Research Note

Indian Journal of Extension Education
Vol. 58, No. 2 (April–June), 2022, (221-223)

ISSN 0537-1996 (Print)
ISSN 2454-552X (Online)

# Knowledge and Adoption Levels of Buckwheat (*Fagopyrum esculentum*) Cultivation by Farmers in Ladakh

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ARTICLE INFO

Keywords: Buckwheat, Knowledge, Adoption, Ladakh

http://doi.org/10.48165/IJEE.2022.58245

ABSTRACT

Buckwheat belongs to the family polygonaceous is a high-value crop of Ladakh where it is grown either as the main season crop or after barley as short duration second crop. In the present investigation, four villages were selected from Leh and Kargil, districts. A random sample of 200 farmers was selected that included 50 farmers from each village. Collective interpolation of surveyed data indicated that the maximum number of farmers had a medium level of knowledge and adoption about the cultivation of buckwheat. The main constraints revealed by the respondents about the cultivation of buckwheat crops included non-availability of improved seeds, lack of knowledge about varieties, lack of knowledge about the market rate, etc. However, the Ladakh administration is now facilitating the cultivation of buckwheat by giving training to the farmers through agriculture university experts and other allied departments in the cold desert aimed to enhance the knowledge base and the adoption of buckwheat cultivation, its popularization and commercialization.

## INTRODUCTION

Buckwheat (*Fagopyrum esculentum*) also known as common buckwheat, Japanese buckwheat, and Silverhull buckwheat is a plant cultivated for its grain-like seeds and as a cover crop (Ahmad et al., 2018). The buckwheat is not closely related to wheat. It is not a cereal, nor is it even a member of the grass family (Ohnishi, 1998). It has triangular seeds and produces a flower that is usually white colour although can also be pink or yellow colour (Brennan, 2020). In the higher Himalayan region of India (4500 amsl), this is the only crop grown and occupies about 90 per cent of cultivated land as a pure crop. In India, buckwheat flour is known as *kuttu-ka-atta* and is culturally associated with the *Navratri* festival. On the day of this festival, food items are made only from buckwheat (Ahmad & Raj, 2012). Buckwheat is a versatile source of fiber, a good dietary food crop as it has high nutritional value and the protein content in buckwheat flour is higher than in commonly used cereals such as rice, wheat, millet, sorghum, and maize (Chrungoo & Cheltry, 2021). It can be sold roasted or unroasted or ground into flour. Being short duration, buckwheat fits well in the high-altitude area of Ladakh where the growing season of a crop is of a limited period because of the early onset of winters and snowfall. It is specific that buckwheat is usually grown traditionally in relatively warmer areas of both Leh and Kargil districts of Ladakh, where double-cropping is possible. It is generally grown as the second crop after harvesting the barley crop. Locally buckwheat is known by various names viz. *dyat*, *dro*, *bro*, *fafer*, etc. in different regional dialects of Ladakh (Ahmad & Raj, 2012).

Buckwheat was one of the staple foods of Ladakhi people a few years ago, however over the period of time cultivation of buckwheat has receded due to the easy availability of subsidized ration (rice). The present generation lacks the information about the importance of buckwheat consumption in the daily dietary food which possesses a tremendous functional and active food constituent. Ladakh Autonomous Hill Development Council (LAHDC) focuses on promoting buckwheat production in the

Received 14-03-2022; Accepted 21-03-2022

Ladakh region and it assured special funding in the Hill Council budget to promote its production and the agriculture university and other allied departments urged the farmers to grow buckwheat crop production on a large scale as cash crops (Anonymous, 2021). The present study was conducted to know the extent of knowledge and adoption by farmers about the cultivation of buckwheat and its constraints faced by respondent farmers in the region.

## METHODOLOGY

The union territory of Ladakh lies in the Trans-Himalayas and comprises Leh and Kargil districts. Leh district is situated between 32°N to 36°N latitude and 75°E to 80°E longitude at an altitude ranging from 2900-5900 m above sea level. Kargil district is situated between 34°N to 27°N latitude and 76°E to 34°E longitude at an altitude ranging from 2686-7010m above mean sea level. Leh district comprises 119 total villages whereas in Kargil district there are 127 total villages. The study was conducted in purposively selected Leh and Kargil districts of the Union territory of Ladakh during 2021. Four villages were selected for this study from two districts of Ladakh viz. Saspol and Dha-Beema (from Leh) and Tambis and Mingi (from Kargil) respectively. A random sample of 200 farmers was selected for the study which included 50 farmers from each village. The knowledge and adoption level of farmers about the recommended package of practices of buckwheat crops was collected with the help of a pre-structured interview schedule. The knowledge of farmers about each major cultivation practice was assigned marks. One mark was assigned for each correct reply and zero to wrong reply or no reply. The percentage of respondents in each practice was also calculated. The extent of knowledge level was measured on the basis of the mean per cent score obtained for each statement and each practice was ranked accordingly. Besides, the buckwheat farmer respondents were divided into three categories (high, medium, and low) on the basis of mean knowledge scores. The Adoption level of recommended practices of buckwheat was analysed in a two-point continuum i.e., Adoption and Non-adoption with a score of 1 and 0. Similarly, the adoption level was measured on the basis of percentage and mean score obtained for each statement, and the adoption level of farmers of buckwheat was divided into three categories (high, medium, and low) on the basis of mean adoption scores. The farmer respondents were asked to point out the constraints in the process of improved production and management practices of the buck-wheat crops.

## RESULTS AND DISCUSSION

The data presented in Table 1 show that extent of knowledge of respondents was highest in land preparation with a mean score of 0.95, followed by harvesting and threshing with a mean score of 0.92. The extent of knowledge of respondents about the date of sowing was 80 per cent followed by sowing methods (74%). The table further shows that respondents had fair knowledge about seed rate (71%), weeding (65%), recommended manures /fertilizers (60%), and irrigation schedule (58%). However, respondents had fair knowledge about spacing (45%), marketing (32%), and improved varieties (25%). Similarly, findings were imported by Sangeetha et al., (2009); Nain & Chandel (2013); Kumar et al., (2021).

In a similar way, the adoption level of farmers about irrigation scheduling, varieties of buckwheat and harvesting, and threshing were observed highest at (75%). The adoption level of farmers about the date of sowing and sowing method both were observed the second-highest (60%). The weeding (57.50%), seed rate (45%), spacing (40%), recommended manures/fertilizers (32.50%), and varieties of buckwheat (30.00%) followed. The results were in agreement with the findings of Shasani et al., (2020) who studied correlates of adoption of groundnut cultivation technology, and Angmo et al., (2021) in case of alfalfa scientific cultivation practices in eastern Ladakh (UT), India.

The majority of the respondents conceded to the level of knowledge regarding buckwheat cultivation in these four villages. The results were that the maximum number of respondents (50%) had a medium level of knowledge, 30 per cent had a low level, and 20 per cent had a high level of knowledge about recommended cultivation practices of buckwheat (Table 2). The findings were observed by Kumar et al., (2020) who studied knowledge of mango growers about management practices in western Uttar Pradesh. Rani and Hariharan (2021) also studied the knowledge level of farm women on the use of ICT through farm women knowledge groups

**Table 2.** Distribution of respondents conceding to the level of knowledge and adoption

| S. | Knowledge | | Adoption | |
|---|---|---|---|---|
| No. | Category | %tage | Category | %tage |
| 1. | Low < 2.95 | 30.00 | Low < 3.0 | 35.00 |
| 2. | Medium 2.95 to 7.95 | 50.00 | Medium 3.0 to 7.5 | 45.00 |
| 3. | High > 7.95 | 20.00 | High > 7.5 | 20.00 |

**Table 1.** Knowledge level and adoption of cultivation of Buck-wheat crop

| S.No. | Practices of Buck-Wheat | Knowledge | | | Adoption | | |
|---|---|---|---|---|---|---|---|
| | | Knowledge (%) | Mean score | Rank | Adoption (%) | Mean score | Rank |
| 1 | Improved recommended varieties | 25.00 | 0.25 | XI | 30.00 | 0.30 | VII |
| 2 | Land preparation | 95.00 | 0.95 | I | 75.00 | 0.75 | I |
| 3 | Date of sowing | 80.00 | 0.80 | III | 60.00 | 0.60 | II |
| 4 | Sowing methods | 74.50 | 0.74 | IV | 60.00 | 0.60 | II |
| 5 | Seed rate | 71.00 | 0.71 | V | 45.00 | 0.45 | IV |
| 6 | Spacing | 43.00 | 0.43 | IX | 40.00 | 0.40 | V |
| 7 | Irrigation schedule | 58.00 | 0.58 | VIII | 75.00 | 0.75 | I |
| 8 | Recommendedmanures/fertilizers | 60.00 | 0.60 | VII | 32.50 | 0.32 | VI |
| 9 | Weeding | 65.00 | 0.65 | VI | 57.50 | 0.57 | III |
| 10 | Harvesting and threshing | 92.00 | 0.92 | II | 75.00 | 0.75 | I |
| 11 | Marketing | 32.00 | 0.32 | X | - | - | - |

(FWKGS) in Madurai, Tamil Nadu, and observed similar results. Table 2 further revealed that the majority of respondents (45.00%) had medium level adoption followed by low (35.00%) and high (20.00%) levels adoption about scientific buckwheat cultivation practices, respectively. Similar findings were imported by Jeeva and Balasubramanian (2007).

Major constraints expressed by the respondents about the cultivation of buckwheat crops are presented in Table 3. The majority of farmers reported non-availability of improved seed (85%) as the major constraints followed by lack of knowledge about varieties with an observed frequency of 71 per cent. The other major constraints reported by the respondent farmers were lack of Govt. support, 70 per cent, and lack of knowledge about the rate of market 68 per cent. Lack of knowledge about marketing (57%) was observed as the constraint faced by the farmers, followed by a lack of knowledge about the medicinal benefits of this crop (50%). The other problems highlighted by the respondents reported that the commercial value of this crop is low as compared to other alternatives (48.50%) and drudgery faced by the farmers for buckwheat cultivation (43.50%). However, the farmers of Ladakh reported that the major constraint is the non-availability of labours (42.50%). The other constraints observed were the low yield of the crop with an observed frequency of 39.50 per cent from the cultivation of buckwheat as perceived by the respondent farmers. The findings were observed by Rana (2012) who studied analyzing problems and prospects of buckwheat cultivation in India. Shah (2013) studied the first report on buckwheat (Fagopyrum Esculentum) from the high-altitude temperate zone of the north-western Himalayan region of Kashmir.

**Table 3.** Constraints expressed by the farmers about the cultivation of buckwheat

| S.No. | Constraints | Percentage |
|---|---|---|
| 1 | Lack of Govt. support | 70.00 |
| 2 | Non-availability of Improved Seed | 85.00 |
| 3 | Low Yield of the Crop | 39.50 |
| 4 | Lack of knowledge about Marketing | 57.00 |
| 5 | Lack of knowledge about varieties | 71.00 |
| 6 | Lack of knowledge about rate of market | 68.00 |
| 7 | Drudgery faced by the farmers for buckwheat cultivation | 43.50 |
| 8 | Non-availability of labours | 42.50 |
| 9 | The commercial value of this crop is low as compared to other alternatives | 48.50 |
| 10 | Lack of knowledge about the medicinal benefits of this crop | 50.00 |

## CONCLUSION

It is concluded from that the majority of respondent farmers had a medium level of knowledge and adoption about the recommended practices of buckwheat cultivation. The maximum number of respondent farmers expressed constraints during the investigation and reported non-availability of the improved seeds in the market followed by a lack of knowledge about varieties of buckwheat. However, the new administration is now facilitating the cultivation of buckwheat by imparting training and awareness to the farmers through agriculture university experts and other allied departments in the cold region of Ladakh.

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