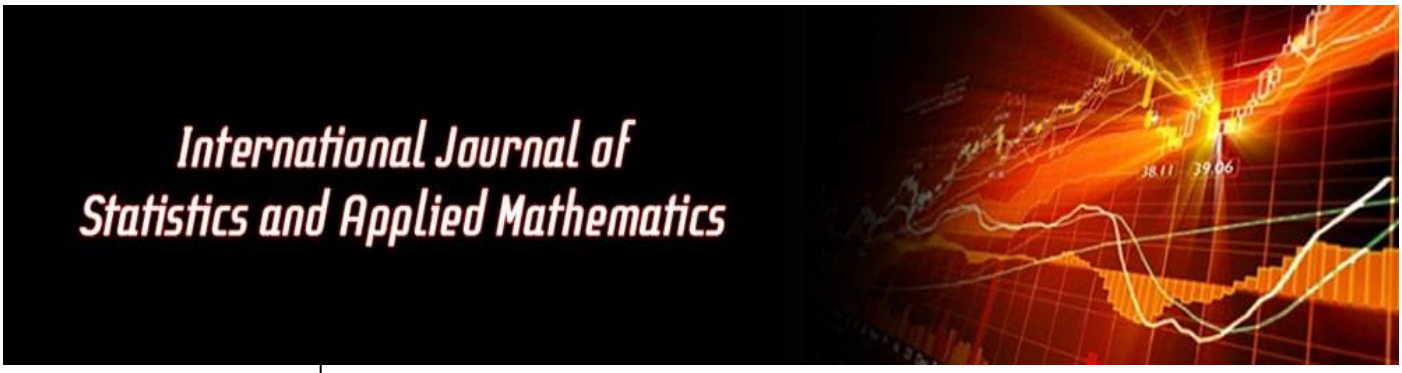

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Impact of front line demonstration on yield and economics of mushroom

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Abstract
Mushroom production is remunerative enterprise to enhance the socio-economic condition of the farmers. It is selected as ODOP for Gaya district. Many Farmers/Farm women & Rural Youths engaged in production of other than button mushroom like Oyster & other species of Mushroom having no or little demand in the market, hence, forced to sale at low rate. So, FLD was conducted by krishi Vigyan Kendra, Manpur, Gaya (during the year 2019-20 & 2020-21) in which Button mushroom kit was given among 134 beneficiaries under FLD. Prior to conducting FLD, the beneficiaries were made abreast with scientific production methods of mushroom through group meeting and training under FLD and 100 of them were selected randomly. The data were collected through questionnaire developed related to mushroom production and analysis was done with suitable statistics like Percentage increase yield, Extension gap, Potential gap, Technology index and Respondent satisfaction index to know the impact of FLD. The result revealed that technologies given in FLD gave more yield by 50.7 percent over control. It showed that there was technology gap (TG), extension gap and technology index of 0.9 kg/bag, 0.85 kg/bag and 32.0 percent respectively. The economic performance of Button mushroom under FLD showed an extra return of Rs. 139 /bag with extra cost of cultivation of Rs. 23/bag with BC ratio of 3.72 for demonstration and 2.46 for Local Check. 59.00 percent of them found to had high satisfaction index (RSI) towards Front Line Demonstration.

Keywords: FLD, yield, economics, technology gap, extension gap, technology index, and respondent satisfaction index

Introduction
The edible fungi are known as Mushrooms which may be cultivated or collected from the nature to fetch income. It is consumed either afresh or processed as pickles, marmalade, dry mushroom, mushroom powder to be used in bread industry, biscuit industry, etc to add nutrition. It is highly remunerative enterprise when cultivated on commercial basis. The life of mushroom is very short so it gives quick return. Mushroom production is done solely in controlled conditions by managing temperature and humidity. It requires dark environment throughout its life span for its normal growth so done in closed environment i.e. inside rooms. Nutritional content of mushroom is so high that it is considered a complete health food to all age groups. It is a cholesterol free low calorie food containing considerable amount of high quality protein, carbohydrates, good fats, fiber, sodium, potassium, magnesium, calcium, phosphorous, iron, etc. It also contains many vitamins like thiamine, riboflavin, niacin, etc. The ratio of potassium-sodium found is 10:1 so it also helps in controlling blood pressure. There are so many species of mushrooms in nature cultivated or collected in different parts of world but only eight of them are important. In our country, only four types of them i.e. white button, oyster, milky and paddy straw mushroom are most popular and being cultivated on commercial basis.

Of these four species, white button mushroom is most popular and account for about 90% of the country's total production. As per the National Horticulture Board, in 2021-22, Bihar produced 10.82 per cent of the total mushrooms produced in the country (28000 tonnes). Mushroom farming is such a component of the farming system that do not compete with other crops. The negative effect of global warming and change in climate was quite clear on the yield of all crops. Due to this, the farmers were losing their interest in farming. So, it was need of the time to motivate more and more farmers as well as rural youths to enhance their income by adopting mushroom production. Seeing the demand and consumption of mushroom in Gaya district of Bihar, Mushroom has been selected as One District One product (ODOP) for Gaya district by Govt. of Bihar. So, the objective of the present study was to create awareness among the people through Frontline demonstration (FLD) for production of more and more button mushroom to increase income of the people as well as to meet its demand in the district and the state.

Material and Methods

Studied by Krishi Vigyan Kendra, Manpur, Gaya in those villages of Gaya district where button mushroom kits were distributed (during the year 2019-20 & 2020-21) among 134 beneficiaries under FLD. Prior to conducting FLD, the beneficiaries were given with scientific production methods of white button mushroom through group meeting and training under FLD and 100 of them were selected randomly for the present study. Time to time, monitoring were done by the KVK experts. During the visit, valuable suggestions were also given in order to fetch maximum yield. Yield of the front line demonstrations and potential yield of the mushroom was compared to estimate the yield gaps and further tabulated as technology and extension gaps (Hiremath and Nagaraju, 2009) [3]. Time to time, the FLD were monitored and valuable suggestions were also given by the KVK experts. Data collected with the help pre - structured interview schedule. Applying different statistical methods, the obtained data were viewed and analyzed to draw the results. Samui *et al*. (2000) [9] developed formulae were used to calculate the technology gap, extension gap and technology index.

$$\text{Percent increase yield} = \frac{\text{Demonstration yield- local check yield}}{\text{Local check yield}} \times 100$$

Extension gap (kg/bag) = Demonstration yield (kg/bag) – Yield of local check (kg/bag).

Technology gap (kg/bag) = Potential yield (kg/bag) – Demonstration yield (kg/bag).

$$\text{Technology index (\%)} = \frac{\text{Potential yield – Demonstration yield}}{\text{Potential yield}} \times 100$$

To kwon the performance of technology demonstrated, satisfaction level of respondent respondents was also assessed. The respondents were interviewed with the help of a pre-tested interview schedule. At the end it was calculated as below.

$$\text{Respondent satisfaction index} = \frac{\text{Individual score obtained}}{\text{Maximum score possible}} \times 100.$$

The economic parameters were calculated on the basis of prevailing market prices of inputs.

Results and Discussions

Yield analysis:

The yield data of mushroom with other parameters for two years i.e. 2019-20 & 2020-21, under FLD programme, has been presented in table- 1. This table illustrates that for demonstrated technology, the mean yield of mushroom was higher (2.6 kg/bag) as compared to 1.8 kg/bag for local check. Kashyap, S. and Singh, M. (2021) [4] also found the similar result. The demonstrated technologies resulted in an increase in yield by 50.72 percent over the Local Check.

Table- 1. Yield performance of white button mushroom under Front Line Demonstration

Year	Item	Species	No. of Beneficiaries	Yield (kg/bag)		% increase over Local check	Technology Gap (kg/bag)	Extension Gap (kg/bag)	Technology Index (%)
				Demⁿ.	Local check				
2019-20	Mushroom	Button Mushroom	84	3.1	2.0	55.00	0.40	1.10	35.5
2020-21			50	2.1	1.5	46.43	1.40	0.60	28.6
Mean			134	2.6	1.8	50.72	0.90	0.85	32.0

It was revealed that the average yield of mushroom during the year 2019-20 for demonstrated technology and local check were 3.1 kg/bag and 2.0 kg/bag respectively while during 2020-21 it was 2.1 kg/bag and 1.5 kg/bag . Hence the mean yield of mushroom of demonstration and local check were 2.6 kg/bag and 1.8 with increase of 50.72 percent respectively. This result coincides with the result of Kushwaha, *et al.* (2016) [7] The gap between demonstrated technology and local check termed as extension gap presented through table-1 reveals that there was mean extension gap of 0.85 kg/bag which may be due to unfavorable weather factors prevailing during mushroom growth and low quality inputs. This lead to poor yield. It was quite obvious from the table that the Mean technology gap found to be 0.90 kg/bag. It was need to motivate the farmers/ rural youths about potential of white button mushroom production so that the extension gap is minimized. The reason for realizing technology gap may be due to low yield and demand of species of mushroom other than button mushroom. Therefore, species wise and demand wise recommendation needed to lower the technology gap. Technology index is showing the possibility of the identified technology at the respondent's level. The table furnished that the basic principle is more the value of technology index, less is the possibility of the technology with respect to button mushroom production technologies. It illustrates that during the years 2019-20 and 2020-21 the technology index were respectively 35.50 percent and 28.6 percent with the mean technology index of 32.0 percent. Hiremath and Nagaraju (2009) [3]; Kushwaha, *et al.* (2016) [7]; Kumar, *et al* (2020) [5] also found the same type of result.

Economic performance

The table-2 indicating the economic performance of button mushroom under FLD.

Table 2: Economic performance of button mushroom

Year	Cost of cultivation (Rs/bag)		Gross Return (Rs/bag)		Net Return (Rs/bag)		Additional cost of cultivation (Rs/bag)	Additioal Return (Rs/bag)	BC Ratio	
	Dem^{n}	Local check	Dem^{n}	Local check	Dem^{n}.	Local check			Dem^{n}	Local check
2019-20	85.00	60.00	310.00	160.00	225.00	100.00	25.00	125.00	3.6	2.7
2020-21	81.00	60.00	308.00	135.00	227.00	75.00	21.00	152.00	3.8	2.3
Mean	83.00	60.00	309.00	148.00	226.00	88.00	23.00	139.00	3.72	2.46

The data in the table indicates that during 2019-20 and 2020-21, the cost of cultivation per bag was higher as Rs. 85.00 and Rs. 81.00 respectively with mean value of Rs. 83.00/bag for demonstrated technology whereas cost involved in local check during both the years were Rs. 60.00 having mean value of Rs. 60.00/bag indicating lower than the demonstrated technologies. Similarly, the gross return in for the years 2019-20 and 2020-21 found to be Rs. 310.00/bag and Rs. 308.00/bag whereas Rs. 160.00/bag and Rs. 135.00/bag respectively for demonstration and local check. But demonstrated plots elicited higher mean gross returns (Rs. 309.00/bag) in comparison to local check (Rs. 148.00/bag). The mean net returns found higher for demonstration of Rs. 226.00/bag than for local check of Rs. 88.00/bag. It was also furnished that with little additional mean cost of cultivation of Rs. 23.00/bag there was higher additional return of Rs. 139.00/bag. The table also point outs higher benefit:cost ratio during both the years for demonstrated technologies and the mean value (3.72) found higher than local check (1.3). Similar result was reported by Hiremath and Nagaraju (2009) [3]; Verma *et al*. (2016) [12]; Raj *et al*. (2013) [8]; Suryavanshi *et al*. (2020) [11] and Kashyap, S. and singh, M. (2021) [4]

The data in table also indicates higher mean additional return of Rs. 139.00/bag as compared to mean additional cost of cultivation of Rs. 23.00/bag. This shows superiority in profitability and economic viability of mushroom demonstrated. Same type of result also reported by Kashyap, S. and singh, M. (2021) [4].

Satisfaction Level

Table 3: Farmers Satisfaction level about Front Line Demonstration on mushroom

Satisfaction Level	Frequency	Percentage
Low	13	13
Medium	28	28
High	59	59

The table-3 showing the respondent satisfaction index towards front line demonstration of mushroom. The data in the table showed that highest number of mushroom growers fall under most liked category showing high level of satisfaction index (59.00 percent) whereas only 28.00 percent and 13.00 percent of the respondents had medium and low level of respondent satisfaction index respectively about FLD on Mushroom. It was also found that majority of respondent farmers/ rural youths fall either under high or medium level of satisfaction level towards performance of technology demonstrated, hence, it indicates a stronger conviction in the frontline demonstrations which in turn would lead to easy and higher adoption of the technology demonstrated. Kumaran and Vijayaragavan (2005) [6] also reported the similar result.

Conclusions

From the data presented in the above tables, it could be inferred that Frontline demonstration has positive impact on yield, and hence, net profit from white button mushroom can be increased substantially as compared to other species due to high demand and remunerative price in the market. The yield of mushroom may be further increased if the white button mushroom is cultivated using scientific methods as recommended. Hence, there is need to disseminate recommended technologies of white button mushroom production through effective extension teaching methods like FLD.

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