**Farmers’ perception towards adoption of organic vegetable production technologies in Longleng district of Nagaland, India**

**ABSTRACT**

This study was conducted at Krishi Vigyan Kendra, Longleng district of Nagaland with a sample size of 150 in the two blocks namely Longleng and Sakshi. The method of summated rating suggested by Likert (1932) was followed in the development of a scale to measure the attitude of farmers towards ~~the~~ organic farming with 20 statements. A survey method through face-to-face interviews using a semi-structured questionnaire was used to collect data. The Findings of the study showed that the majority of the respondents (51.3%) were between the ages of 35 and 50 years i.e., most of the farmers were middle aged in their economically active stage. It was also observed that 55.3 per cent of the respondents were male whereas 44.7 per cent were female. In case of educational qualification, 48.7 per cent of the respondents studied up to secondary followed by higher secondary (20 %). 42 per cent of the respondents were categorized as small farmers followed by medium farmers (30%), marginal farmers (19.3%) and large farmers (8.7%). It was also found from the study that 46.7 per cent of the respondents had favourable attitude towards adoption of organic vegetable production technologies. However, the study also indicated that the most prominent attitudinal statement as ranked first with mean score 4.59 by the farmers was that organic farming will keep environment free from pollution followed by organic farming strengthens the use of indigenous knowledge (4.43) ranked 2nd.

**Key word:** Attitude, adoption, organic farming, technology

**Introduction**

“Organic farming is one of the production system which prohibits the use of chemical agro-inputs (pesticides and fertilizers). Organic farming relies on organic material *viz*., crop and animal residues, bio-pesticides, and legumes for sustaining productivity of soil with fertility and pest management under natural resources and a healthy environment as reported by Council on energy, environment and water. The National Organic Standards Board of the United States Department of Agriculture, describe as "an ecological production management system which promotes and enhances biodiversity, biological cycles, and soil biological activity i.e. based on the minimal use of off-farm inputs and management practices that restore and increase ecological harmony” (USDA)[2]. "Biswas and Islam (2018) [8] reported that “positive attitudes toward organic farming reduces the environmental impact of conventional farming and adoption of sustainable agricultural practices. Farmers’ positive attitude towards organic farming enhances the production of safe and healthy food options which leads to meet the increasing demand for organic products among health-conscious consumers” [12,7,11,2,10] (Knowler and Bradshaw, 2007; Baumgart-Getz *et al*., 2012; Herath and Wijekoon 2013; Altenbuchner *et al*., 2014; Fatemi and Rezaei-Moghaddam, 2020). “The intensification of organic agriculture in India has three dimensions and is being adopted by farmers for different reasons. India is bestowed with lot of potential to produce all varieties of organic products due to its various agro climatic regions. As per the available statistics, India’s rank in terms of World’s Organic Agricultural land was 15 as per 2013 data\*\*\* *Update with latest reports”* (FIBL & IFOAM Year Book 2015)[3]. “India produced around 1.35 million MT (2015-16) of certified organic products which includes all varieties of food products namely sugarcane, oil seeds, cereals and millets, cotton, pulses, medicinal plants, tea, fruits, spices, dry fruits, vegetables, coffee etc. India has also achieved the status of single largest country in terms of total area under certified organic wild harvest collection. Success of organic movement in India depends upon the growth of its own domestic markets. The definition of FAO states Organic agriculture is a unique production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles and soil biological activity, and this is accomplished by using on- farm agronomic, biological and mechanical methods in exclusion of all synthetic off-farm inputs”. [15] Mathlouthi *et al*., (2022) “stated in his study reported that in developed and wealthy countries, agriculture is very less popular way of income, but agriculture provides direct or indirect benefits everyone in the world”.

Nagaland, is having a total land area of 16,579 sq km, with a population of 19,78,502 where agriculture plays an vital role  and the per capita GDP is 133849 (Nagaland Statistical Handbook,2021)[6]. Chaurasia (2023)[9] in his article mentioned that about 70 percent of population Nagaland state is dependent on agriculture and crops like oilseeds, potatoes, cereals and millets, pulses, sugarcane, tomatoes etc. The state Nagaland is organic by default where follows traditional agriculture system. It is reported that about 13,500 hectares in 241 villages covering 13,500 farmers are engaged in organic farming with abundant organic resources like forest litter, crop residue, livestock, water etc. “Nagaland has potential for promotion of organic farming as farmers has been practicing traditional system of agricultural without the use of external inputs since its inception”. (Nchumthung Murry, 2019) [17]. Attitude towards a practice is measured by the perception of usefulness and can lead to better understanding of the technology’s usefulness; thus, leading to a propensity to adopt these technologies. Keeping this in view, the present study was designed to ascertain the level of attitude of the farmers towards adoption of organic vegetable production technologies.

**MATERIALS AND METHODS**

The present study was carried out using ex-post facto research design in Longleng District of Nagaland. Study was undertaken in ~~the~~ two blocks namely Longleng and Sakshi. A comprehensive list of all the vegetable growers of selected villages was prepared and farmers were categorized into marginal farmers (<1 ha), small farmers (1-2 ha), medium farmers (2-5 ha) and large farmers (>5 ha). A proportionate sample from each category was drawn randomly to have a total sample size of 150 farmers selected using a random sampling method from 10 revenue villages.

Attitude in this study was operationally defined at the farmers’ degree of favorable or ~~unfavourable~~ unfavorable views, options, and feelings, towards organic vegetable production technologies. Such a favorable attitude helps in the better adoption of vegetable cultivation practices.

The method of summated rating suggested by [13] Likert (1932) was “followed in the development of scale to measure the attitude of farmer towards the organic farming. A total of 20 statements, expressing the attitude of farmers toward~~s~~ ~~the~~ organic vegetable farming were collected based on the applicability of statements to study area. The responses were obtained on a five point continuum *viz*., Strongly Agree (SA), Agree (A), Undecided (UD), Disagree (DA) and Strongly Disagree (SDA) with a score of 5, 4, 3, 2, and 1, respectively for the positive statement and for the negative statement reverse scoring was adopted. Primary data was collected using a pre-tested questionnaire during the year 2016. A survey method, using face-to-face interviews and a semi-structured questionnaire, was used to collect data”.

**RESULTS AND DISCUSSION**

***Demographic characteristics of respondents***

Demographic characteristics of the respondents analysed in this study relevant to respondents’ attitude of organic farming include age, gender, education, land holding, annual income, farming experience. Analyses of result obtained from this study (table 1) revealed that majority of the respondents (51.3%) were between the ages of 35 and 50 years, youth comprised of 34 per cent while adult comprised of 14.7 per cent. This indicated that most of the farmers were middle aged, in their economically active stage. Findings also revealed that 55.3 per cent of the respondents were male whereas 44.7 per cent were female. This finding is in line with [18] Oluwasusi (2014) who reported that involvement of male respondents (70.8%) were more than female (29.2 %). It is evident from Table 1 that 48.7 per cent of the respondents studied up to Secondary (Class: 6-10), followed by Higher Secondary (Class: 11-12) 20 per cent, Graduates and above 14 per cent, Primary (Class: 1-5)10 per cent, and lastly illiterate 7.3 per cent. It also depicted that the land holding status of the respondents had been distributed in the category of marginal, small, medium and large farmers. Largest percentage of the respondent i.e., 42 per cent was small farmers followed by medium farmers (30%), marginal farmers (19.3%) and large farmers (8.7%). This result is similar to the work of [16]Mohanty *et al*., that showed highest percentage of farmers (40%) were small farmers followed by medium farmers (30.83%) and marginal farmers (22.66%). Majority of the respondents had good land holding size; as one of the important factors of production. In case of annual income, it was indicated that 44 per cent of the respondents were categorized under low income category (> ₹36,000 to ₹64,000) followed by medium (>₹64,000 to ₹1,20,000), poor (up to ₹36,000), high (>₹ 1,20,000 to ₹5,00,000), very high (>₹ 5,00,000). Findings also revealed that the majority (57.3%) had farming experience of between 17 to 27 years followed by 28 per cent respondents with low experience (5 to 16 years) and 14.7 per cent respondents with high experience (28-38 years).

**Table 1.Demographic characteristics of respondents (n = 150)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Variables** | **Category** | **Frequency** | **Percentage** |
| **Age (years)** | Young (up to 35) | 51 | 34 |
| Middle aged (35 to 50) | 77 | 51.3 |
| Old aged (above 55) | 22 | 14.7 |
| **Total**  | **150** | **100** |
| **Gender** | Male  | 83 | 55.3 |
| Female  | 67 | 44.7 |
| **Total** | **150** | **100** |
| **Education** | Illiterate (nil) | 11 | 7.3 |
| Primary (Class: 1-5) | 15 | 10 |
| Secondary (Class: 6-10) | 73 | 48.7 |
| High Secondary (Class: 11-12) | 30 | 20 |
| Graduate and above | 21 | 14 |
| **Total** | **150** | **100** |
| **Land holding(*ha*)** | Marginal farmers (<1 ha) | 29 | 19.3 |
| Small farmers (1-2 ha) | 63 | 42 |
| Medium farmers (2-5 ha) | 45 | 30 |
| Large farmers (>5 ha) | 13 | 8.7 |
| **Total** | **150** | **100** |
| **Annual income** | Poor (up to ₹ 36,000/-) | 19 | 12.7 |
| Low (>₹36,000/ – ₹64,000/-) | 66 | 44 |
| Medium(>₹64,000– ₹ 1,20,000/-) | 49 | 32.7 |
| High (>₹ 1,20,000/- -₹ 5,00,000/-) | 10 | 6.6 |
| Very high (>₹ 5,00,000) | 6 | 4 |
| **Total** | **150** | **100** |
| **Farming experience** | Low experience (5 - 16 years) | 42 | 28 |
| Medium experience (17 - 27 years) | 86 | 57.3 |
| High experience (28 - 38 years) | 22 | 14.7 |
| **Total** | **150** | **100** |

***Distribution of farmers on the basis of their attitude toward adoption of organic vegetable production technologies***

To acquire an overview of the attitude toward adoption of organic vegetable production technologies, farmers were classified into three categories i.e., most favourable, favourable and least favourable on the basis of calculated mean and standard deviation of attitude score obtained by them. Data given in Table 1 showed that 46.7 per cent of the respondents showed favourable attitude towards adoption of organic vegetable production technologies followed by 40.6 per cent that expressed most favourable attitude. However, only 12.7 per cent farmers expressed least favourable attitude toward adoption of organic vegetable production technologies.

It was observed that 75.9 per cent of the respondents were marginal, 54 per cent of small, 53.3 per cent of medium and 53.8 per cent of large vegetables growers had favourable attitude toward organic vegetable production technologies. Besides, 17.2 per cent of marginal, 33.3 per cent of small, 29 per cent of medium and 38.5 per cent of large vegetables growers reflected most favourable attitude toward organic vegetable production technologies (Table 1). However, 6.9 per cent of marginal, 12.7 per cent of small, 17.7 per cent of medium and 7.7 per cent of large vegetables growers expressed least favourable attitude toward organic vegetable production technologies. This might be because the farmers are realizing the importance of organic vegetable cultivation from the commercial angle. The least favourable attitude of farmers might be due to lack of organic inputs, planting material *etc*.

**Table 2. Distribution of farmers on the basis of their attitude toward adoption of organic vegetable production technologies (n=150)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Category** | **Marginal farmers** | **Small farmers** | **Medium farmers** | **Large****farmers** | **Total**  |
| **F** | **%** | **F** | **%** | **F** | **%** | **F** | **%** | **F** | **%** |
| Most favourable | 05 | 17.2 | 21 | 33.3 | 13 | 29 | 05 | 38.5 | 61 | 40.6 |
| Favourable | 22 | 75. 9 | 34 | 54 | 24 | 53.3 | 07 | 53.8 | 70 | 46.7 |
| Least favourable | 02 | 6.9 | 08 | 12.7 | 08 | 17.7 | 01 | 7.7 | 19 | 12.7 |
| Total | 29 | 100 | 63 | 100 | 45 | 100 | 13 | 100 | 150 | 100 |

***Distribution of farmers in terms of attitude towards adoption of organic vegetable production technologies***

“In Table 3 farmers’ response to the attitude statements on organic agriculture practices were rated on a 5-point scale. The respondents were asked to rate the statements using the 5 point Likert scale as follows: 1 strongly disagree, 2 disagree, 3 undecided, 4 agree and 5 strongly agree. The scores were reversed for negative statements. All the means for the attitudinal statements were above the cut-off point of 3. The most prominent attitudinal statement ranked first with mean score 4.59 by the farmers was that organic farming will keep environment pollution-free. Organic agriculture reduces non-renewable energy use by decreasing agrochemical needs and also contributes to mitigating the greenhouse effect and global warming through its ability to sequester carbon in the soil, which ultimately keep environment free from pollution and expectedly the farmer had ranked it first.  Organic farming as a practice that preserves and conserves the natural resources is also a good strategy in adapting biggest agricultural challenge and also organic farming practices on commercial scale is also an another challenge. Therefore, the statement changing to organic farming strengthens the use of indigenous knowledge was ranked 2nd with mean score 4.43. this result was supported” by [18]. However, presently the organic foods do need to get premium prices as encouragement to the farmers to continue organic production which ranked 3rd having mean score of 4.17. Likewise, organic farming improves soil fertility (3.91), adoption of organic farming practices is highly risky (3.84) and organic farming is transitionally difficult to sustain (3.7) were ranked as fourth, fifth and sixth. The result of this research are in line with [1]Adebayo and Oladele (2013) that the most prominent attitudinal statement as ranked by the farmers were statements that organic agriculture improves soil fertility and soil structure (4.38). On the other hand, majority of the respondents disagreed to the statement organic farming has no long term effect on ecological health with mean score 3.76 and ranked seventh. 35.5 percent of the respondents agreed to the statement organic farming should be taken up to encourage the local people with mean score 3.66. The remaining score of the items ranged from 3 to 3.66. These items were related to organic agriculture practices engendering reduced vegetable production and food security limitations. These showed that organic agriculture has some limitations and not a total revolutionary trend to food security.

From the study, it can be concluded that most of the respondents have favourable and most favourable attitude towards organic vegetable cultivation. It was found that most prominent attitudinal statements like organic farming will keep environment free from pollution, changing to organic system is an exciting new challenge and organic foods do need to get premium prices for encouragement to farmers to continue organic production which ranked first, second and third, respectively by the farmers. It can be inferred from this result that the respondents were much aware about the potential of vegetable organic farming practices. Organic farming is an integrated approach, where all aspects of farming systems are interlinked and work for each other. Therefore, the extension service providers like state agriculture departments, NGOs etc. should take into active consideration which need to provide training to the vegetable farmers and need based advisory services for commercial organic vegetable cultivation. Organic agriculture has great potential to fetch premium price in the national and international markets. Therefore, in Longleng, it is very indispensable to fix prices of organic products as well as establishment of proper marketing and storage facilities so that it will encourage the producer and also enhance the farmers’ attitude towards commercial organic vegetable production.

**Table 3: Distribution of farmers in terms of attitude towards adoption of organic vegetable production technologies (n= 150)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sl.****No** | **Statements (sample=150)** | **SA (%)** | **A****(%)** | **UD****(%)** | **DA****(%)** | **SDA****(%)** | **Mean Score** |  **Rank**  |
| 1 | Organic farming will keep environment free from pollution | 89(59.3) | 61(40.7) | - | - | - | 4.59 | I |
| 2 | Organic farming strengthens the use of indigenous knowledge  | 78(52) | 59(39.3) | 13(8.7) | - | - | 4.43 | II |
| 3 | Organic foods do need to get premium prices for encouragement to farmers to do organic production | 46(30.7) | 84(56) | 20(13.3) | - | -  | 4.17 | III |
|  4 | Organic farming improves soil fertility  | 65 (43.3) | 41(27.3) | 19(12.7) | 16(10.7) | 09(6) | 3.91 | IV |
| 5 | Adoption of organic farming practices is highly risky | 47(31.3) | 58(38.7) | 26(17.3) | 12(8) | 07(4.7) | 3.84 | V |
| 6 | Organic farming is transitionally difficult to sustain | 40(26.7) | 62(41.3) | 22(14.7) | 15(10) | 11(7.3) | 3.7 | VI |
| 7 | Organic farming has no long term effect on ecological health  | 15(10) | 20(13.3) | 19(20) | 41(32) | 55(27.3) | 3.67 | VII |
| 8 | Organic farming should be taken up to encourage the local people | 40(26.7) | 53(35.3) | 31(20.7) | 19(12.7) | 07(4.6) | 3.66 | VIII |
| 9 | There will be no proper farming without fertilisers and chemicals | 13(8.7) | 22(14.7) | 22(14.7) | 55(36.6) | 38(25.3) | 3.6 | IX |
| 10 | Organic farming works better when farmers operates in groups than individually | 32(21.3) | 70(46.7) | - | 48(32) | - | 3.57 | X |
| 11 | Organic farming should be done for commercial purpose | 37(24.7) | 49(32.7) | 31(20.7) | 26(17.3) | 07(4.6) | 3.55 | X I |
| 12 | Organic farming increases demand of its product | 40 | 51 | 20 | 26 | 13 | 3.52 | XII |
| 13 | Adoption of organic farming is boon to agriculture | 31(20.7) | 53(35.3) | 20(13.3) | 40(26.7) | 06(4) | 3.42 | XIII |
| 14 | Organic farming is not healthy and beautiful in appearances as conventional farming | - | 29(19.3) | 43(28.7) | 68(45.3) | 10(6.7) | 3.39 | XIV |
| 15 | There are only few people who can afford to buy organic product in Indian context | 18(12) | 56(37.3) | 33(22) | 43(28.7) | - | 3.32 | XV |
| 16 | Success and failure of organic farming lies in the hand of end users | 25(16.7) | 48(32) | 27(18) | 37(24.7) | 13(8.6) | 3.23 | XVI |
| 17 | Agricultural professions lack proper knowledge and training of organic farming practices | 24(16) | 52(34.7) | 20(13.3) | 42(28) | 12(8) | 3.22 | XVII |
| 18 | Organic farming will not be able to feed the whole population of country | 25(16.7) | 28(18.7) | 21(14) | 41(27.3) | 35(23.3 ) | 3.22 | XVIII |
| 19 | Farmers need technical assistance to convert to organic farming | - | 66(44) | 33(22) | 51(34) | - | 3.1 | XIX |
| 20 | Organic farming will give less income as the yield is lower | 16(10.7) | 44(29.3) | 24(16) | 53(35.3) | 13(8.7) | 3.02 | XX |

**{**Strongly agree (SA) =5, Agree (A) =4, Undecided (UD) =3, Disagree (DA) =2, Strongly disagree (SDA) =1**}**

**Conclusion**

Organic farming has a abundant benefit to the environment, ecosystem as well as human health. It can be concluded from the study that most of the farmers had favourable attitude towards organic farming. It was also concluded that most of middle aged male farmers actively involved in organic farming with educational level of Class 6-10. However, small farmers were actively involved with low income with 17-27 years of farming experiences. The result also concluded that statement like Organic farming will keep environment free from pollution got first rank with mean score 4.59 followed by Organic farming strengthens the use of indigenous knowledge and Organic foods do need to get premium prices for encouragement to farmers to do organic production got second and third rank with mean score 4.43 and 4.17. Organic farming has a great potential of successfully contributing to health of citizens, environmental standards, local food security, increased family health.

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