Gothan, Anjora (41 Rs/lt). And gross income, net income was maximum in Vrindavan gothan, Anjora (65 Rs/lt & 24 Rs/lt) and minimum in Kanhadham gothan, Mangata (60 Rs/lt & 15.6 Rs/lt). The input-output ratio was higher in Vrindavan gothan, Anjora (1:1.34) than Kanhadham gothan, Mangata (1:1.23). Majorly insecticide was sold to the farmers directly and through the C-Mart also. And major buyer of insecticide was farmers.

Keywords: Total cost, gross income, net income, input-output ratio, cow-urine based insecticide, Gothan, Godhan Nyay Yojana

Introduction
In recent years, sustainable agricultural practices and eco friendly alternatives to synthetic pesticides have gained significant attention worldwide. One such promising approach is the utilization of cow-urine based insecticides, which not only offer an effective pest control solution but also promote organic farming methods. This research paper focuses on conducting an economic analysis of cow-urine based insecticide production and marketing in Gothan under Godhan Nyay Yojana, implemented in the Rajnandgaon district of Chhattisgarh, India.
The Chhattisgarh government's Godhan Nyay Yojana was introduced on July 20, 2020, against the backdrop of the state's signature "Naruva-Garuva-Ghuruva-Badi" initiative. That was unveiled on the occasion of hareli, the Chhattisgarh government's first event. Garuva, Ghuruva, and Badi are terms for composting, livestock husbandry, seasonal or perennial streams, respectively. The programme aims to enhance rural livelihood, promote sustainable agriculture and protect the environment. Gothans are established, where cows are provided with proper care, and their waste products, such as cow-urine, are collected and also under Godhan Nyay Yojana livestock rearers sell their collected cow-urine. Cow-urine is rich in various bioactive compounds, which have been found to process insecticidal properties.
The utilization of cow-urine based insecticides offers a unique opportunity to create value from a traditionally under-utilized resource, while also reducing the dependence on harmful chemical pesticides. By harnessing the potential of cow-urine as a natural insecticide, the Godhan Nyay Yojana endeavors to benefit both farmers and the environment. This research paper aims to analyze the economic viability of cow-urine based insecticide production and marketing in Gothan under the Godhan Nyay Yojana in the Rajnandgaon district. This study will explore various aspects, including cost of production, marketing and potential profitability.

Methodology
This study was done in Rajnandgaon district of Chhattisgarh. Rajnandgaon block was selected from four blocks of Rajnandgaon district. And from that 2 gothans (1 model and 1 non-model) were selected. The analytical tools are used as follows

OST concept

a. Total Cost

The sum of all cost incurred by a firm in producing certain level of output.

Total cost = Total Fixed cost+ Total Variable Cost

b. Profitability Concepts

A. Gross Income

Total value of main product is called as gross income.

Gross Income = Physical Production× Price/qt

B. Net Income

Net income is amount of accounting profit a company has left over after paying off all its expenses.

Net Income=Gross Income- Total Cost

C. Input- Output Ratio (IO Ratio)

It is the ratio between gross income and total cost.

Input- Output Ratio= Gross Income/Total Cost

Marketing channel

A marketing channel is a collection of interdependent organizations/marketing agencies work together in the process of marketing of processed products which is identified in the selected Gothan.

Results and Discussions

1. Cost and returns of Cow-urine based insecticide (Rs/lt)

Table 1 represents the cost of cow-urine based insecticide per kilogram. The overall cost was 42.7 rupees per kilogram. The maximum cost from Kanhadham gothan, Mangata (non-model) was 44.4 Rs/lt and lowest cost from Vrindavan gothan, Anjora (model) was 41 Rs/lt. On that the overall cost was shared by different raw materials as cow urine 9.2 Rs/lt (21.54%), green leaves 10 Rs/lt (23.41%), fuel 4 Rs/lt (9.36%), packaging 17 Rs/lt (39.81%) and transport & others 2.5 Rs/lt (5.85%).

Table 2 displayed the net income, gross income, total cost and input-output ratio. The overall total cost was 42.7 Rs/lt, gross income 62.5 Rs/lt and net income was 19.8 Rs/lt. The gross and net income from model gothan (Vrindavan gothan, Anjora) 65 Rs/lt and 24 Rs/lt was higher than the non-model gothan (Kanhadham gothan, Mangata) 60 Rs/lt and 15.6 Rs/lt. The overall input-output ratio was 1:1.28 and Vrindavan gothan, Anjora (model) was 1:1.34 was higher than the Kanhadham gothan, Mangata (non-model) was 1:1.23.

Table 1: Cost of Cow-urine based Insecticide (Rs/lt)

S.N.	Particulars	Model Gothan	Non-Model Gothan	Overall
	Vrindavan gothan, Anjora		Kanhadham gothan, Mangata	
1.	Total cost (Rs)	41	44.4	42.7
2.	Production (lt)	1	1	1
3.	Gross income (Rs/lt)	65	60	62.5
4.	Input-Output ratio	1:1.34	1:1.23	1:1.28
5.	Net income (Rs/kg)	24	15.6	19.8

Table 2: Total cost, Gross income, Net income and Input-output ratio (Rs/lt)

S.N.	Particular	Model Gothan		Non-model Gothan		Over all	
		Vrindavan gothan, Anjora		Kanhadham gothan, Mangata			
		Quantity	Value	Quantity	Value	Quantity	Value
1.	Cow urine (lt)	2	8 (19.51)	2.6	10.4 (23.42)	2.3	9.2 (21.54)
2.	Green leaves	As required	10 (24.39)	As required	10 (22.52)	As required	10 (23.41)
3.	Fuel	1	4 (9.75)	1	4 (9.00)	1	4 (9.36)
4.	Packaging	1	17 (41.49)	1	17 (38.28)	1	17 (39.81)
5.	Transport and other expenses	2 (4.87)		3 (6.75)		2.5 (5.85)	
	Total cost	41 (100)		44.4 (100)		42.7 (100)	

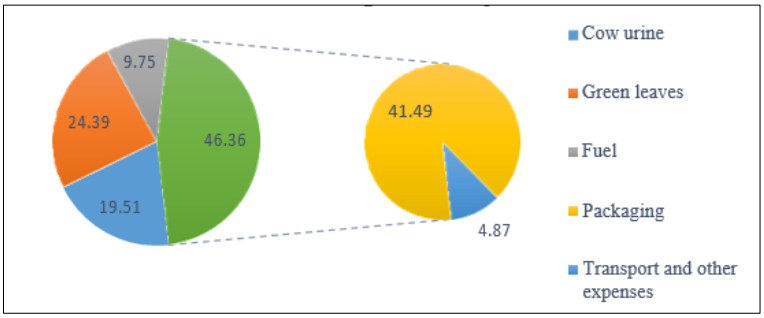

Fig 1: Cost of Cow-urine based Insecticide Production of Vrindavan gothan, Anjora

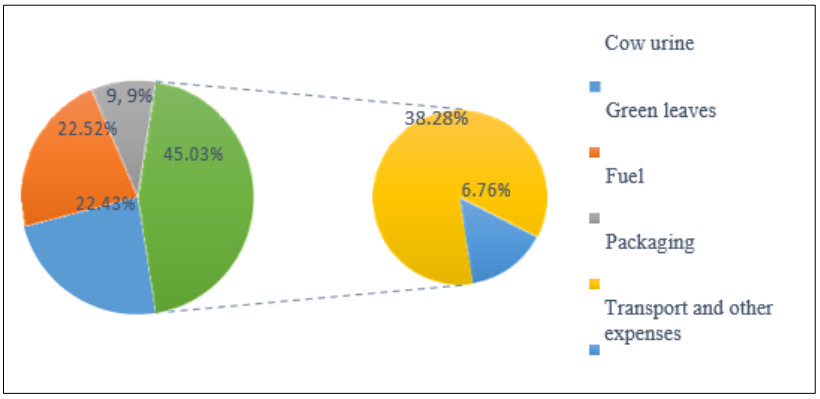

Fig 2: Cost of Cow-urine based Insecticide Production of Kanhadham gothan, Mangata

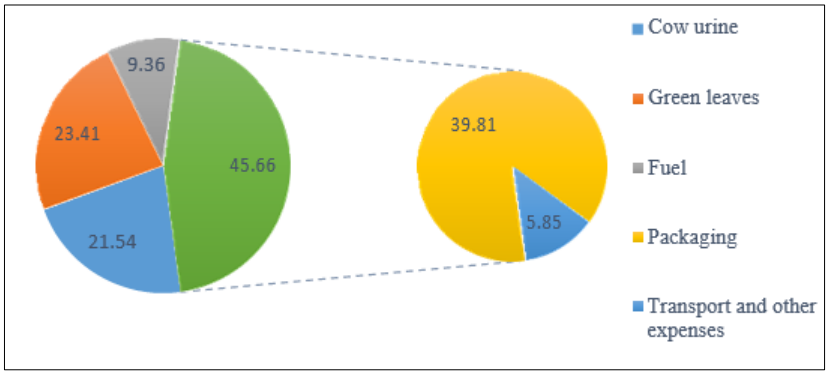

Fig 3: Cost of Cow-urine based Insecticide Production Overall

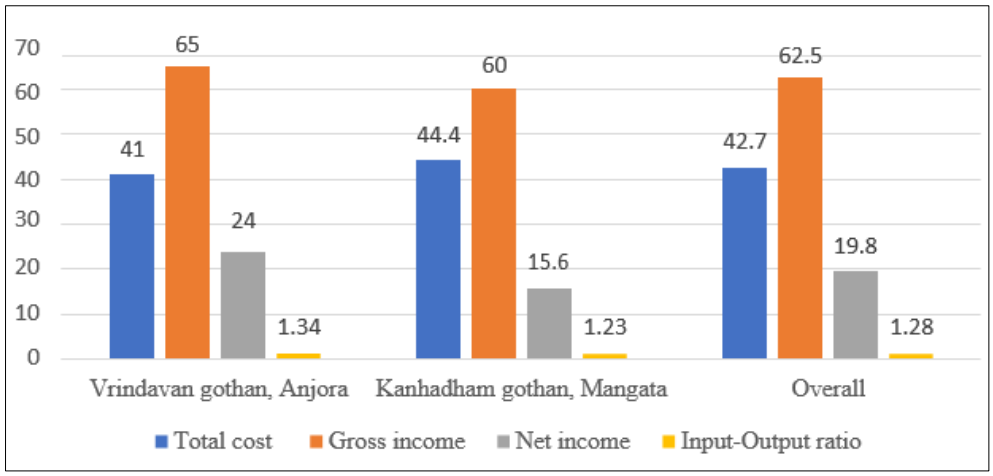

Fig 4: Total cost, Gross income, Net income & Input-Output ratio of Cow-urine based Insecticide production

2. Marketing of Cow-urine insecticide

The price was decided by the WSHG's in gothan who produced the insecticide according to the cost and demand of product. The price is decided in selected gothans was 65 Rs/lt in Vrindavan gothan, Anjora (model) and 60 Rs/lt in Kanhadham gothan, Mangata (non-model). There was different marketing channel for different gothans such as follows;

a. Vrindavan gothan, Anjora (model)

WSHG's ⟶ C-Mart ⟶ Consumer/Farmer

b. Kanhadham gothan, Mangata (non-model)

WSHG's ⟶ Consumer/Farmer

Table 3: Consumers of Cow-urine based Insecticide

S.N.	Consumers	Quantity (In litter)	Price (Rs/lt)
1.	C-Mart (Vrindavan gothan, Anjora)	212	13780.00
2.	Farmer (Kanhadham gothan, Mangata)	195	11700.00
Total		407	25480.00

Conclusion

The current study is based on economic analysis of cow-urine based insecticide production and marketing in gothan under Godhan Nyay Yojana in Rajnandgaon district. According to the study the cost of insecticide of Kanhadham gothan, Mangata (non-model) was higher than the Vrindavan gothan, Anjora (model). The net gross and net income was highest in Vrindavan gothan, Anjora (model) and lowest in Kanhadham

gothan, Mangata (non-model). And insecticide majorly sold to farmer directly and through C-Mart from the selected gothans.

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