**An Analytical Study of the Relationship between Farmer Characteristics and the Use of Indigenous Technical Knowledge in Agriculture**

**ABSTRACT**

Indigenous Technical Knowledge (ITK) in Agriculture encompasses traditional practices and wisdom passed down from generation to generation, which is essential for sustainable agricultural practices in harmony with native ecosystems and cultural values. Integrating ITK with present-day agricultural practices boosts resilience and facilitates community-led innovation in agriculture. The present study examined the relationship between farmer Characteristics and the use of indigenous technical knowledge in agriculture.A total of 120 respondents were selected through multistage cum random sampling. The collected data were analyzed using the Chi-square test to determine the association between ITK and various selected independent variables. The results showed that the majority (75.00%) of the respondents were aged between 35 to 41 years, with a primary-level education. The majority (64.17%) of the respondents belonged to the Other Backwards Classes (OBC), 54.20 per cent lived in nuclear families, and 49.20 per cent were marginal farmers. Agriculture was identified as the main occupation by 65.80 per cent of the respondents, with a medium level of annual family income between Rs. 70920 to 241296. Additionally, 75 per cent of respondents had medium levels of mass media exposure. The results revealed that Age (0.0497), Sex (0.0326), Occupation (0.0158), and Mass Media Exposure (0.0142) were positively associated at the 0.05 level.

**Keywords:** Agriculture, Chi-square Test, Education, ITK, Variables, Wisdom

**INTRODUCTION**

Indigenous Technical Knowledge (ITK) in agriculture refers to the local, traditional knowledge systems that rural and indigenous populations have developed over generations of observation, experience, and adaptation. The knowledge systems are developed around traditional practices that are critical parts of crop production, pest control, and resource management, parts which often emphasize sustainability, biodiversity, and ecological balance. As environmental degradation and climate change exceed catastrophic limits, many are seeing value in updating and implementing ITK practices into modern agricultural systems to develop resilient and sustainable farming systems.Indigenous technical knowledge system consists of an integrated body of knowledge system which tends to focus on different aspects of agricultural sciences, i.e. agriculture, animal husbandry, and natural resource management. (Lenka and Satpathy, 2020). The traditional knowledge system of agriculture varied from society to society, which shaped the history of food self-sufficiency. For centuries, farmers of the nation have stayed in the cave of deprivation, have maintained their distinctive culture of farming, and have sustained themselves on their traditional knowledge system. (Palli, and Atanu, 2020). Indigenous Technical Knowledge (ITK) has immense innovation potential, especially at the grassroots level. (Borthakur and Singh, 2012). Indigenous Technical Knowledges (ITKs) are vast collections of traditional knowledge, beliefs, and wisdom that have been passed down from one generation to the next for the preservation, efficient use, and conservation of soil, plants, and other species as well as natural resources. Folklore, myths, customs, folk songs, proverbs, puppetry, and other traditional methods are the main ways that it is passed down through the generations. (Lekshmi and Dinesh Babu, 2009). Indigenous technical knowledge (ITK) is specifically concerned with the actual application of the thinking of local people in various operations of agriculture and allied areas; whereas Indigenous knowledge system (IKS) delineates a cognitive structure in which theories and perceptions of nature and culture are conceptualized. (Mushtaq, et. al., 2020). Technical knowledge (ITK) is the accumulated skill and knowledge of a locality or a community that has been passed down from generation to generation. It is the set of knowledge, skills, and abilities of the local people that have been developed through close interactions with nature and natural resources for their livelihood to minimize crop environmental risks, to maintain productivity and sustainability. (Boruah, et. al., 2023). Indigenous knowledge has been a challenge, as it demands cross-cultural and inter-disciplinary understanding. Of late, the contribution of Indigenous knowledge (IK) to the conservation of resources and solution science has been realized by academia and policy-makers, which is expanding the frontiers of knowledge use for innovation. (Dhal, 2013).

**RESEARCH METHODOLOGY**

The present study was conducted in the Ambedkar Nagar district of Uttar Pradesh. Out of 5 Community Development blocks in Ambedkar Nagar district, Tanda block was selected purposively. The 120 respondents were selected through a multistage cum random sampling technique. Ex-post facto research design was used for the study. Data were obtained using a structured interview schedule. The collected data have been analyzed with the help of the Statistical Package for Social Sciences (SPSS, version 16.0). Chi-Square was used with a .05 level of confidence. The χ2 test was first used by Karl Pearson in the year 1900. The χ2 testis one of the simplest and most widely used non-parametric tests in statistical work. The equation for Chi-Square (χ2)is stated as follows:

$$χ^{2}=\frac{∑\left(f\_{o}-f\_{e}\right)^{2}}{f\_{e}}$$

Here,

Ƒο = frequency of occurrence of observed or experimentally determined facts.

Ƒe = expected frequency, ƒοoccurrence on independent hypothesis.

**RESULTS AND DISCUSSION**

**Socio-Economic and Communication Profile of the Respondents**

The results revealed (Table 1) that the majority (75.00%) of the respondents belonged to the middle age group (34 to 51 years) followed by 14.16 per cent of the young age group (up to 33 years) and 10.84 per cent of the respondents from old age group (above 52 years) respectively. Thus, it may be concluded that the majority of respondents belonged to the middle age group of 34 to 51 years. The study was aligned with the findings of (Singh and Singh, 2024). The findings revealed that the majority (90.84%) of respondents were male and 9.16 percent were female. The study was aligned with the findings of (Dube et. al., 2024). The findings revealed that the majority (35.80%) of respondents were educated up to primary school, followed by 22.50 per cent of educated up to middle school, and 21.70 per cent of respondents were educated up to high school, 10.80 per cent were found illiterate. 7.50 per cent of respondents were intermediate, and 1.70 per cent of respondents were educated up to undergraduate level, respectively. The reason for the relatively low level of higher education reflects structural barriers and limited access to quality education in rural areas. Similar findings were reported by (Kailash et. al., 2021). The majority (64.17%) of the respondents belonged to the other backwards category, followed by the general category (20.83%), and the scheduled caste (15.00%). A similar result was reported by (Nayak et al.*,* 2021). The majority (65.80%) of the respondents were involved in agriculture, followed by 21.70 per cent of respondents who were engaged in Agriculture + Service, and 8.00 per cent of respondents engaged in business. 6.70 per cent were engaged in service while 5.00 per cent were labourers. This finding might be because this trend confirms the persistent agrarian nature of the rural economy. The results validate the (Gupta, 2019). The majority (63.33%) of the respondents had an annual income between Rs. 70920 to 241296, followed by below Rs. 70920 (19.17 %), and 17.50 per cent of respondents had an annual income of Rs. 241296 and above. It can be concluded that the majority (63.33%) of the respondents had an annual income between Rs. 70920 to 241296. This finding might be because the majority of the respondents were marginal farmers, mostly dependent on agriculture. A similar result was reported by (Kumar etal., 2016). The majority (54.20%) of respondents belonged to the nuclear family type, whereas 45.80 per cent of respondents belonged to the joint family type. The probable reason for the types of families can be that changing social dynamics, possibly influenced by migration, access to independent housing, and aspirations for autonomy. A similar result was reported by (Nayak et. al., 2021). The majority (65.00%) of respondents belonged to the Medium (5 to 7) family size, followed by 20.83 per cent of respondents belonged to the Small (below 4) family size, and 14.17 per cent of respondents belonged to the Large (above 8) size of family. A similar result was reported by (Singh et. al., 2021). The majority (49.20%) of the respondents were marginal farmers, followed by small farmers (30.80%), and 18.30 percent were semi-medium farmers, and none of the respondents owned more than 2 hectares of land holdings. A similar result was reported by (Nayak et. al., 2021 and Singh et. al., 2017). The majority (75.00%) of respondents had a medium extent of mass media utilization, followed by high (15.83%) and low (9.17%). The probable reason for this might be that most of the families were resource-poor and had limited resources and household items. Hence, they had very low access to mass media. A similar result was reported by (Singh and Singh, 2024; Chandra and Singh, 2021).

**Table 1- Distribution of respondents Socio-Economic and Communication Profile**

 **(n=120)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S. No.** | **Variables** | **Category** | **Frequency** | **Percentage** |
|  | Age  | Young (up to 33) | 17 | 14.16 |
| Middle (34-51) | 90 | 75.00 |
| Old (above 52) | 13 | 10.84 |
|  | Sex | Male | 109 | 90.84 |
| Female | 11 | 9.16 |
|  | Education | Illiterate | 13 | 10.80 |
| Primary school | 43 | 35.80 |
| Middle school | 27 | 22.50 |
| High school | 26 | 21.70 |
| Intermediate | 9 | 7.50 |
| Graduate | 2 | 1.70 |
|  | Caste | Other Backwards category (OBC) | 77 | 64.17 |
| Scheduled category (SC) | 18 | 15.00 |
| General | 25 | 20.83 |
|  | Occupation | Agriculture | 79 | 65.80 |
| Agriculture + Service | 26 | 21.70 |
| Business | 01 | 8.00 |
| Service | 08 | 6.70 |
| Labour | 6 | 5.00 |
|  | Annual Income | Low (Below Rs. 70920) | 23 | 19.17 |
| Medium (Rs. 70920 to 241296) | 76 | 63.33 |
| High (Above Rs. 241296) | 21 | 17.50 |
|  | Family types | Nuclear family | 65 | 54.20 |
| Joint family | 55 | 45.80 |
|  | Size of family | Small (below 4) | 25 | 20.83 |
| Medium (5 to 7) | 78 | 65.00 |
| Large (above 8) | 17 | 14.17 |
|  | Landholding | Marginal farmer(below 1 hectare) | 59 | 49.20 |
| Small farmer (1-2 hectare) | 37 | 30.80 |
| Semi-medium (2-4 hectare) | 22 | 18.30 |
| Medium farmer (4-10 hectares) | 000 | 0.00 |
| Large farmer (10 hectares & above) | 2 | 1.70 |
|  | Mass media exposure |  Low (up to 4) | 19 | 15.83 |
|  Medium (5-7) | 90 | 75.00 |
|  High (above 8) | 11 | 9.17 |

 **Relationship between Indigenous Technical Knowledge in Agriculture and socio-economic variables of the respondents**

The findings revealed (Table 2) that the age of farmers (0.0497) was significantly associated with the indigenous technical knowledge at a 0.05 level of significance. It means the variables significantly wielded their influence on the indigenous technical knowledge of the farmers. This result was similar to the findings of (Venkatesan and Sundaramari, 2012). The study found that Sex (0.0326) was significantly associated with the indigenous technical knowledge at a 0.05 level of significance. This result was similar to the findings of (Anyan and Frempong 2019). The study found that Occupation (0.0158) was significantly associated with the indigenous technical knowledge at a 0.05 level of significance. The study found that mass media exposure (0.0142) had a positive correlation with indigenous technical knowledge. This result was similar to the findings of (Singh and Singh, 2023). On the other hand, the six remaining independent variables, viz. education (0.126), caste category (0.139), family income (0.294), family Type (0.138), family size (0.226), and Size of Landholding (0.142), did not show a significant association with indigenous technical knowledge. This implies that indigenous technical knowledge is not necessarily determined by caste background, type of family structure (nuclear or joint), family size, family income, and land holding size. Hence, the result confirms the null hypothesis.

**Table 2: Relationship between Indigenous Technical Knowledge in Agriculture and socio-economic variables of the respondents (n=120)**

|  |  |  |
| --- | --- | --- |
| **S. No.** | **Independent Variables** | **Pearson Chi-Square** |
| **Calculated Value** | **Degree of freedom** | **P-Value** |
| 1. | Age | 9.50 | 4 | 0.0497\* |
| 2. | Sex | 6.84 | 2 | 0.0326\* |
| 3. | Education | 12.212 | 4 | 0.126 |
| 4. | Caste Category | 6.941 | 4 | 0.139 |
| 5. | Occupation  | 12.212 | 4 | 0.0158\* |
| 6. | Family Income | 4.932 | 4 | 0.294 |
| 7. |  Family type | 3.952 | 2 | 0.138 |
| 8. | Family Size | 5.650 | 4 | 0.226 |
| 9. | Size of land holding | 3.952 | 4 | 0.142 |
| 10. | Mass media exposure | 12.458 | 4 | 0.0142\* |

**CONCLUSION**

The research suggests that Indigenous Technical Knowledge (ITK) is still important to agriculture and is a crucial part of sustainable agriculture in the context of traditional, local knowledge and contextualized thinking. This research focused on the characteristics of farmers, about ITK, and provides some insights into the social-demographic factors of farmers’ ability to retain or use traditional knowledge. The research found that age, sex, occupation, and mass media exposure were significantly associated with the use of ITK, which suggests that both personal experience and access to information channels play a critical role in shaping farmers’ engagement with traditional practices. On the contrary, education level, caste, income, family size, family type and landholding size showed no significant relationship with ITK use, indicating that indigenous knowledge persists across diverse socio-economic backgrounds. This indicates an ability of rural farming communities to hold out, adapt, or be resilient in the context of agricultural change. ITK could be used in conjunction with or in partnership with formal scientific approaches to support more effective agricultural interventions and embrace more sustainable development plans that are locally founded and culturally specific to the community. There needs to be greater advocacy for documentation, dissemination, and validation of ITK with an emphasis on social networks and mass media methods.

Disclaimer (Artificial intelligence)

Option 1:

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

Option 2:

Author(s) hereby declare that generative AI technologies such as Large Language Models, etc. have been used during the writing or editing of manuscripts. This explanation will include the name, version, model, and source of the generative AI technology and as well as all input prompts provided to the generative AI technology

Details of the AI usage are given below:

1. **No any AI has been used in this article**

2.

3.

**REFERENCES**

Anyan, F. Y., and Frempong, G. (2019). Assessing the Effects of Demographic Characteristics on ICT and Indigenous Knowledge Usage by Small-Scale Farmers. *International Journal of Applied Science and Technology*, *9*(1), 39-46.

Boruah, R., Sarmah, R., Dutta, J. K., Borah, D., Deka, C. R., and Kalita, H. K. (2023). Indigenous technical knowledge (ITK) practices by tribal farmers in Sonitpur district of Assam. *The Pharma Innovation Journal*, 12(5), 4390-4394

Borthakur, A., and Singh, P. (2012, November). Indigenous technical knowledge (ITK) and their role in sustainable grassroots innovations: An illustration in Indian context. In *Proceedings of International Conference on Innovation & Research in Technology for Sustainable Development,* 38- 42.

Chandra, S., and Singh, A. K. (2021). Socio-personal profile and problems faced by farmers of Banda district of Uttar Pradesh in using ICTs. *International Journal of Current Microbiology and Applied Sciences*, *10*(03), 396-401.

Dube, R., Kumar, S., and Singh, S. K. (2024). Socio-Economic Profile of KVK Staff and Farmers for Utilization of ICT Tools in Central Uttar Pradesh, India. *Asian Journal of Agricultural Extension, Economics and Sociology* 42 (6), 350-56.

Dhal, S. (2013). Indigenous Agricultural Knowledge and Innovation: A Study of Agricultural Scientists in Odisha. *International Journal of Information Systems and Social Change*, *4*(3), 57-71.

Gupta, S. (2019). Impact of socio-economic and communication source utilization pattern of farmers of KVK Bichpuri, Agra. *The Journal of Rural and Agricultural Research*, *19*(2), 68-72.

Kailash, Mishra, O. P. Kumar, L., and Singh, S. K. (2017). Utilization pattern of mobile phone technology (smartphone) among the farmers of Nagaur district in Rajasthan. *Indian Research Journal of Extension Education*, *17*(4), 117-121.

 Kumar, S., Subash, S., and Jangir, R. (2016). Socio-economic profile and communication behaviour of indigenous cattle dairy farmers in Thar Desert of Rajasthan. Advances in Life Sciences, 5(21), 9781-9785.

Lenka, S., and Satpathy, A. (2020). A study on indigenous technical knowledge of tribal farmers in agriculture and livestock sectors of Koraput District. *Indian Journal of Extension Education*, *56*(2), 66-69.

Lekshmi, P. S. S and Dinesh Babu A. P. (2009). Indigenous Technical Knowledge and ancient proverbs of the coastal fisher folk of Kerala and their implications. *Indian Journal of Traditional Knowledge*, 8(2), 296-297

Mushtaq, A., Pathania, S. S., Khan, Z. H., and Ahmad, M. O. (2020). Indigenous technical knowledge in pest management. *Journal of Entomology and Zoology Study*, *8*(5), 296-302.

Nayak, T., Singh, A. K., Hashim, M., and Singh, S. K. (2021). To Study the Socio-economic Profile of SHG Members in Tentulikhunti Block of Nabarangpur District (Odisha). *International Journal of Current Microbiology and Applied Sci*ences, *10*(03), 1196-1200.

Palli, R., and Atanu, D. (2020). Indigenous Traditional Knowledge (ITK) in Agriculture: Cases from Srikakulam District, Andhra Pradesh. *International Journal of Multidisciplinary Educational Research*, *9*(4), 163.

Singh, S. K., and Singh, A. K. (2024). Study on the level of knowledge and adoption of improved urd production technology and its relationship with socio-demographic profile of the farmers. *Journal of AgriSearch*, *11*(02), 123-127.

Singh, A. K., Singh, A. K., and Maji, S. (2021). A study on the socioeconomic profile of the dairy farmers in central plain zone of Uttar Pradesh. *International Journal of Current Microbiology and Applied Sciences*, *10*(1), 988-995.

Singh, S. K., and Singh, A. K. (2023). A Study on the Impact of ICTs on Education and its Relationship with Socio-demographic Profile of Students: Impact of ICTs on Education and Socio-demography of Students. *Journal of AgriSearch*, *10*(2), 136-140.

Venkatesan, P., and Sundaramari, M. (2012). Socioeconomic Correlate with the Perceived Effectiveness of Indigenous Tribal Agricultural Practices. *Journal of Extension Education*, *24*(3), 4864-4867.