Resource use efficiency of Vermicompost production under Gothan and Godhan Nyay scheme in Chhattisgarh, India

Abstract:

The present study undertaken in Chhattisgarh state, has estimated the resource use efficiency in vermicompost production under Gothan and Godhan Nyay Scheme. Samples of 12 vermicompost units were selected from the state. Efficiency in any system is an expression of obtainable output with the addition of unit amount of input. The result of the study define that variables cow dung and Vermi culture, cow dung was found positive but non-significant which indicates that quantity of cow dung have positive impact on output. Regression coefficient of Vermi culture was found positive and significant at 1 percent which indicated that 1 percent increase in the quantity of vermi culture would increase yield. The resource use efficiency for cow dung and vermi-culture were negative, non-significant and less than unity indicates efficiently utilized of both inputs.

Key words: Resource use efficiency, vermicompost, economic function, regression.

Introduction

Efficiency means any system is an expression of obtainable output with the addition of unit amount of input. Whereas the term "resource use efficiency" denotes the output of any crop per unit of the resource applied under a specified set of soil and climate condition. (Bera,2021). "Cattle dung plays important role in mineralization, nutrient recovery, earthworm, and microbial activity leading to vermi-fertilizer production. Among the aerobic methods, vermicomposting technology for organic solid waste management is having manifold advantages and has been well addressed in recent years" (Bhat et al., 2018). "Environmental pollution problems associated with biowastes and the central role of vermicomposting technology are depicted. Cattle or cow is an important sole or amendment material for vermicomposting several kinds of biowastes". (Singh et al., 2020). "Vermicomposting is one of the generating additional sources of income, economic empowerment, and assuring sustainable livelihood approach along with the already known environmental benefits, has been newly found to be one of the most appropriate and successful models for the rural or not socio-economically resourceful

communities. The Generation of a large amount of solid waste around the world is a major ecological problem. Vermicomposting may be the viable option to handle solid waste in an environmentally friendly way". (Ali et al., 2015). Due to the increased cost of farming couples with environmental and health issues, farmers in India are gradually shifting back to organic farming. Consumers are now willing to pay higher premiums for healthy organic food.

This study aims to examine, the resource use efficiency of vermicompost production under Gothan and Godhan Nyay scheme of Chhattisgarh. This scheme of Chhattisgarh launched **'Gothan'** and **'Godhan Nyay Yojna'** under the ambitious Suraji village scheme Narwa, Garwa, Ghurwa, and Badi on 20th of July 2020. By the state Government, the Godhan scheme has been started on the occasion of the important festival of Chhattisgarh 'Hareli'. Gothan is home to cattle. In Godhan Nyay Yojna the state government purchases cow dung at 2 Rs. per kilogram from the farmers and cattle rearers of the state which leads to income as well as employment generation initially in the rural pocket later across the state. The purchasing of cow dung is done at the Gothan. The purchased cow dung turned into vermicompost by the self-help group and later the organic manure like vermicompost sale to the farmers at Rs. 10 per kilogram and Supercompost at Rs. 6 per kilogram. Besides preparing organic manure, the dung is used to prepare various other useful items such as Diya, flower vase, etc.

Vermicompost production yield is often limited by such as light, temperature, water and humidity. Excessive inputs of resources can increase production; the utilization efficiency of those resources will decrease. This approach of applying excessive amount of inputs not only reduces the economic benefits received by farmers, but also causes environmental pollution. Therefore, it is necessary to consider RUE. Current study isconsidering resource use efficiency of vermicompost production, focused on vermin and cow dung.

Methodology

The present study has been carried out in Chhattisgarh. A multistage random sampling technique has been used for the selection of sample units. In the first stage sampling, Bilaspur, Raigarh and Janjgir-Champa districts were selected purposively due to high rate of production of vermicompost. In the second stage from each district 4 Gothans were selected which has been categorized as Model Gothan, Non-model Gothan, City Gothan and Village Gothan. So total 12 Gothan (Vermicompost production units) were selected for the study.

Analysis of Resource use efficiency

The resource use efficiencies were studied by fitting the cob-Douglas type production function (Monetary values) to the farm level data.

Cobb-Douglas production function

$Y=a.X1^{b1}, X2^{b2}, ɐμ$

Y= output from vermicompost production (Qt/ha)

X1= per/ha cow dung (kg)

X2= per/ha vermi-culture (kg)

b1 and b2= are parameter/elasticity of coefficient of respective input or regression coefficient of factor inputs

a= constant/intercept term

ɐμ=Error

Calculation of MVP at factor cost

MP=b1 Y X *i*

b1= production elasticity

Y and Xi are the geometric mean of the variable

I=1,2,3……..

MVP= Mp.Py

Where, Py = price of y

MVPx1 = b1 Y/Xi*Py

MVP= marginal value product

B1= regression coefficient

Xi= geometric mean of Xi inputs

Y= geometric mean of output

Py= per unit price of output

t-test

t= b/S.E. (b)

b= partial regression coefficient

S.E. (b)= standard error of 'b'

Results and Discussion

Resource use efficiency in vermicompost production

Cobb-Douglas production function was used for estimating resource use efficiency in vermicompost production on the basis of goodness of fit (R^2) which indicates the proportion of total variation of the dependent variable jointly explained by the independent variables.

The result for resource use efficiency for vermicompost is presented in table 1. The results found to be that two variables i.e. cow dung (X1) and vermicompost (X2). Table 1 revealed that the above out of two variables, cow dung (X1) was positive but non-significant it indicates that it have positive impact on output. Regression coefficient of Vermi (X2) was found to be positive and significant at percent and 1 percent increase in the use of this variable would increase the yield. The work supported by Zekeri and Tijjani (2013).

Table 1. Result of Cobb-Douglas production function for vermicompost:

(Per/ha)

S.No.	Particular		Coefficient of variation	Standard Error
1	Intercept	A	-1.434*	1.850
2	Cow dung	X1	0.420	0.255
3	Vermi	X2	0.668*	0.201
4	R2		0.859	
5	Number of observation		12	

(Figures in parenthesis are standard errors of respective regression coefficient)

Note:*= 1% level of significance

Resource use efficiency in Vermicompost production

The resource use efficiency for cow dung and vermicompost were negative, non-significant and less than unity indicates efficiently utilized of both inputs. The finding was support the work of S.C. Dhakal et al.(2015) and Srivastava et al.(2015).

Table 2. Resource use efficiency foe vermicompost production

(Per/ha)

S.N.	Resour	Units	Bi	MVP	Pi	t-	Compa	Signifi	Remar

	ces					calculated value	rison	cant/Non-significant	ks
1	Cow dung	kilogram	0.420	0.141	1	-6.272	t cal< t tab	Non-significant	Efficiently utilized
2	Vermi-culture	kilogram	0.668	0.631	1	-6.029	t cal< t tab	Non-significant	Efficiently utilized

Conclusion:

The study revealed that in the production of vermicompost, variables, cow dung and Vermi both showing positive relationship with efficiency,; cow dung indicate non-significant and positive impact on output indicating this resource was efficiently utilized.

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