# Adoption Behaviour of Vegetable Growers towards Improved Technologies

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## ABSTRACT

*The average productivity of majority of the vegetables in India is lower (12 t/ha) compared to that in other agriculturally developed countries of the world. It could be enhanced through adoption of improved technologies including weed management. The knowledge of farmers about vegetable varieties and their behaviour in adopting these varieties and other technologies including weed management have been assessed. This study is based on a total sample of 100 farmers selected randomly in Jabalpur district of Madhya Pradesh. A majority of the farmers are reported to have high and medium level knowledge of improved technologies of tomato and cauliflower cultivation. However, only 17 per cent in Sihora and 35 per cent in Panager Blocks of Jabalpur district are reported to be high adopters of the improved technologies including weed management in Cauliflower. A majority of the farmers have expressed that lack of control measures for weed, leaf curl in tomato, high cost of pesticide and fertilizer, lack of marketing, impure seeds and chemical, timely labour availability as the major reasons for non-adoption of improved technologies. A significant correlation between extension contact and knowledge and adoption of improved technology has been found. It is suggested that there is a need to strengthen communication methods like TV and radio by extending the duration of farm programs and providing specialized training to the growers. Research efforts should be strengthened to develop multiple disease, pest and weed-resistant varieties and direct supply of these varieties to farmers. It is observed that co-operative farming may solve the problem of small farmers in respect to post-harvest management and value-addition.*

***Key word:*** *Behaviour; Adoption; Vegetable; Technology;*

India is next only to China in area and total production of vegetables with an average productivity of 15.2 tonnes / ha (APEDA 2010). It occupies prime position in the production of cauliflower, second in onion and third in cabbage in the world. However, there is huge scope to further boost the production by increasing the productivity per unit area of land with the help of improved technologies. The average productivity of cabbage, potato and pea in India is 22.0, 19.4 and 6.7 tonnes / ha, respectively which is too low as compare to the per hectare production of cabbage 55.3 tonnes in Korea Republic, potato 44.8 tonnes in Netherlands and pea 16.6 tonnes in France (*Gopalakrishnan, 2007*). Vegetables are typically grown in India in field conditions; the concept is opposed to the cultivation of vegetables in green houses as practiced in developed countries for high yields. The vegetables sector also suffers from lack of availability of good quality planting material and low use of hybrid seeds. (*Reddy and Tirkey 2004*). Poor farm management and manual harvesting practices also apply to the vegetables cultivation in India.Keeping this view in mind an attempt was made to study the adoption behaviour of vegetable growers towards improved technologies for tomato and cauliflower alongwith to document the possible reasons of non-adoption of the improved technologies with special reference to weed management in the Jabalpur region of Madhya Pradesh.

## METHODOLOGY

The study was conducted in Panager and Sihora blocks of Jabalpur district of Madhya Pradesh. A total of ten sample villages, five from each block, were selected in consultation with the local Agriculture Office.

A total sample size of 120 farmers was chosen by randomly selecting 12 vegetable growing farmers from each village. These selected farmers were personally interviewed using a pre-tested survey schedule to collect data on the recommended package of practices being adopted in cultivation of tomato and cauliflower . To understand the process and level of adoption, farm size, participation in extension programmes of various departments, contact with extension personnel and other subject matter specialist, exposure to mass media and social participation were considered as explanatory variables, and knowledge of farmers about latest technologies, adoption level, consultancy pattern and other possible reasons of non-adoption were considered as dependent variables. The variables were scored according to the scales already developed and in-use in the extension research studies. The data were analysed and interpreted in terms of frequencies, percentage and score values.

## RESULTS AND DISCUSSION

*Knowledge of farmers about improved technologies in cultivation of vegetable crops:* The result showed that majority of the farmers were having medium to high level of knowledge about improved technologies for tomato cultivation. It was found that 33.3, 41.7 and 25 per cent farmers fell in high, medium and low knowledge level category, respectively (Table1).

Table 1. Knowledge of farmers about improved technologies in cultivation of vegetable crops (N = 120)

| Knowledge level | Tomato | | Cauliflower | |
|---|---|---|---|---|
| | Sihora (n=60) | Panager (n=60) | Sihora (n=60) | Panager (n=60) |
| High | 15 (25) | 25 (42) | 10 (17) | 17 (28) |
| Medium | 29(48) | 21 (35) | 4 (7) | 6 (10) |
| Low | 16 (27) | 14 (23) | 46 (76) | 37 (62) |

Note: Figures within the parentheses are per cent to total farmers (n) from respective blocks.

However, the two blocks differed significantly in terms of distribution of farmers in a knowledge category. Forty two percent of the farmers from Panger showed high level of knowledge about improved tomato technologies as against only 25 per cent in Sihora. Whereas about half of the farmers (48%) in Sihora block were having medium level of knowledge in comparison to 35 per cent farmers of Panager. The numbers of farmers having low level of knowledge were almost similar in both the blocks.

In contrast to improved tomato technologies, majority of the farmers showed low knowledge level of improved cauliflower cultivation technologies. Only 31percent of the total farmers were in medium to high level of knowledge categories while 69 percent of them were having low level of knowledge about improved cauliflower technologies (Table 2). The farmers from Panager were a bit more advanced than Sihora block interms of knowledge level. Seventy six percent of the farmers from Sihora showed low knowledge level as compared to 62 per cent in Panager.

Table 2. Adoption of the improved technologies of Tomato and Cauliflower by farmers

| Adoption level | Tomato | | | Cauliflower | | |
|---|---|---|---|---|---|---|
| | Sihora (N=60) | Panager (N=60) | Total (N=120) | Sihora (N=60) | Panager (N=60) | Total (N=120) |
| High | 17 (28) | 19(32) | 36 (30) | 11(18) | 19 (32) | 30 (25) |
| Medium | 35 (58) | 30 (50) | 65 (54) | 4 (7) | 3 (5) | 7 (6) |
| Low | 8 (14) | 11(18) | 19 (16) | 45 (75) | 38 (63) | 83 (69) |

Note: Figure within the parentheses are per cent to total

The data showed that the adoption level of technologies among the farmers were more or less similar in trend as recorded in case of knowledge level. Eighty four percent of the total farmers under study were in medium to high adoption categories in respect to improved tomato technologies. While 69 per cent of farmers were low adopters as far as improved technologies for cauliflower were concerned. In terms of distribution of farmers in different adoption categories, Panager block was slightly advanced than Sihora block. Considering the total responses recorded for tomato and cauliflower technologies, 32 per cent farmers of Panager were high adopters of technologies as compared to 23 per cent (28% for tomato and 18% for cauliflower) high adopting farmers in Sihora. The results of this study suggested that strengthening of the extension facilities could increase the knowledge and adoption behaviour of farmers especially about improved cauliflower technologies in the study areas.

A majority of the tomato cultivators in Panager were medium adopters of practices like suitable soil preparation, seed rate, fertilizer application, weed control, plant protection measures and disposal of produce (Table 3). While a majority of the cauliflower

cultivating farmers were low adopters of these practices. It was observed that only the technology relating to transplanting of cauliflower seedlings was adopted by majority of farmers. These findings are in line with *Horpar et al. (2006)*. This indicated that there was a need for strengthening the training and extension services for farmers at the village level especially in respect to the improved technologies for cauliflower production. More or less similar trend was noticed in regard to the adoption of improved tomato and cauliflower technologies by the farmers of Sihora block (Table 4).

Table 3. Adoption of improved practices in Tomato and Cauliflower by farmers in Panager block. (in number)

| S. No. | Practices | Tomato | | | Cauliflower | | |
|---|---|---|---|---|---|---|---|
| | | High | Medium | Low | High | Medium | Low |
| 1. | Soils | 37 (62) | 6 (10) | 17 (28) | 9 (15) | 4 (7) | 47 (78) |
| 2. | Seeds and nursery preparation | 21 (35) | 28 (47) | 11 (18) | 19 (32) | 3 (5) | 38 (63) |
| 3. | Transplantation | 32 (53) | 13 (22) | 15 (25) | 30 (50) | 14 (23) | 16 (27) |
| 4. | Manures and fertilizers | 9 (15) | 40 (67) | 11 (18) | 20 (33) | 4 (7) | 36 (60) |
| 5. | Inter-culture and weed control | 14 (23) | 35 (58) | 11 (18) | 22 (37) | 4 (7) | 34 (57) |
| 6. | Plant protection | 4 (7) | 33 (55) | 13 (22) | 18 (30) | 3 (5) | 39 (65) |
| 7. | Harvesting and marketing | 6 (10) | 42 (70) | 12 (20) | 15 (25) | 10 (17) | 35 (58) |

Note: Figure within the parentheses are the farmers response measured in percent

Table 4. Adoption of improved practices in Tomato and Cauliflower by farmers in Sihora Block. (in number)

| S. No. | Practices / Crops | Tomato | | | Cauliflower | | |
|---|---|---|---|---|---|---|---|
| | | High | Medium | Low | High | Medium | Low |
| 1. | Soils | 4 (7) | 43 (72) | 13 (21) | 6(10) | 4 (7) | 50 (83) |
| 2. | Seeds and nursery preparation | 6 (10) | 44 (73) | 9 (15 ) | 11 (18) | 4 (7) | 45 (75) |
| 3. | Transplantation | 18(30) | 18 (30) | 24 (40) | 10 (17) | 20 (34) | 30 (34) |
| 4. | Manures and fertilizers | 5 (8) | 47(78) | 8 (13) | 9 (15) | 8 (13) | 43 (72) |
| 5. | Inter-culture and weed control | 12 (20) | 40 (67) | 8 (13) | 15 (25) | 5 (8) | 40 (67) |
| 6. | Plant protection | 3 (5) | 47 (78) | 10 (17) | 12 (20) | 3 (5) | 45 (75) |
| 7. | Harvesting and marketing | 5 (8) | 48 (80) | 7 (12) | 3 (5) | 12 (20) | 45 (75) |

Note: Figure within the parentheses are the farmers response measured in percent

An attempt was also made to identify the knowledge source of farmers for growing vegetables. It was found that seed shop was the major preferred source of knowledge in both the blocks (Table 5). Horticulture/ Agriculture Officer and Extension personnel of State Agriculture University / ICAR Institute were the other major agents in providing knowledge to vegetable cultivators in the study area.

Information consultancy pattern of vegetable growers revealed that mass media like radio and television were not the preferred sources of knowledge for these vegetable growers. It could be due to non-suitability of time to listen to the programs on vegetable production; and moreover programmes on vegetable production technologies are rarely broadcasted. The farmers appreciated the introduction of farm advisory services on T.V. and they are taking interest in watching the programme and getting solution of their problems using expert advice.High cost of fertilizers, scarcity in labour, supply for production activities, lack of regulated market and irrigation facilities, and poor selling price at harvest were the major reasons for non-adoption of improved technologies in both the vegetable crops in the study area (Table 6). Besides that the lack of control measures for leaf curl viral disease was another important reason for non-adoption of improved tomato cultivation technologies by the low adopters. These findings are close conformity with *Feder, G. (2002)*.

Overall the study revealed that there was a significant difference in respect to the adoption of improved technologies for tomato and cauliflower production. Although the two blocks differed in respect to the knowledge and adoption behavior, in general only a small fraction of the farmers remained as low adopters in respect to the improved technologies for tomato. While, a major chunk of farmers of both the blocks remained low-

Table 5. Information consultancy pattern of vegetable growers

| S. No. | Source of information | Panager | | Sihora | |
|---|---|---|---|---|---|
| | | Score | Rank | Score | Rank |
| 1. | Seed shop/ Company agent | 75 | I | 58 | I |
| 2. | K.V.K /SAUs | 63 | II | 35 | II |
| 3. | Horti. Officer/ Agri. Officer | 48 | III | 30 | III |
| 4. | ICAR Institute | 42 | IV | 18 | IV |
| 5. | AEO | 25 | V | 15 | V |
| 6. | Radio | 23 | VI | 14 | VI |
| 7. | Television | 20 | VII | 7 | VII |

Table 6. Reasons for non-adoption of improved technologies in cultivation of vegetable crops.

| Reasons | Farmers' response% | |
|---|---|---|
| | Panager | Sihora |
| *Seeds* | | |
| Impure seeds | 20 | 15 |
| Non availability of tomato seeds resistant to leaf curl virus and bacterial wilt | 15 | 22 |
| *Fertilizers* | | |
| High cost of fertilizer | 41 | 38 |
| Non-availability of required fertilizers at proper time | - | 12 |
| *Plant protection measures* | | |
| Lack of control measures for leaf curl virus | 82 | 75 |
| High cost of plant protection | 20 | 25 |
| chemicals Lack of awareness | 15 | 18 |
| *Others* | | |
| Non-availability of timely labour | 60 | 55 |
| Lack of regulated marketing facilities | 40 | 45 |
| Suitable price at the time of harvesting | 42 | 35 |
| Lack of irrigation facilities | 35 | 30 |
| Poor texture of soil | 10 | 8 |

adopters about all the improved technologies for cauliflower production. In view of this the farmers, specially those who adopted the technologies for tomato, were asked to explain the reasons behind such behavioral differences. It was revealed that since the tomato was already being grown for long time in the study areas, the farmers adopted the technologies in due course of time and it was easy for them to accept and adopt newer technologies in respect to this crop. Whereas the cultivation of cauliflower at commercial level is a recent trend in this area. The farmers were more worried particularly about the marketing of cauliflower as it is to be sold off immediately after harvest. This risk factor inhibited them to adopt the new technologies.

## CONCLUSION

The study concluded that Panager block was relatively more advanced than the Sihora block in respect to both knowledge level as well as technology adoption. There was medium to high level of adoption of improved tomato cultivation technologies, but very poor adoption level was noticed in respect to cauliflower cultivation technologies.It was expected that extensive extension activities at village level and; through radio and TV in respect to post harvest technology as well as development of marketing, storage and post processing facilities would remove the fear factor and thereby would increase the adoption of improved cultivation technologies for cauliflower in the area studied. Alternative fertilizers, i.e. bio-fertilizers should be made available to farmers to reduce the costs involved in using chemical fertilizers and also for sustainable production. Cooperative farming, easy accessibility to credit and transportation facilities may solve the problem of small farmers towards technology adoption.

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