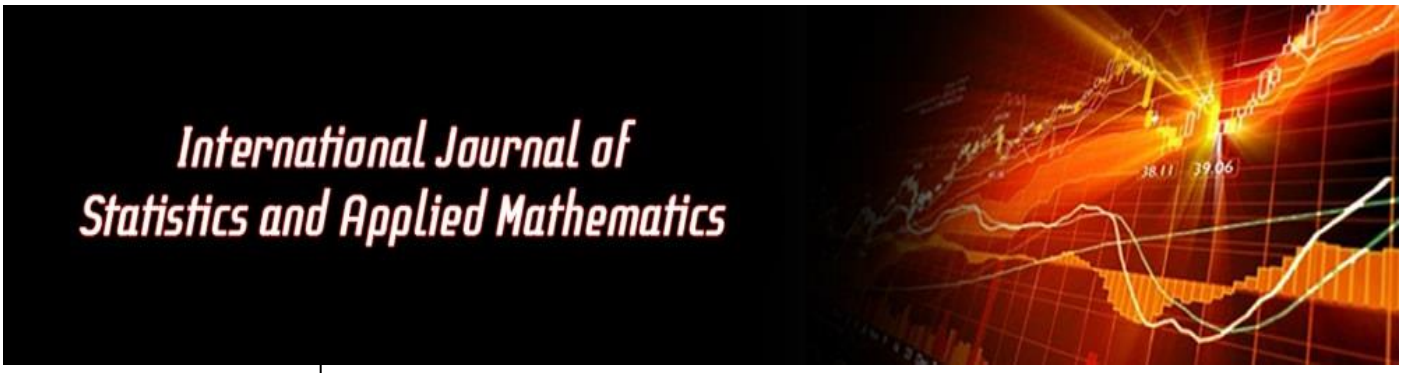
International Journal of Statistics and Applied Mathematics 2024; SP-9(5): 87-88



ISSN: 2456-1452
Maths 2024; SP-9(5): 87-88

www.mathsjournal.com
Received: 20-07-2024
Accepted: 24-08-2024

Kayande SK
M.Sc. Student, Department of Agricultural Economics, VNMKV, Parbhani, Maharashtra, India

Perke DS
Associate Dean and Principal, College of Agricultural, Dharashiv, Maharashtra, India

Pathrikar DT
Assistant Professor, Department of Agricultural Economics, VNMKV, Parbhani, Maharashtra, India

Bharti SV
Assistant Professor, Department of Agricultural Economics, VNMKV, Parbhani, Maharashtra, India

Corresponding Author:
Kayande SK
M.Sc. Student, Department of Agricultural Economics, VNMKV, Parbhani, Maharashtra, India

Determinants of adoption of improved safflower PBNS-12 variety in Parbhani district of Maharashtra

Kayande SK, Perke DS, Pathrikar DT and Bharti SV

Abstract
Safflower (*Carthamus tinctorius* L.), originating from India, Afghanistan and Ethiopia is a versatile member of the Asteraceae family. It is a significant oilseed crop in India, ranking second among major oilseeds such as groundnut, sesame, mustard, linseed and sunflower. seed is a valuable alternative oil crop due to its high oil content, ranging from 24 to 36 per cent, along with protein content of 11 to 17 per cent, moisture content of 4 to 7 per cent and linoleic acid content of 55 to 70 per cent. A multistage sampling design was utilized for the selection of districts, tehsils, villages and safflower growers. In the initial stage, Parbhani district was purposively selected due to the extensive cultivation of the PBNS-12 safflower variety in this area. In second stage, six villages were selected randomly from the three selected tehsils i.e. two villages each from Parbhani, Selu and Gangakhed tahsils. The selection process were resulted in a total of 60 safflower growers and 60 non-growers from the six villages. The total sample size is 120. Logit or Logistic regression model was used to analysed the significant level and recommended determinants were used in adoption of improved safflower PBNS-12 variety. The result showed that logistics model was fitted to identify potential determinants for adoption of PBNS-12 variety and results were yield, annual income and family size has found significant variables for level of adoption at 5 per cent and 10 per cent respectively.

Keywords: Safflower, PBNS-12, Determinants, Significant, Logit or Logit regression

Introduction
Safflower (*Carthamus tinctorius* L.), originating from India, Afghanistan and Ethiopia is a versatile member of the Asteraceae family. It is a winter-spring growing, minor oilseed crop cultivated in India and Australia. It is a significant oilseed crop in India, ranking second among major oilseeds such as groundnut, sesame, mustard, linseed and sunflower. Its economic importance stems from its high oil content (24 to 36 per cent) and nutritional value for both humans and livestock, making it vital to both state and national economies. India ranks as the fourth largest safflower producer globally with an output of 200,000 tonnes and the largest cultivation area at 4,30,000 hectares. However, its average productivity is relatively low at 465 kg/ha. The major safflower-growing states in India are Maharashtra and Karnataka, which together account for over 90 per cent of the country's production. Specifically, Maharashtra contributes 72 per cent of the cultivation area and 63 per cent of the production, while Karnataka accounts for 23 per cent of the area and 35 per cent of the production. In India, safflower is primarily cultivated for its oil.

Oilseeds occupy 10 per cent of the total cropped area and contribute 8 per cent to the country's food production. They are primarily used to extract edible oil, a key source of fats and proteins. Fatty acids from these oils provide 2.5 times more calories than carbohydrates. In the human body, fats and oils serve as transport mediums for vitamins A, D, E and K. Safflower is a versatile crop grown for its edible oil, medicinal properties and industrial uses. Its oil is rich in polyunsaturated fatty acids, particularly linoleic acid (78 per cent) which helps lower blood cholesterol levels and is used in treating heart diseases. It also serves as an excellent drying oil for paints and varnishes. The florets of safflower contain carthamin, a source of yellow and red dyes, which are used to colour cotton and silk fabrics. The meal or seed cake is used as livestock feed.

Floret extracts, rich in amino acids, minerals and vitamins are utilized in treating various conditions such as menstrual problems, cardiovascular diseases, trauma-related pain and swelling, hypertension, male sterility, female infertility and respiratory diseases. In India and Burma, young safflower seedlings are consumed as a green vegetable due to their high carbohydrate, protein, fat, calcium and iron content. safflower flowers can be utilized in herbal tea preparations, and the dye derived from them is employed in colouring medicinal formulations, tablets, and in textile industries. Safflower meal is by-product of oil extraction, is a valuable component used in animal feed.

Methodology

Logit or Logistics method

The present study was conducted in Marathwada region of Maharashtra state during the year 2023-24 with the objective to determinants of adoption of safflower PBNS-12 variety. This method which was to identify the factors influencing adoption, was be accomplished using logistic regression. This statistical method analyses the relationship between one dependent variable and several independent variables. Multiple regression is a statistical technique that can be used to analyse the relationship between a single variable dependent variable and several independent variables. The logistic regression equation can be represented as:

$$Logit=Li=\beta0+\beta1X1+\beta2X2+\beta3X3+\beta4X4+\beta5X5+\beta6X6+\beta7X7+\beta8X8+\mu$$

Where,

- Y = Dependent variable
- β0 = Intercept
- β1, β2, β3, β4, β5= Regression coefficients corresponding to each explanatory variable
- X1, X2, X3, X4, X5 = Explanatory variables
- μ = Error term

Sr. No.	Dependent Variable (Y)	Dummy Variable	Independent Variable (X)	Particular
1	Grower	1	Yield	X1
2	Non-Grower	0	Age	X2
3			Education	X3
4			Annual Income	X4
5			Family Size	X5

The basic model of Logit estimation (Gujrati, 2004)

$$IIPi = E\ (Y = 1/Xi) = 1/\ 1+e\ -(\beta1+\beta2xi) \quad (1)$$

For ease of exposition, we right (1) as

$$Pi = 1/1+e^{-z}\ i = e^{z}/1+e^{z} \quad (2)$$

Where, $Zi= \beta1+\beta2Xi$

Where Pi is the probability that farmers are Godavari Pigeon pea variety adopter then (1-Pi) is the probability that farmers are non-adopter and 'e' is the exponential constant.
Equation (2) represents a cumulative logistic distribution function. Which it is easy to verify that Zi ranges from -∞ to +∞, pi ranges between 0 to 1 and the logit goes from -∞ to +∞.

Results and Discussion

To Identify determinants of adoption of safflower of PBNS-12: The logit model was fitted to identify potential determinants for adoption of PBNS-12 variety and results are presented in Table.

Sr. No	Coefficient	Standard Error	Z-Value
Intercept	-2.62	0.1	0.3832
Yield	0.000026**	0.000013	2.03
Age	-0.0041	0.021	-0.19
Education	0.049	0.48	1.03
Annual Income	0.00000041**	0.0000018	2.17
Family Size	0.91*	1.42	-1.84

**, *represent significance at 5%, 10% respectively. (Dependant Variable= Adoption of PBNS-12 variety Yes =1; No =0)

From Table, it is observed that yield, annual income and family size has found significant variables for level of adoption at 5 per cent and 10 per cent respectively. So, said significant variables are responsible to increase the attitude of farmers towards level of PBNS-12 variety adoptions.

Conclusion

1. The result of logit model was analysed that determinants like yield, annual income were positively significant at 5 per cent level and family size was positively significant at level 10 per cent.
2. The determinants like education was positively impact and age was negatively impact on safflower PBNS-12 variety respectively.

Acknowledgement

I extend my special and heartiest thanks to my research guide, teachers, seniors and batchmates for their guidance, genuine interest, activeness and sharp insights. I deeply thank my beloved parents for their unwavering inspiration, continuous encouragement and steadfast support throughout my academic career.

References

1. Ekunwe PA, Emokaro CO, Aigba GA. Socio-economic determinants of output of groundnut production in Etsako West Local Government area of Edo State, Nigeria. Albanian J Agric Sci. 2013;12(1):111-116.
2. Habib N, Zubair A, Aisha S. Determinants of sunflower area and yield in districts Swabi and Mardan of Khyber Pakhtunkhwa, Pakistan. Pak J Agric Sci. 2018;31:332-335.
3. Elisabeth DAA, Mutmaidah S, Harsono A. Adoption determinants of biofertilizer technology for soybean in rainfed area. In: IOP Conference Series: Earth and Environmental Science. 2019;347(1):1-10.
4. Kumar A, Roy D, Joshi PK, Tripathi G, Adhikari RP. Impact of contract farming of paddy seed on smallholder farm profits: Evidence from Nepal. Agric Econ Res Rev. 2019;32(1):25-39.
5. Yegon PK, Kibet LK, Lagat JK. Determinants of technical efficiency in smallholder soybean production in Bomet District, Kenya. J Dev Agric Econ. 2015;7(5):190-4.
6. Simtowe F, Asfaw S, Abate T. Determinants of agriculture technology adoption (BBF) under partial population awareness: The case of pipeon pea in Malawi. Agric Food Econ. 2016;4:1-21.
7. Ukwuaba IC, Agbo FU, Adeosun KP. Socio-economic and institutional determinants of watermelon marketing in Enugu State, Nigeria. J Agric Ext. 2018;22(3):161-173.