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Entrepreneurial behaviour and socio economic analysis of mushroom growers in Karnataka

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ABSTRACT

Mushroom demand is showing tremendous growth worldwide due to its nutritional and medicinal qualities.In spite of huge potential and need to meet protein demand of large vegetarian population, India's progress in mushroom entrepreneurship is not that impressive. Entrepreneurial behaviour along with other personal and socio-psychological traits of entrepreneurs plays a prominent role in achieving success in any enterprise. In the present study conducted among the mushroom growing entrepreneurs across Karnataka State, an effort was made to understand influence of identified variables on farmers' entrepreneurial behaviour. Five attributes of farmers and their units, six attributes of socio-psychological traits and four extension variables were studied for investigating their effect on entrepreneurial behaviour of the respondents. Regression analysis showed that, academic qualification, cosmopolitanism, self-reliance, mass media participation, extension participation and training were significantly contributing to the entrepreneurial behaviour of the respondents.

Key words: Backward regression, Entrepreneurial behaviour, Multiple linear regression, Mushroom cultivation

Mushroom being one of the high quality protein rich vegetable is increasingly demanded worldwide for its other nutritional and medicinal properties too. Global mushroom industry has seen a rapid growth with the production increasing more than 25 fold during the last 35 years (from about 1 billion kg in 1978 to 27 billion kg in 2012) (Royse 2014). However, in spite of varied agro-climatic conditions together with abundant agriculture residues and inexpensive labour, the mushroom entrepreneurs in India have not made significant impact on the global mushroom scenario. With the conspicuous growth of mushroom production only in recent years, India produces more than 100 000 tonnes of fresh mushrooms. But, this contribution amounts to less than 1 per cent of global mushroom production (Wakchaure 2011). This is in spite of the well documented food and nutritional insecurity threats to very large section of Indian society (Bhavani *et al*. 2008, Gills *et al*. 2015, Kesavan 2015) for which a varied measures have been suggested (Gills *et al*. 2015, Sharma *et al*. 2015, Chauhan *et al*. 2016).

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The production of mushroom in Karnataka has been grossly underreported at 84 tonnes by Pandey *et al.* (2011); therefore, the authors of this paper estimated the annual production of mushroom in the State at 800 tonnes during 2014.

Studying and analysing entrepreneurial behaviour has been sufficiently emphasised because of its strong relationship with human capital and various outcomes associated with entrepreneurial behaviour (Baron and Kenny 1986, Cohen *et al.* 2003). To succeed in mushroom cultivation which is a non-traditional crop enterprise in the study area, the growers must possess desired entrepreneurial traits and knowledge about the crop enterprises. The success of entrepreneurs in mushroom cultivation is also contingent upon their socio economic characteristics. Hence, the present study was envisaged to analyse socio economic attributes of mushroom grower respondents and their influence on their entrepreneurial behaviour in the state of Karnataka.

MATERIALS AND METHODS

The study was conducted in Karnataka. The entrepreneurs growing any edible variety of mushroom, with an experience of taking at least one commercial crop, were selected for the study. The ICAR-Indian Institute of Horticultural Research, Biocentre of state department of horticulture and private spawn laboratories were contacted to know about the mushroom producing entrepreneurs in the state. In total, 60 respondents were identified for the investigation. The snowballing technique was also employed

to identify the mushroom growers in the state.

The respondents were classified into different categories based on a number of variables or attributes of entrepreneurs. For socioeconomic, psychological and extension variables, three categories (low, medium and high) were made based on mean and standard deviation. To measure the entrepreneurial behaviour as a continuous variable, scale developed by Shirur (2015) by following the normalized rank approach (Guilford 1954) was employed. Entrepreneurial behaviour is operationally defined as the combination of various socio-psychological, cognitive, effective and skill attributes of an individual entrepreneur to operate his enterprises successfully to earn higher economic returns. The socio economic traits of entrepreneurs were finalised based on the review of literature and suitability to mushroom entrepreneurship. Mushroom units maintained by the entrepreneurs were studied for different attributes like distance from the district headquarter, floor area of cropping rooms, major varieties grown, type of growing and type of enterprise. Descriptive statistical methods, linear regression and stepwise regression were applied to analyse the data and to draw the conclusions.

RESULTS AND DISCUSSION

General attributes of mushroom entrepreneurs

More than half of the mushroom units in the study area were situated at a distance of 20-50 km from the district headquarters (Table 1). Forty five per cent of the units were situated < 20 km away from district place. Only one unit was farther from the district by > 50 km. The concentration of mushroom units around cities and towns is guided by the demand for mushrooms from the urban population, availability of main raw materials (except straw/agriculture residue) required for mushroom cultivation in urban areas and difficulty of transporting this highly perishable and delicate product in the absence of a cool chain connectivity in rural areas. Nain *et al*. (2015) found that, mushroom cultivation is potential activity in the national capital region-Delhi with high government priority, ease of implementation, low risk expectation and good benefit cost ratio.

Floor area decides the quantum of mushroom produced by the unit. Most of the mushroom units (72 %) were very small to small with less than 1500 sq feet floor area. Around 23 per cent of the units were having the floor area between 1 500 to 15 000 sq feet. Only three units (5 %) had more than 15 000 sq feet floor area. The three large units were producing white button mushroom variety in the environment controlled facilities of different scale.

Majority (87%) were growing tropical mushroom varieties like oyster and milky mushrooms and the rest (13%) were involved in production of white button mushroom which is a temperate mushroom. The environment modulation to grow the temperate mushroom requires investment on industrial scale and incurs the huge operating expenses mostly on its electricity consumption which is supplied for mushroom cultivation at industrial rates.

Table 1 Distribution of mushroom growing units according to key attributes (N=60)

Attributes	Category	Percentage
Distance from district headquarters	< 20 km	45.00
	20-50 km	53.33
	>50 km	1.66
Floor area of cropping rooms	Small (< 1500 sq.ft.)	71.67
	Medium (1500-15000 sq.ft.)	23.33
	Large (>15000 sq.ft.)	5.00
Major varieties grown	Temperate mushroom (White button mushroom)	13.33
	Tropical mushroom (Oyster/Milky/ Paddy straw)	86.67
Type of growing	Seasonal	31.67
	Round the year	68.33
Type of enterprise	Sole	18.33
	Major	36.64
	Subsidiary	45.00
Age of the entrepreneur	Young (< 35 years)	48.33
	Middle (35-50 years)	36.67
	Old (>50 years)	15.00
Gender of the entrepreneur	Male	75.00
	Female	25.00
Academic qualification of the entrepreneur	Illiterate / Functionally literate	0.00
	Primary school	1.66
	High school	15.00
	PUC/ Diploma	31.67
	Graduation	36.67
	Post-graduation and above	15.00
Family size of the entrepreneur	Small (< 4 members)	18.33
	Medium (4-6 members)	58.34
	Large (> 6 members)	23.33
Experience in mushroom entrepreneurship	< 2 years	55.00
	2-5 years	33.33
	> 5 years	11.67

Since, the tropical mushroom varieties are suitable to the climatic conditions of the state, these varieties were grown by majority of growers in their units with temporary or permanent structures of different materials.

About 32% of the units in the study area opted for seasonal cultivation of a particular variety of mushroom. Whereas, in round the year cultivation, the entrepreneurs modify the micro environment to take up a particular variety of mushrooms (68% respondents). In most of the districts of the state, high temperature and low relative humidity are to be reversed to take up the mushroom cultivation of many varieties. Growers with low investment capacity resort to spraying of water on the floor and ceiling, hanging the wet gunny bags in cropping rooms or covering the roof with straw as an insulating material, etc. to bring down the temperature and to increase the relative humidity making compromise with the productivity.

A large number of respondents (45%) opted mushroom

cultivation as subsidiary avocation, 22 entrepreneurs (37%) as major and 11 respondents (18 %) adopted as, the sole occupation. Respondents opted as the sole enterprise concentrated only on mushroom enterprise to realize higher return from the fresh mushrooms, selling the spent mushroom substrate, selling value added products of mushrooms and offering training to others, etc.

Personal variables of mushroom entrepreneurs

The respondents' personal characteristics were analysed with respect to their age, gender, academic qualification, family size and their experience in mushroom cultivation. Table 1 revealed that nearly half of the respondents were young, followed by middle aged (37%) and old aged people (15%). Bhagyalaxmi *et al*. (2003), Rana *et al*. (2014) and Singh *et al*. (2015) have reported that on an average the entrepreneurs in other agri-businesses are either in the middle or old age category.

It is worthwhile to note that young aged people have higher probability of considering mushroom enterprise as an economic activity. Hence, the enterprises like mushroom cultivation practiced well by the rural youth shaving higher academic qualifications.Chahal and Ponnusamy (2014) reported that mushroom rearing is a desired area of specialisation for women entrepreneurs under the central sector scheme on agri-clinics and agri-business centres.

Unlike other agri-businesses, 25% of mushroom enterprises in the study area were run by female entrepreneurs. Women friendly cultivation technologies of oyster and milky mushrooms may be the catalyzing factors behind sizeable number of women entrepreneurs. Singh *et al.* (2013) found that oyster mushroom cultivation is an economically profitable activity for women SHGs in difficult and remote districts of Uttarakhand. The B:C ratio under expected yield is quite remunerative. Therefore, the role of women folk in economic activities like mushroom cultivation should be supported by the institutional support in the form of inputs, financial assistance and marketing linkages.

With respect to the academic qualification of the respondents, over half of the respondents were having either a graduate or a post graduate degree indicating that, higher academic qualification is a precursor for mushroom entrepreneurship. On the other hand, farmers in the study area engaged in other agri-businesses possess lower level of academic qualifications (Rana *et al*. 2014, Singh *et al*. 2015). Entrepreneurs with higher level of such qualifications can easily understand the technical aspects of mushroom rearing. Farmers with lesser academic qualification may perceive difficulty in understanding the science and technology behind various operations like, spawn production, environment moderation, pest and disease management, appropriate crop growing practices, maintenance of hygiene etc. which are typical to mushroom entrepreneurship.

On the family size, majority (58%) belonged to medium sized families, followed by large and small families. Large and medium sized families are an added advantage, as it complements by supplying the labour and managerial support to the enterprise of the family. This enterprise demands sharing responsibilities on managerial and labour aspects in the family.

Majority (55%) of respondents were having less than two years of experience about mushroom cultivation. Another 23% respondents were having 2-5 years of experience and remaining (12%) were having more than five years of experience in mushroom rearing. These results are in contradiction to the ones reported by Solanki *et al.* (2003) and Singh *et al*. (2015) that, majority of farmers had long experience indicating higher attrition rate of growers in mushroom enterprise.

Socio-economic and psychological attributes

The socio-economic and psychological attributes of the mushroom entrepreneurs were analysed and the results are presented in Table 2. The land holding was less than 2 ha for majority (70%) of the respondents. Only 3.3% were large farmers with more than 10 ha land. These findings once again confirm that farmers with land holding lacking the potential to generate complete livelihood have higher tendency to supplement their income through diversified activities like mushroom growing.

With respect to cosmopolitanism (supportive to inputs and output marketing), deferred gratification (delayed expectation of returns and business break-even point) and competition orientation, maximum number of respondents falls under medium category but in varying proportions. With respect to self-reliance, majority (60%) were highly self-reliant (confident and having self-belief) followed by medium (23%) and low self-reliant (17%). On the credit orientation equal number of respondents fell under low, medium and high category (33.3% each) because most of the oyster mushroom and milky mushroom growers were not the beneficiary of any loan or subsidy from the financial institutions or from the State Department of Horticulture. Hence, the results indicate mixed response of respondents towards the credit orientation. Govinda Gowda and Narayana Gowda (2006) reported high level of deferred gratification among majority of the grape growers in Karnataka.

Extension variables

Four extension variables; mass media participation, extension participation, extension contact and participation in training were considered for this analysis and the results are presented in Table 2. Majority of the respondents were having medium level of mass media participation (48%) and extension contact (57%) followed by high level with 30 and 25% respondents, respectively. The remaining were having low mass media participation (22%) and low extension contact (18%). Ramanna *et al*. (2000) made similar observations as observed in the present study on extension contact.

Among the respondents, 41% and 40% respectively had low extension participation and low participation in training on mushroom cultivation. Around 33 and 38%

Table 2 Distribution of respondents according to key attributes (per cent values)

Attributes	Criteria		
	Low#	Medium#	High#
Land holding@	70.00	26.66	3.33
Cosmopolitanisms	26.67	48.33	25.00
Self-reliance	16.67	23.33	60.00
Deferred gratification	23.33	45.00	31.67
Competition orientation	31.67	36.67	31.67
Credit orientation	33.33	33.33	33.33
Mass media participation	21.67	48.33	30.00
Extension contact	18.33	56.67	25.00
Extension participation	41.67	33.33	25.00
Participation in training	40.00	38.33	21.67

@: Low represents marginal and small (<2 ha), medium (2-10 ha) and large (>10 ha)

#: Based on total sample size of 60

of the entrepreneurs were categorized as having medium extension participation and medium participation level in trainings. Rokonuzzamana (2013) also reported similar results on level of respondents participation in trainings related to income generating activities.

Medium to high level of mass media participation was on the expected line as majority of the respondents were having high academic qualifications. However, the low extension participation among 42% respondents and medium extension participation among 33% respondents suggests that even with high academic qualification level, the mushroom entrepreneurs were less inclined to attend the extension events. Lesser number of extension activities organized directly for mushroom entrepreneurs or inability of these programs to address the needs of existing enterprises might be the reason for it.

Linear multiple regression between studied variables and entrepreneurial behaviour

The linear multiple regression analysis done to test the effect of independent variables on entrepreneurial behaviour showed that academic qualification was showing significant contribution at 5% level of significance and mass media participation and extension participation were contributing at 10% level of significance to affect entrepreneurial behaviour of mushroom growers (Table 3). The R^2 of regression model suggested that all the variables together explained 63% of variability observed in the entrepreneurial behaviour.

Backward regression analysis of studied variables with the entrepreneurial behaviour

Considering the large number of variables showing non-significant contribution in the linear multiple regression and taking clue from the inter-correlation of these variables (Table 5), backward regression analysis was done to eliminate the least contributing variables in each step to identify the highest contributing variables. The results of backward regression analysis (Table 4) showed that in addition to academic qualification, mass media participation and extension participation, other variables, viz. cosmopolitanisms, self-reliance and training were also significantly contributing to the entrepreneurial behaviour of the respondents.

Table 3 Linear multiple regression showing the relationship between independent variables and the entrepreneurial behaviour (N=60)

Variables	Parameter estimate	Standard Error	t Value	Pr > |t|
Intercept	14.089	12.134	1.160	0.252
Age	0.068	0.121	0.560	0.580
Gender	3.152	2.763	1.140	0.261
Academic qualification	2.741	1.236	2.220	0.032**
Members	-0.495	0.499	-0.990	0.328
Landholding	0.114	0.155	0.740	0.465
Cosmopolitanisms	0.493	0.303	1.630	0.112
Self-reliance	1.897	1.506	1.260	0.215
Deferred gratification	0.255	0.288	0.890	0.381
Competition orientation	-0.038	0.415	-0.090	0.927
Credit orientation	-0.029	0.326	-0.090	0.929
Mass media participation	0.440	0.246	1.790	0.081*
Extension contact	-0.175	0.445	-0.390	0.697
Extension participation	0.798	0.451	1.770	0.085*
Training	0.319	0.289	1.100	0.277
Size (Floor area of cropping)	0.000	0.000	-0.450	0.659
Experience	-0.257	0.279	-0.920	0.362
Major varieties grown	0.448	3.927	0.110	0.910
Type of growing	1.292	2.477	0.520	0.605

** Significant at 5 per cent level, * Significant at 10 per cent level, R^2=0.6304, F value: 3.88

Table 4 Backward regression analysis of independent variables with the entrepreneurial behaviour (N=60)

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	18.57345	7.62971	291.9293	5.93	0.0183
Academic qualification	2.6859	1.10983	288.52138	5.86	0.019
Cosmopolitanisms	0.51343	0.25249	203.69059	4.13	0.047
Self-reliance	2.94457	1.1629	315.84131	6.41	0.0143
Mass media participation	0.4066	0.17083	279.06853	5.67	0.0209
Extension participation	0.65685	0.37388	152.04318	3.09	0.0847
Training	0.40738	0.23271	150.95995	3.06	0.0858

R^2= 0.5493, F value: 13.16

Table 5 Correlation matrix showing the interrelationship among different variables selected for the study (n=60)

No	Variables	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14	V15	V16	V17	V18
V1	Age	1																	
V2	Gender	-.037	1																
V3	Acad. quali.	.104	.128	1															
V4	Family size	.094	.189	-.010	1														
V5	Land holding	.152	-.008	.068	-.042	1													
V6	Cosmopolite	-.080	.023	.201	-.144	.106	1												
V7	Self-reliance	.016	.229	.293*	-.156	.105	.129	1											
V8	Def. grat.	.011	-.055	.291*	-.116	.251	.139	.352**	1										
V9	Comp. ori.	.200	-.161	.210	.165	.295*	.242	.236	.236	1									
V10	Credit ori.	-.092	.012	.107	.074	.117	.159	.081	.084	.190	1								
V11	Mass Med	.161	.013	.399**	.011	-.095	.311*	.164	.304*	.186	.198	1							
V12	Ext. Cont	.371**	-.188	.192	.067	.267*	.319*	.034	.207	.393**	.298*	.583**	1						
V13	Ext. Part	.232	-.192	.024	-.034	.256*	-.028	.198	.017	.129	.139	.017	.194	1					
V14	Training	.363**	.090	.383**	-.065	.341**	.123	.269*	.158	.266*	.208	.179	.273*	.316*	1				
V15	Size	.294*	.184	.110	-.241	.270*	.178	.148	.112	.099	.110	.069	.213	-.094	.318*	1			
V16	Experience	.486**	.143	.150	.315*	-.033	-.001	-.023	-.178	.100	-.071	.088	.183	.072	.156	-.034	1		
V17	Major var	.090	.113	.107	.022	.114	.003	.222	.024	-.002	.257*	.143	.317*	.031	.258*	.498**	.052	1	
V18	Type_gro	-.170	.021	.044	.018	-.054	.265*	-.017	.206	.126	.147	.297*	.161	-.197	.116	.131	-.070	.162	1

** Correlation is significant at 0.01 level (2-tailed), *Correlation is significant at 0.05 level (2-tailed)

CONCLUSIONS AND POLICY IMPLICATIONS

Mushroom cultivation is mostly practiced around cities in Karnataka. Mushroom entrepreneurship largely an urban or semi-urban affair, if promoted in the rural areas will achieve multiple benefits like utilizing surplus agriculture residue for producing protein rich food, livelihood security and economic development among rural people, employment generation and addressing malnutrition by increased mushroom consumption in rural areas.

The study revealed that more than half of the respondents were having either graduate or a post-graduate degree. Higher tendency of academically well qualified youth opting to undertake mushroom cultivation in the study area makes this activity as one of the preferred options to be targeted on priority basis under the Central Government's "Attracting and Retaining Youths in Agriculture (ARYA)" scheme. Similarly one-fourth mushroom enterprises among the studied respondents, being run by the women makes this venture an appropriate tool for better implementing various women development schemes by the Karnataka State Women's Development Corporation, Government of Karnataka. Incidentally, the cultivation of *Pleurotus*, *Calocybe* and *Macrocybe* mushroom is relatively easy for cultivation and requires less investment as compared to white button mushroom and is a well-suited options for the women entrepreneurs.

Higher attrition rate of mushroom cultivators necessitates training programmes on mushroom cultivation technology that should address the technological needs of growers with higher emphasis on hands on training component. It is pertinent to ensure that the extension events are organized in line with the needs of the stake holders and not just for funds utilization or mandatory organization of events etc. The study showed that, in addition to academic qualification, mass media participation and extension participation, other variables, viz. cosmopolitanisms, self-reliance and training were also significantly contributing to the entrepreneurial behaviour of the respondents. Lack of quality in training programmes lead to unsuccessful start-ups as well as exploitation of farmers by the ill-qualified consultants. ICAR-Directorate of Mushroom Research, Solan may collaborate with ICAR-Indian Institute of Horticultural Research (IIHR), Bangaluru for developing mushroom technologies for the state of Karnataka and the nearby states. It will help ICAR-IIHR to support mushroom start-ups in their state of the art Agri-Business Incubator which has many success stories or mentoring start-ups for running successful agri-businesses.

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