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Decisional factors affecting the adoption of organic farming accompanying with its extent in Haryana

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Abstract
Organic farming system is a farming method, relating to farming system which is basically aimed at sustainable agricultural and horticultural production in an eco-friendly way, which is practiced by the farmers since the ancient period of India. The organic production system tends to retain the environment and its ecology with environmentally good health by making use of the natural resources in accordance with the desired agricultural production for the consumption of human being on this earth. While seeing the benefits of organic farming this study attempts to recognize the factors driving the adoption of organic farming practices along with its extent in Haryana. The study uses an exploratory research design. The research type is qualitative and quantitative type of research. The data are collected mainly through the combination of primary and secondary sources. There were 560 respondents which have been taken as sample respondents from the two districts from each zone and one block from each district, by selecting the two villages from each block. There were total 560 numbers of the respondents which have represented the whole Haryana state in terms of practicing the organic and non-organic types of the agriculture by the farmers. The selection of block has done on the random basis. All the municipal councils and committees; belonged to the sample districts have included. There were 560 sample respondents which have selected from the local bodies and administered and particularly designed in accordance with the structured interview schedule uniformly for taking the first hand information. Multistage Sampling has been used to select the respondents. For analysing of data Factor analysis as well as Multiple Regression Analysis has been utilized. The findings of this objective revealed that there is significant impact of Stimulators, Demographics and Farm Economy on Organic Farming and shows a decent extent of adoption of organic farming in the study area.

Keywords: Adoption, benefits, extent, factors, organic farming etc.

Introduction

Organic farming system is a farming method, relating to farming system which is basically aimed at sustainable agricultural and horticultural production in an eco-friendly way, which is practiced by the farmers since the ancient period of India. The organic production system tends to retain the environment and its ecology with environmentally good health by making use of the natural resources in accordance with the desired agricultural production for the consumption of human being on this earth. In the organic type of farming system, the agricultural production, is taken in the eco-friendly environment and focus is given on application of the naturally available inputs, such as organic wastes like crop residual, cattle and farm wastes, biological material and aquatic wastes and along with human beneficial microbes (bio fertilizers/ bio control agents) to release nutrients to crops and protect them from insect pest and diseases for increased agricultural production. Agriculture is central to human related material. It make available food and fuel and help to maintain the ecosystem. It is a significant source of the human livelihood. Thus, it is one of the major sources of environmental degradation too. It tends to contribute to bring a climatic change, depleting the surface and sub-surface water resources, degrading soil fertility by the contaminate the environment through making an extensive use of the chemical derived fertilizers and pesticides. The agricultural production dependents on the modes of agriculture production and with the present practices, it has led to deplete and degrade the natural resources. The sustainable food security in the ongoing scenario is seemed to be ensured but the side effects

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of the modern agricultural production has led to give a harmful impact on the human health. It is therefore, requires not only that all the people at all times should make access to the nutritious food, but this food be prepared with the minimal environmental impact too.

Sustainable agricultural development requires that the agriculture system should meet the primary requirements of the present and the future generations. The negative aspects of the conventional system of agricultural practices by the farmers has led to create the problems like degradation of the fertile soil, raising of the health and environment relating issues etc. which essentially led to find an alternative mode of agriculture. It is, therefore, the organic farming was recommended as an alternative mode of agriculture to the conventional type of the farming. However, the principles and the philosophy of this alternative farming system is quite different and has considerable differentiation with an edge over the conventional farming system with varied grounds.

The Organic farming system in India is not new and is being followed from ancient time. It is a method of farming system which primarily aimed at cultivating the land and raising crops in such a way, as to keep the soil alive and in good health by use of organic wastes (crop, animal and farm wastes, aquatic wastes) and other biological materials along with beneficial microbes (bio-fertilizers) to release nutrients to crops for increased sustainable production in an eco-friendly pollution free environment. As per the definition of the United States Department of Agriculture (USDA) study team on organic farming "organic farming is a system which avoids or largely excludes the use of synthetic inputs (such as fertilizers, pesticides, hormones, feed additives etc.) and to the maximum extent feasible rely upon crop rotations, crop residues, animal manures, off-farm organic waste, mineral grade rock additives and biological system of nutrient mobilization and plant protection". FAO suggested that "Organic agriculture is a unique production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles and soil biological activity, and this is accomplished by using on-farm agronomic, biological and mechanical methods in exclusion of all synthetic off-farm inputs".

Need of Organic Farming
The stress of feeding the growing population pressure on agriculture necessitates not is only to keep agricultural production continuous but to surge it further in sustainable way. Modern conventional farming using pricey chemicals and synthetic inputs is now facing sustained production with high input cost and weakening returns surpluses. According to FiBL survey 2021 India holds a unique position among 187 countries practicing organic agriculture. India is home to 30% of total organic producers in the world having 2.30 million ha. Total organic cultivation area, 27, 59,660 total farmers (11, 60,650 PGS and 15, 99,010 India Organic), 1703 total processors and 745 traders. A major relative increase of organic agricultural land was noted in recent past throughout the country. With the growth of population number our compulsion would be not only to stabilize the production of the agricultural but to boost it in sustainable way. The scientists have drawn the conclusions that the 'Green Revolution' with higher application of the input which has reached at a maximum level and is now showing with diminishing return of falling the dividends. Thus, a

natural equilibrium now needs to be strike a balance at all the cost for the property and life. Now it has becomes imperative to have an obvious choice for that would be relatively relevant in the current scenario; when all these agro-chemicals which are manufactured from the fossil fuel which is not renewable and are steady diminishing. It may also lead to higher cast in terms of the foreign exchange in the future. The study is meant to contribute an understanding of the actual and potential role of organic farming in the sustainable development of agriculture in Haryana. Agriculture is still the mainstay of the masses of Haryana and at the same time, is prey to the well-applauded chemical farming system of agriculture. The study is expected to pay the way for enhance the income of the farmers, particularly the small and marginal farmers; where due to small size of the land holdings, they receive meager income through their conventional farming system which have been practicing since numerous of years. Their low sizes of their land holdings are too small to survive a livelihood for their respective families in Haryana. Closely associated with problematic area, the carrying capacity of these smaller piece of land have been facing steady declining across the periods with another effects of sub-division of land to the next generations. It was, therefore felt very essential to promote organic farming so that the organic farming agricultural and horticultural produces may fetch remunerative prices in the neibouring urban areas.

Literature Review
Das, Surya & Tapan Kumar Pai (2020) have reviewed the growth and development of organic farming in India. The authors have given their optimistic views on the organic farming and viewed a healthy view toward healthy nation. In this paper, a focus has been given on the food quality and its safety that have gained steady growing attention from the consumers. Conventionally grown food grains have been immense adverse impact on the human and bovine health due to excessive presence of the pesticide residue, heavy metal, excessive nitrate, heavy hormones, antibiotic residues, and the genetically based modified organisms too. Madhavi *et al* (2021), have examined the food safety and the quality which has drawn an adequate attention towards the health of the consumers. There are numerous of studies which have observed an immense adverse health impact, because of excessive concentration of the higher levels of the pesticide residue, with excessive concentration of the nitrate, hormones, antibiotic residue, heavy metals, hormones, and also the modified organisms. In this context, various studies show that the grown foods are relatively less nutritious and have lesser quantum of the protective antioxidants in the food items. The farming practices with the chemical pesticides, herbicide and chemical derived fertilizers have an adverse impact on the human health. Yadav, S.K *et al* (2013), the authors examines the post-independence scenario of the agriculture under the green revolution, where the HYVs, assured irrigation and high dose of chemical fertilizers have been using to increase the agricultural production and the productivity under the innovative agricultural technology. No doubt there is a steady growth in food grain manifolds, but had a unhealthy impact on the health of the people, belonged to different strata of society. This innovative agricultural technology has led food surplus; by giving its significant impacts to deteriorate the environment, soil health, pesticide toxicity, and agricultural output and its sustainability. Agricultural

Scientists and the policy makers are reassessing agricultural practices which dependent on excessively on biological inputs rather than making more heavy usage of the chemical based fertilizers and the pesticides. In order to address this problem, the organic farming is an alternative farming practices which is fully capable to provide qualitative food without adversely affecting the health of the soil and prevailing local environment. It is therefore, it becomes imperative to promote the large-scale organic farming to feed the large size of the population. Setboonsarang, S & F.E. Gregorio (2017) have highlighted the role of organic farming in terms of achieving the sustainability in the production and the productivity in the agricultural produce and the vegetable in the current growing contaminated scenario. The authors have suggested some of the strategies which are to be applied to achieve the target of the long terms sustainable in accordance with prevailing socio-economic and the physiographic conditions. M. Manjula & P. Indira Devi (2021) have examines the state policy on the 'Organic farming' has been supported by the central and as well as the state governments in India since the year 2005. The shift in the focus of the policy from the basis of the conventional chemical-input derived farming to the "*organic farming*" emerged as a better response in terms of ecological sustainability relating to farming practices by the Indian farmers. It is disheartening to note that the organic farming area coverage is less than 2 per cent of the total net sown under the organic farming in the country. It is therefore, there is an ample scope to shift from chemical fertilizer based farming to the organic farming. Bansal & Mamta (2017) According to authors the Organic farming is now recognized as the best alternative to the conventional type of the agricultural practices where the agricultural practices provides a best quality of food grain without any having harmful effect to the health of the soils, environment and the human life too. It assists a safeguard in terms of the long-term sustainability of the soil fertility by maintaining the organic matters and humus levels high, encouraging the soil relating biological activities activate all the times. In organic farming, the pests, weeds are controlled under the process of biological control rather than chemical control. The crops relating diseases are controlled by the crop rotations, crop rotation, natural predators, organic manure, and resistant varieties and minimize the thermal, biological and chemical usages Aniruddh Kumar (2017) has reviewed the Indian agriculture and the crisis, faced by the farmers and the food grain consumers. Further, aiming at addressing the chemical fertilizer based crops and its side effects; Dr. Kumar has suggested the 'Organic Farming' rather than fully depend upon the conventional farming to address this agrarian crisis. The author has highlighted the problems of the farmers, mainly of the indebtedness and the lending the loan from the Priority Sector.

Accordingly, this study is hopefully, identified the reasons for the adoption of organic farming practices as well as its extent of adoption in Haryana.

Research Objective
The research objective of the study is to recognize the factors driving the adoption of organic farming practices along with its extent in Haryana.

Research Methods and Materials
The study uses an exploratory research design. The research type is qualitative and quantitative type of research. The data are collected mainly through the combination of primary and secondary sources.

The methodology applied in the study, which has included the selection of study area, sampling design, method of data collection, period of the study and tools used to analyses and interpret the information and data collected from the selected farmers during the field survey. There were 560 respondents which have been taken as sample respondents from the two districts from each zone and one block from each district, by selecting the two villages from each block. There were total 560 numbers of the respondents which have represented the whole Haryana state in terms of practicing the organic and non-organic types of the agriculture by the farmers. The selection of block has done on the random basis. All the municipal councils and committees; belonged to the sample districts have included. There were 560 sample respondents which have selected from the local bodies and administered and particularly designed in accordance with the structured interview schedule uniformly for taking the first hand information. Multistage Sampling has been used to select the respondents. For analysing of data Factor analysis as well as Multiple Regression Analysis has been utilized.

Results and Discussion
To achieve the aforementioned objective, the data obtained from respondents is analyzed in the following manner:
EFA was the first step, applied to all statements contributing towards financial risk tolerance. "EFA is a decent way of ascertaining latent factors from an array of apparently significant variables. In a more general way, FA is a set of techniques, which by examining the correlation amid variables, lessens their number into fewer factors, which elucidate much of the original data, more economically.". "The essential premise when using FA must be ensured before executing the technique.
1. Metric data is required.
2. Sample size of respondent's > 4-5 times of the number of statements. Consequently, the size of sample respondents in the present study was 480 which is more than 4 to 5 times the number of statements.
3. Correlation must exist amid variables and that should be tested via the Barttlet test of sphericity. A significant correlation matrix ensures that the FA could be applied. Given that, Table 1 shows the significant value of the Bartlett test of sphericity i.e. .000 which ensures the exercise of FA.
4. Kaiser-Meyer- Olkin (KMO) statistics value > 0.5. Consequently, Table 1 displays the value of KMO statistics .890 which confirms the FA application".

Table 1: KMO and Bartlett's Test

KMO		.894
Bartlett's Test of Sphericity	Approx. Chi-Square	2745.417
	DF	559
	Sig.	.000

Source: Primary Data

The above-mentioned table shows the value of KMO (a measure of sample adequacy) is.894, which is more than its threshold limit of 0.5, and the chi-square is 2745.417 with DF 559, and sig. value 0.00, which is less than 0.05.

Communalities of all statements are shown in Table- 2

Table 2: Communalities

Institutional strategy for advancing organic farming	1.000	.919
Utilizing the media	1.000	.909
Politeness in the world	1.000	.851
Propensity for innovation	1.000	.850
Financial incentives	1.000	.739
Size of Family	1.000	.818
Type of family	1.000	.958
Employment	1.000	.768
Provider of income	1.000	.811
Age	1.000	.830
House kind	1.000	.809
Yearly income	1.000	.863
Education	1.000	.832
Agricultural Power	1.000	.829
Experience with organic farming	1.000	.908
Cropping vigor	1.000	.782
Possession of farm implements	1.000	.817
Farm size	1.000	.823
Accessibility to irrigation systems	1.000	.893
Market potential	1.000	.921
Extraction Method: Principal Component Analysis		

Source: Primary Data

"Communality assesses the presence of variance in a particular variable that can be explained by all of the factors together and can be taken as the indicator's reliability".

According to the aforementioned Table 2, all values are more than. 70 indicate that no variables in the study should be removed.

Table 3: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1.	7.767	35.306	35.306	7.767	35.306	35.306	4.647	21.123	21.123
2.	3.771	17.140	52.447	3.771	17.140	52.447	4.108	18.673	39.795
3.	2.810	12.772	65.219	2.810	12.772	65.219	3.363	15.286	55.082
4.	2.389	10.861	76.080						
5.	1.913	8.696	84.776						
6.	.430	1.953	86.730						
7.	.379	1.724	88.454						
8.	.333	1.511	89.965						
9.	.315	1.432	91.397						
10.	.262	1.189	92.586						
11.	.233	1.058	93.644						
12.	.226	1.026	94.670						
13.	.199	.903	95.572						
14.	.177	.804	96.377						
15.	.173	.784	97.161						
16.	.139	.633	97.794						
17.	.127	.577	98.371						
18.	.118	.538	98.909						
19.	.089	.405	99.315						
20.	.063	.287	99.601						
21.	.054	.247	99.848						
22.	.033	.152	100.000						
Extraction Method: Principal Component Analysis.									

Source: Primary Data

Eigen Value measures a factor's explanatory power over variables. As a consequence, for 21 statements, 3 factors were maintained, accounting for 65.219 percent of the total variation. According to the above table, the first factor explains 35.306 percent of the variance, the second 17.140 percent and the third 12.772 percent of the variance Table-3.

Statements	Component		
	1	2	3
Institutional strategy for advancing organic farming	.954		
Utilizing the media	.934		
Politeness in the world	.922		
Propensity for innovation	.918		

Financial incentives	.915		
Size of Family		.909	
Type of family		.892	
Employment		.892	
Provider of income		.862	
Age		.855	
House kind		.832	
Yearly income		.820	
Education		.821	
Agricultural Power			.867
Experience with organic farming			.834
Cropping vigor			.831
Possession of farm implements			.821
Farm size			.816
Accessibility to irrigation systems			.800
Market potential			.793
Institutional strategy for advancing organic farming			.734

Source: Primary Data

The Rotated Factor Matrix is shown in Table 4 (Principal Component Method with varimax rotation). Malhotra and Sidhu (2007) state that the minimal factor loading for a statement to be in a factor must be more than 0.40.

Summary of Factor naming, Statements, Factor loading and Cronbach's Alpha are shown in Table 5.

Table 5: Factor Naming, Statements, Factor Loading and Cronbach's Alpha

Factor No-	Name of the Factor	Statements/ Variables	Factor Loadings	Cronbach's Alpha
1.	Stimulators	Institutional strategy for advancing organic farming	.954	.987
		Utilizing the media	.934	
		Politeness in the world	.922	
		Propensity for innovation	.918	
		Financial incentives	.915	
2.	Demographics	Size of Family	.909	.965
		Type of family	.892	
		Employment	.892	
		Provider of income	.862	
		Age	.855	
		House kind	.832	
		Yearly income	.820	
		Education	.821	
3.	Farm Economy	Agricultural Power	.867	.945
		Experience with organic farming	.834	
		Cropping vigor	.831	
		Possession of farm implements	.821	
		Farm size	.816	
		Accessibility to irrigation systems	.800	
		Market potential	.793	
		Institutional strategy for advancing organic farming	.734	

Source: Primary Data

Table-5 confirmed that all factor loading values are greater than 0.5. Cronbach's alpha is also high for all factors (>0.7). The above table shows that all of the factors are highly reliable. Five factors have been extracted throughout the EFA process and they are labelled following their nature.

The findings revealed the influencing factors of risk tolerance that Are-Stimulators, Farm Economy and Demographics. In accordance with the factor loading the most contributing factor/ reason behind adoption of organic farming is the stimulators and the least contributing factor towards organic farming is Farm Economy.

Now, in order to examine the extent of adoption of organic farming Multiple Regression has been utilized.

Regression Analysis

A statistical method for examining the relationship between one dependent variable and independent variables is called regression. Using known values for the independent variables to forecast the value of the single dependent variable is the goal of regression analysis. In the present study, dependent variable is financial risk tolerance and the independent variable is financial literacy. All the premises to apply regression analysis has been met specially the data is normal and metric in nature.

Table 6: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	DF1	DF2	Sig. F Change
1.	.87[a]	.739	.658	.773	.065	.456	1	801	.002
a. Predictors: (Constant), S, D, FE									
b. Dependent Variable: OF									
(Source- SPSS)									

The R value in the table illustrates, while Stimulators, Demographics and Farm Economy was utilized as an independent variable, a high degree of association .87 amid Stimulators, Demographics and Farm Economy and Organic farming was detected. Following column provides the R Square value. For the 1st model, .739 is the value which Stimulators, Demographics and Farm Economy accounts for 74 percent variation in Organic Farming.

Table 7: ANOVA

Model		Sum of Squares	DF	Mean Square	F	Sig.
1.	Regression	.181	1	.191	.340	.000[b]
	Residual	65.899	801	.987		
	Total	65.08	802			
a. Dependent Variable: OF						
b. Predictors: (Constant), S, D, FE						

Source: SPSS

Table 8 demonstrates that, the values of F-ratio for the model is .340. (Which shows significance). In other words, it implies that the independent variable has an impact over dependent variable in the current study i.e. it shows Stimulators, Demographics and Farm Economy have an impact over Organic farming.

Table 9: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1.	(Constant)	43.73	.568		8.626	.000
	S, D, FE	23.98	.410	.089	.450	.001
a. Dependent Variable: OF						

Source: SPSS

Table 10 demonstrates unstandardized value. A Positive value- signifies a direct association between the independent and dependent variables Negative value- signifies an inverse association between the independent and dependent variables.

Unstandardized value for Model in Table 10 is 23.98. These value specifies that if Stimulators, Demographics and Farm Economy is increases by 1 unit, Organic Farming increases by 23.98.

Table 10 illustrates values of β that explicates the amount of variation in S.D outcome in response to one S.D variation in the predictor.

Value of (β) = .089. These values specify that if Stimulators, Demographics and Farm Economy increases by 1 Standard Deviation, Organic Farming increases by .089.

Table 10: Residuals Statistics

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	3.07	3.19	3.13	.045	802
Residual	2.176	.931	.000	.668	802
Std. Predicted Value	1.235	1.375	.000	1.000	802
Std. Residual	1.722	1.404	.000	.764	802
a. Dependent Variable: OF					

Table 10 shows the residual statistics depicting predicted value and residual value with their standard values.

Conclusion
The findings of this objective revealed that there is significant impact of Stimulators, Demographics and Farm Economy on Organic Farming and shows a decent extent of adoption of organic farming in the study area.

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