

Original Research Article

Opinion of Students and Technical Staff about Agricultural Biotechnology in Jharkhand

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ABSTRACT

The impact of climatic variability on farming may threaten food security and livelihood activities. Agricultural biotechnology (genetically modified crops, tissue culture, marker assisted selection, etc.) has potential to meet food requirement of human population and cope up adverse impact of climate change. The Government has allowed cultivation of Bt Cotton in India. People are having different opinion about cultivation of genetically modified (GM) crops. There is apprehension from few people that GM crops may adversely affect human beings as well as animals. But few people are in favour of adoption of GM crops for enhancing productivity and human welfare. Knowledge about agricultural biotechnology especially GM crops is crucial for providing feedback regarding acceptance or rejection of the technology. The present study was contemplated to find out opinion of students and technical staff about agricultural biotechnology especially GM crops. Data was collected from 50 students of relevant disciplines and 50 technical staff of ICAR institutes and Birsa Agriculture University, Ranchi, Jharkhand. Students and technical staff were having favourable opinion about most of the statements of Agricultural Biotechnology. Eighty per cent students and forty per cent technical staff are in favour that Government should allow cultivation of GM crops at farmers' field for increasing production and productivity. Forty percent students and thirty percent technical staff respondents were in favour of labelling of GM food. Sixty per cent respondents of both categories stated that adoption of GM crops will lead to monopoly of private companies. The outcome of study will help in policy formulation about adoption of agricultural Biotechnology.

Keywords

Agricultural biotechnology, GM crops, Tissue culture, Attitude, Opinion

Introduction

Small and marginal farmers are susceptible to climatic vagaries. The impact of climatic variability on farming may threaten food security and livelihood activities. In this perspective, to meet food requirement of human population is a great challenge. Traditional crop breeding is unable to meet

this challenge. Agricultural biotechnology with its novel approaches may be helpful in meeting food as well as feed requirement. Agricultural biotechnology allows plant breeders to make precise genetic changes to impart beneficial traits to the crop plants through genetic engineering. Golden rice, golden mustard, pharma foods, new variety

of corn, sorghum, wheat and plants that resist viral pests, saline soils, etc. are being developed through biotechnology. The release and marketing of genetically modified (GM) foods have resulted in a public debate in many parts of the world. This debate is likely to continue, probably in the broader context of other uses of biotechnology (e.g. in human medicine, GM foods, etc.) and their consequences for human societies. Students and technical staff are of different opinion about uses of agricultural biotechnology, especially GM crops. In this context, there is need to study opinion of students and technical staff about agricultural biotechnology which will be helpful in government planning to meet food and feed requirement.

Materials and Methods

The study was carried out during 2016-17. The Likert method of summated rating (Likert's Technique, 1932) was used for measurement of opinion of respondents. Opinion and attitude are synonymously used in this paper. Attitude is the degree of positive or negative affect associated with some psychological object. According to Thurstone (1946), "Psychological object means any symbol, phrase, slogan, idea, person and institution towards which people can differ with respect to positive or negative affect". Attitude in this study was operationalized as the degree of positive or negative feeling of both categories of respondents (i.e. students and technical staff) towards agricultural biotechnology. Attitude scale developed by Yadav *et al.*, (2018) with little modification was used for measurement of opinion of students and technical staff about Agricultural Biotechnology which is mentioned in Table 1.

The responses were collected from 50 students and 50 technical staff in Jharkhand

on a five point continuum representing strongly agree, agree, undecided, disagree and strongly disagree with scores of 5, 4, 3, 2 and 1 for positive statements and vice-versa for negative statements. Respondents were selected purposively so that they will respond to questions related to Agricultural Biotechnology. The attitude score of each individual in students and technical staff categories was calculated by summing the scores obtained by him/ her on all the items. The attitude scores on this scale ranges from 20 to 100. The higher score indicated that respondent had more favourable attitude about agricultural biotechnology.

Results and Discussions

Fig. 1 and 2 depicted that both categories of respondents i.e. students and technical staff were having favourable opinion about most of the statements (items) of Agricultural Biotechnology. Both, students and technical staff showed favourable opinion (higher than 50 % level of favourableness) towards genes play an important role in controlling behaviour of an organism (item 1), DNA finger printing is useful technology in analysis of diversity at genome level (item 7), Less insecticide will be used in cultivation of Bt cotton (item 12), Cultivation of GM crops is not more technical in nature (item 15), Adoption of GM crops will not lead to monopoly of private companies (item 17), Biofertilizers (e.g. Azotobactor, Anabena, Rhizobium, VAM, etc) may improve soil health (item 18) and GM crops cultivator becomes innovative farmers for other fellow farmers (item no. 20). However, both categories of respondents expressed unfavourable opinion (higher or equal to 40 % level of unfavourableness) towards consumption of GM food may lead to deformation in human body system (item no. 6).

Table.1 Attitude scale

Sl. No	Attitude Statements	Categories of responses				
		SA	A	UN	DA	SD
1	Genes play an important role in controlling behaviour of an organism					
2	Economic impact of GM crops on Indian farmers' and society is positive					
3	Government should allow cultivation of GM crops (Bt brinjal, Bt soyabean, Bt paddy, Bt canola, etc.) at farmers field for increasing production and productivity of crops					
4	Cattle eating GM crops may develop complications such as premature deliveries, abortions, infertility and prolapsed uteruses					
5	Transgenic seed of mustard (produced through incorporation of bacterial gene) is not useful for farmers					
6	Consumption of GM food may lead to deformation in human body system					
7	DNA finger printing is useful technology in analysis of diversity at genome level					
8	Agricultural Biotechnology is driven by profit, not by scientific research					
9	Only educated farmers can adopt cultivation of GM crops					
10	GM food should not be labeled					
11	Farmers working in the field of GM crops are likely to have problems like itching, skin eruptions, red eyes, swollen faces, etc					
12	Less insecticide will be used in cultivation of Bt cotton					
13	The pollen of transgenic maize may kill beneficial insects in the field					
14	Virus free plants developed through meristem culture will be effective in managing viruses in commercial cultivation of crops					
15	Cultivation of GM crops is more technical in nature					
16	Biopesticides (e.g. Trichogramma, Trichoderma, NPV, etc.) are environment friendly technology					
17	Adoption of GM crops will lead to monopoly of private companies					
18	Biofertilizers (e.g. Azotobactor, Anabena, Rhizobium, VAM, etc) may improve soil health					
19	Genetically modified (GM) crops (e.g. Bt Cotton, Bt Brinjal, Bt Soybean, Bt Maize, Bt Canola, etc) may help in providing food security by increasing productivity of respective crops					
20	GM crops cultivator becomes innovative farmers for other fellow farmers					

Note: SA: Strongly Agree, A: Agree, UN: Undecided, DA: Disagree and SD: Strongly Disagree

Table.2 Relationship between profiles of students with their attitude about agricultural biotechnology

S.No.	Independant variables	Coefficient of correlation (r value)
1	Age	-.183
2	Sex	.771**
3	Family Background	.273
4	Training Experience	.092
5	Field Experience	.050
6	Membership in Society	-.378
7	Social Participation	.515*
8	Educational Qualification	.637*

*. Correlation is significant at the 0.05 level (2-tailed).

**.. Correlation is significant at the 0.01 level (2-tailed).

Table.3 Relationship between profiles of technical staff with their attitude about agricultural biotechnology

S.No.	Independant variable	Coefficient of correlation (r value)
1	Age	-.073
2	Sex	-.069
3	Family Background	-.363
4	Service length	-.113
5	Training Experience	-.303
6	Field Experience	-.679*
7	Membership in Society	-.527
8	Social Participation	.224
9	Educational Qualification	.182

*. Correlation is significant at the 0.05 level (2-tailed).

Fig.1 Item wise opinion of students about Agricultural Biotechnology

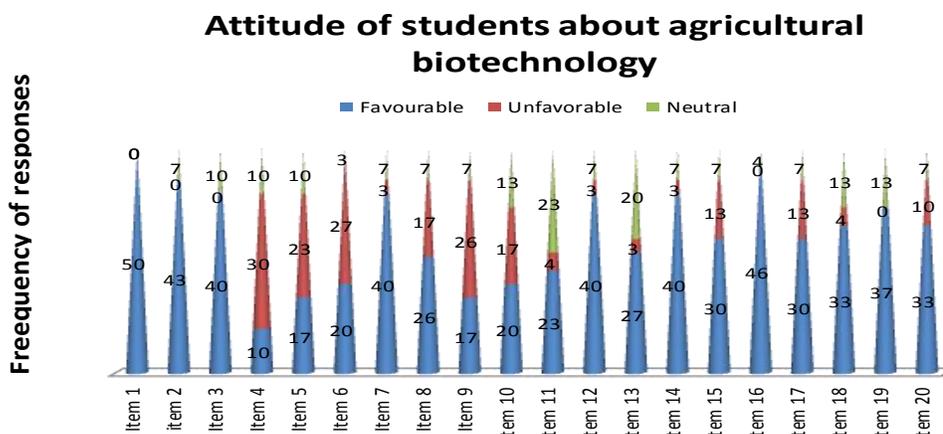


Fig.2 Item wise opinion of technical staff about Agricultural Biotechnology

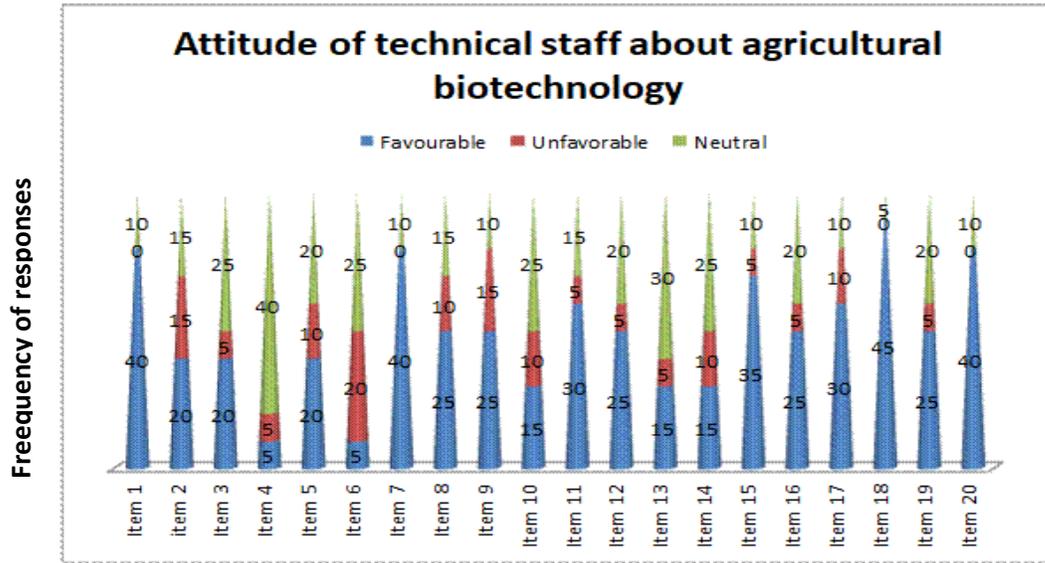


Fig.3 Students' opinion about Govt. should allow cultivation of GM crops at farmers' field

Fig.4 Opinion of technical staff about Govt. should allow cultivation of GM crops at farmers' field

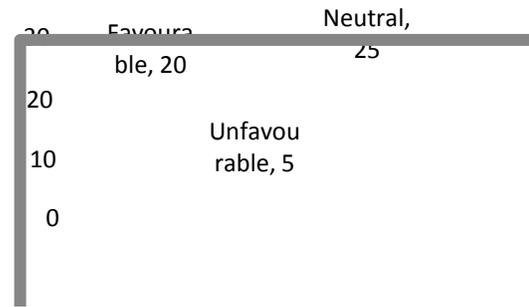
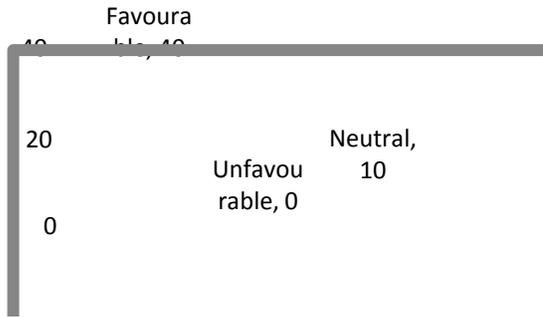


Fig.5 Students' opinion- GM food should be labelled

Fig.6 Opinion of technical staff - GM food should be labelled

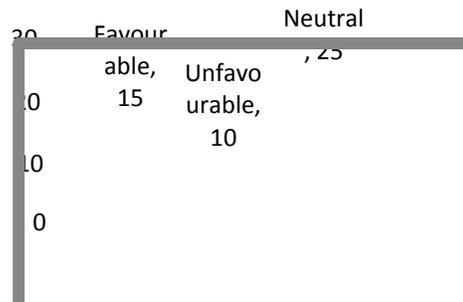
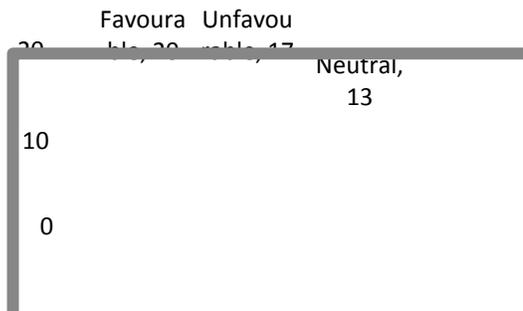


Fig.7 Students' opinion- Adoption of GM crops to monopoly of private companies

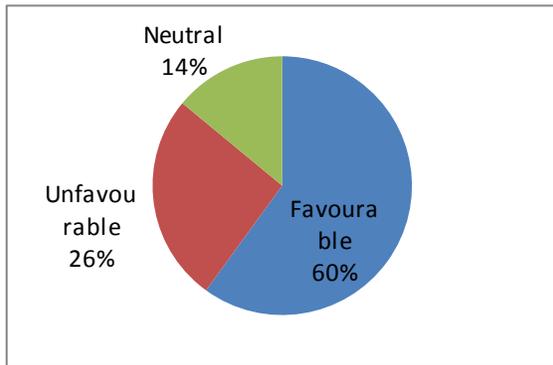


Fig.8 Opinion of technical staff - Adoption of will lead GM crops will lead to monopoly of private companies

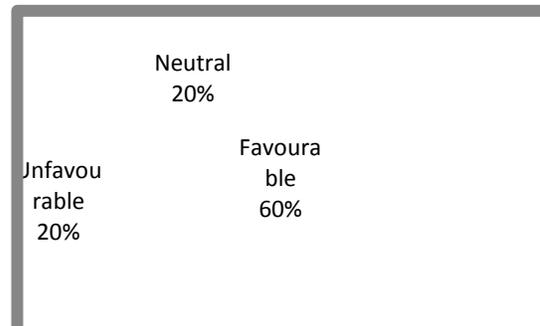


Fig. 3 & 4 indicated that 80 % students and 40 % technical staff are in favour that Government should allow cultivation of GM crops at farmers' field for increasing production and productivity. Both categories of respondents, students and technical staff desired for augmenting productivity which is possible through cultivation of GM crops.

students were non significantly correlated with their attitude regarding agricultural biotechnology. However, sex was significantly correlated at 1 % level of significance. Social participation as well as education of students were significantly correlated with their attitude at 5% level of significance.

Fig. 5 and 6 reflected opinion of students and technical staff about labelling of GM food. Forty percent students and thirty percent technical staff respondents were in favour of labelling of GM food. They advocated that GM food must be labelled so that consumers may distinguish GM and non-GM food and people will not use GM food unknowingly.

All interviewed female students were having M. Sc. Biotechnology degree. They expressed favourable attitude about importance and uses of agricultural biotechnology. Further, social participation and educational qualification of students brought favourable attitude among them towards agricultural biotechnology.

People were discussing regarding monopoly of private companies in dealing GM crops. Fig. 7 and 8 indicated that 60 % respondents of both categories stated that adoption of GM crops will lead to monopoly of private companies because most of the GM materials are in the hands of private companies. These companies may exploit farmers in the era of GM crops cultivation.

Table 3 indicated that age, sex, family background, service length, training experience, membership in society, social participation and education of technical staff were non significantly correlated with their attitude regarding agricultural biotechnology. These variables had no influence on opinion of technical staff about agricultural biotechnology. However, field experience was correlated at 5% level of significance. Most of the Technical staff are doing field oriented job. Their attitude is based on output of agricultural biotechnology in the field.

Table 2 indicated that age, family background, training experience, field experience and society membership of

In conclusion, attitude score obtained from above mentioned scale reflected liking/disliking of students and technical staff about GM crops, biofertilizer, biopesticide, DNA finger printing and other aspects of agricultural biotechnology. Eighty per cent students and fourty per cent technical staff are in favour that Government should allow cultivation of GM crops at farmers' field for increasing production and productivity. Result will be helpful in addressing controversy about release and marketing of GM crops. It will also be useful for policy makers in making plan for harnessing agricultural biotechnology for human welfare.

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