Research on the Path of Improving Farmers' Scientific and Technological Literacy in Sichuan Ethnic Areas

Aihong Liu[1], Zili Chen[1], Rage Azi[2], Zhang Yuan[3], Mao Ruiyi[4]

[1]School of Economics and Management, Neijiang Normal University, Neijiang, China, 641100

[2]Development, Reform, and Economic Informatization Bureau of Meigu County, Liangshan Prefecture, Sichuan Province, China, 616450

[3]Development and Reform Bureau of Ruoergai County, Aba Prefecture, Sichuan Province, China, 624500

[4]Bureau of Economic Information and Business Cooperation, Baiyu County, Ganzi Prefecture, Sichuan Province, China, 621750

Keywords: Sichuan; Ethnic Areas; Scientific and Technological Literacy; Farmers

Abstract: As a basic goal of international science education, STL (Scientific and Technical Literacy) is the cornerstone of the two major goals of popularizing science and improving the quality of science education in the current reform of science education. A farmer with scientific quality should be able to evaluate the reliability of scientific information according to the source of information and the methods used to produce it. The remarkable promotion of STL in rural areas is of great practical significance for realizing agricultural and rural modernization and rural revitalization. Based on the current situation of farmers' STL in Sichuan ethnic areas, this paper studies and analyzes farmers' knowledge level and the media for obtaining scientific knowledge. Based on the perspective of STL communication, this paper puts forward the promotion path of farmers' STL in Sichuan ethnic areas in order to make some useful supplements to the research on promoting farmers' STL.

1. Introduction

With the development of China's modernization process, farmers have become a major group of floating population in China. Targeted scientific communication for farmers is not only beneficial for farmers to understand scientific knowledge and improve STL (scientific and technical literacy), but also beneficial to urbanization and social and economic development [1]. The pluralistic competition of modern economy and society is, in the final analysis, the competition of people's comprehensive quality. STL, as an important part of people's comprehensive quality, has become an important indicator to measure a country's comprehensive strength and an important reference to reflect a region's future development potential and civilization. However, economic development will increase the gap between the rich and the poor, and there will be a huge difference between urban and rural cultural levels.

Among the constituent elements of productive forces, the human factor is the most active one. It is an important task to popularize scientific and technological knowledge, spread scientific ideas and carry forward scientific spirit. The remarkable improvement of STL in rural areas is of great practical significance for realizing agricultural and rural modernization and rural revitalization [2-3]. Aiming at how to effectively improve the STL level of rural farmers and promote the construction of new countryside in China, based on the current situation of STL of farmers in Sichuan ethnic areas, this paper studies and analyzes the knowledge level of farmers and the media for obtaining scientific knowledge, and based on the perspective of STL communication, finds out the realization path of STL improvement in Sichuan ethnic areas.

  DOI: 10.25236/icemeet.2023.061

2. Overview of STL scientific theory

STL, as a basic goal of international science education, is the cornerstone of popularizing science and improving the quality of science education in the current reform of science education [4]. People have their own understanding of the definition of STL, and its connotation produces various definitions from different angles. STL has three dimensions [5-6]: first, it can understand the basic scientific principles and working methods (that is, the essence of science); The second is to be able to understand the main scientific concepts and terms (that is, scientific knowledge); Third, we can know and understand the influence of science and technology on social development. It is the degree and level of the actor's scientific knowledge and ability to use science and technology. The main way to improve farmers' STL is to promote scientific knowledge and technology to the public through scientists and professors in a simple and easy-to-understand way. With the development of society and the improvement of people's living standards, people pay more attention to the quality of material life and spiritual life, and are more inclined to improve their self-cultivation in social science and humanities to form a healthy and civilized lifestyle.

In STL education, we should pay attention to the study of our national culture, such as social customs, beliefs, etiquette habits, cultural connotations and so on. Scientific method and scientific spirit include the cause of science, the nature of science, the work of scientists, the position and role of science in human society, the process and method of scientific research, the spirit of doubt, the spirit of argument, openness, the values of accepting different opinions and views, and the sense of social justice [7]. A farmer with scientific quality should be able to evaluate the reliability of scientific information according to the source of information and the methods used to produce it; Scientific quality also means the ability to put forward and evaluate arguments based on arguments, and to properly apply the conclusions drawn from these arguments [8]. The scientific knowledge of scientific research results is a result element, which on the surface cannot be classified and related to other elements, but the construction of other elements forms scientific knowledge [9].

3. Present situation and existing problems of farmers' STL in Sichuan ethnic areas

In this study, Liangshan Yi Autonomous Prefecture in Sichuan ethnic areas was taken as the investigation object. A total of 500 questionnaires were distributed, and 473 questionnaires were effectively recovered, with an effective recovery rate of 94.6%. At the same time, taking gender, age, education level, occupation and other dimensions as grouping marks, SPSS26.0 is used to statistically group the collected samples, thus obtaining the structural characteristics of sample distribution. Through a questionnaire survey of 473 residents in Liangshan Yi Autonomous Prefecture, the following problems were found according to the survey results:

3.1. The overall cultural level of Liangshan farmers is low

Being able to correctly understand and understand the relationship between science and technology, nature and society is not only an important content of STL, but also an important goal to improve residents' STL. From a macro point of view, the progress of science and technology constantly promotes the development of human society; From the microscopic point of view, science and technology have penetrated into the daily life of residents. The survey results show that 88.1% of Liangshan natives and 85.4% of residents in surrounding areas think that the overall cultural level of farmers in Liangshan area is not high enough. In modern society, the level of school education in many rural areas is low. In the questionnaire survey, 77.6% of the residents in counties around Liangshan and 89.7% of the local residents think that the level of school education in Liangshan is not high enough. These data reflect that the threshold of teachers in Liangshan is low, the strength of teachers is weak, there is still a gap between educational facilities and big cities, parents lack educational awareness, and there is still much room for improvement in farmers' cultural level.

3.2. Farmers in Liangshan have a low understanding of scientific terms

Scientific terms are the weakest part of farmers' scientific knowledge, such as "molecule" (9.7%), followed by "DNA" (24.6%), "internet"(33.8%%) and" green food "(31.9%) (Figure 1). The reason is that scientific terms are not closely related to people's daily life, and they are not spoken language.

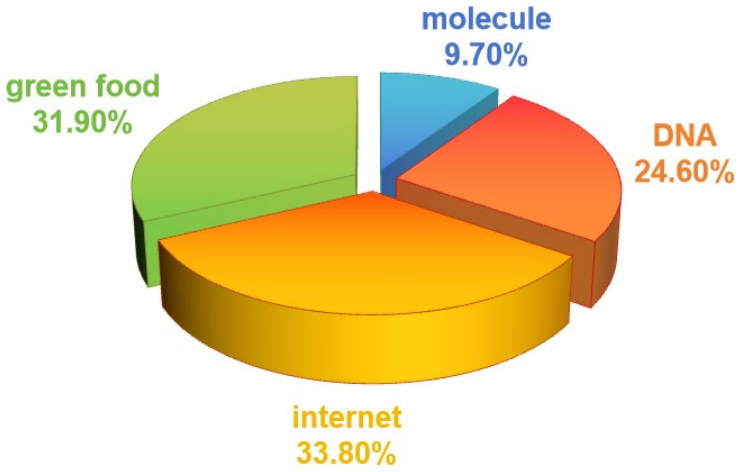

Figure 1 Farmers' understanding of scientific terms

There are significant differences in STL levels among farmers of different ages. The older you get, the lower your mastery rate of technical terms and scientific terms, but on the contrary, you are better than the younger public in mastering scientific knowledge closely related to daily life. STL levels of different occupational groups are uneven. Teachers, cadres and students in rural areas have the highest proportion of proper nouns and can keep up with the development of the times. For example, the correct answer rate to "internet" reaches 60.7%. Individual and private households are second.

3.3. Farmers have a single channel to obtain scientific and technological information

The survey results show that TV, movies, radio (87.6%), newspapers, books and magazines (38.5%), conversations with relatives and friends, neighbors (30.4%) and their own agricultural practices (31.8%) are the most common ways to obtain them, while training, visiting exhibitions (7.6%) and telephone consultation account for a low proportion. See Figure 2 for details.

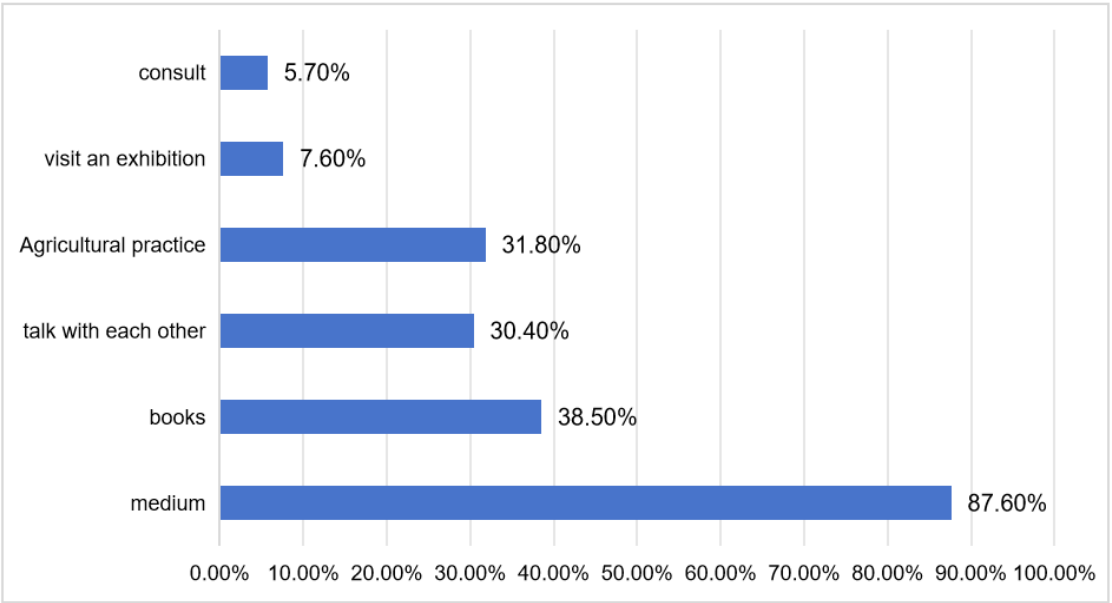

Figure 2 Farmers' access to scientific and technological information

From this, it can be seen that TV broadcasting plays an important role in farmers' popular science communication channels, and it can be seen that farmers have a single channel to obtain scientific and technological information, so we should strengthen the quality of popular science columns in TV broadcasting and expand popular science propaganda channels.

4. STL promotion path for farmers in Sichuan ethnic areas

4.1. Strengthen STL education for farmers

In school education, we should pay attention to both sides. While attaching importance to curriculum education, we should strengthen comprehensive quality education. On the issue of family education, the local government can hold family education training sessions for parents of different ages to make parents pay attention to their children's education and combine family education with school education. Regarding social education, relevant government departments should create a good social atmosphere, call on farmers to regulate their behavior, and cultivate good farmers who are polite, reasonable, and ethical. Through various methods and means such as night school training, science and technology lectures, and on-site guidance, farmers can be taught knowledge on the use of modern agricultural technology, scientific planting, and agricultural product processing technology. This allows farmers to learn and use scientific knowledge, truly experience the fruits of scientific knowledge, increase their interest in popular science knowledge, and promote the process of agricultural modernization and the implementation of rural revitalization strategies.

4.2. Strengthen the popularization of STL

As far as farmers are concerned, most of them are both a group seeking knowledge and a group whose values are easy to change [10]. The difficulty of improving residents' STL lies in how to make residents acquire more scientific knowledge and deepen their understanding of scientific methods, and the effective carrier to solve this problem is to hold various popular science education activities regularly. With the development and progress of society, today's newspapers have become a comprehensive media for people to understand entertainment information, social news and scientific and technological information. People of any income class, education level, age level and ethnic background can be readers of newspapers. This is because newspapers have some advantages that TV and radio do not have.

Farmers know social news, scientific knowledge and other information, mainly through television, followed by newspapers and radio. For farmers, the network is still a medium with low contact frequency. It can be said that the network is not the main channel for farmers to receive information dissemination. We should give full play to the scientific communication function of television. To improve farmers' STL, it is necessary not only to have accurate, fast and effective scientific media, but also to have communication content consistent with farmers' information needs. Give full play to the scientific communication function of newspapers and magazines. For farmers, newspapers are the media with the biggest change in contact frequency before and after they go to work. Obviously, newspapers are also a good choice to improve farmers' STL. Therefore, it is necessary to make full use of the scientific communication function of broadcasting, explore the advantages of broadcasting, expand the types of popular science programs, pay attention to the relationship between science and technology and life in topic selection, and combine scientific knowledge with farmers' daily life as much as possible. Relevant departments and network marketers should also vigorously explore and promote the popularity of the Internet among farmers, and strengthen the cultivation of farmers' network application ability so that farmers can use the Internet to obtain scientific and technological information.

4.3. Strengthen the team building of popular science popularization personnel

Science popularization in rural areas needs a group of scientific and technical personnel who are enthusiastic about science popularization, familiar with rural characteristics and can often go deep

into the front line of rural areas. We should also cultivate a group of popular science backbones among farmers, who are familiar with farmers' needs, improve their scientific and cultural quality and moral sentiment, and spread scientific ideas, popularize scientific knowledge, carry forward scientific spirit and solve specific problems around farmers through them. Multi-organization of mutual exchanges between villagers, learn from each other's strengths. In the long-term production practice, farmers have accumulated rich scientific and technological experience, but they have also encountered many technical problems. They hope to provide a platform for villagers to exchange and learn while training in science and technology, such as establishing technical exchange associations such as planting, breeding and processing. . Many farmers have a low level of education, some just graduated from primary school or junior high school, and their understanding ability is not strong, so they feel more difficult when receiving technical training. This requires trainers to concise their knowledge first, so that they can explain it in simple terms and be easy to understand.

4.4. Broaden the channels of raising funds and improve the evaluation and feedback mechanism of popular science work

Improving farmers' STL is inseparable from financial support, and the limited government funding restricts the better development of popular science work, so we should attract diversified funding through other channels. We can encourage all sectors of society to provide financial and material support for the construction of popular science in new areas by means of government grants, free support from enterprises, departmental donations and donations from charities, so as to form a relatively stable source of popular science funds. It is necessary to include the funds for popular science in the government budget and realize the synchronous growth with the fiscal revenue. The provincial and county governments at all levels in Sichuan province should also increase the investment in popular science funds in the existing fiscal expenditure to ensure the basic special funds for popular science. At the same time, in addition to the government's financial support for popular science, we should also broaden the channels for raising funds and attract diversified capital investment in various ways.

Because it is difficult to quantify the assessment, it is necessary to know whether the training and materials are easy to accept, whether farmers can understand them and whether they are really applied to daily agricultural production after the training and publicity materials are finished. It is necessary to sum up the difficulties in the work so as to revise and improve it in the future and better carry out the popular science work. It is necessary to incorporate evaluation and feedback into the important content of science and technology popularization and stick to it for a long time.

4.5. Overview of Practice

Relying on the internally developed "XiangZhenTianDi" digital rural comprehensive service platform and the "XiangZhenTianDi" digital new farmer training system [11], leveraging alumni resources in the ethnic areas of Meigu County, Liangshan Prefecture, and establishing connections with the Development and Reform of Ethnic Areas and the Economic Informatization Bureau, this study employs questionnaire surveys and on-site investigation methods to assess and analyze the scientific literacy of farmers in ethnic regions. Targeted scientific literacy courses are then developed based on the survey results. Utilizing the distinctive "County-level service provider - township-level station master - village-level administrator" talent cultivation model of XiangZhenTianDi, a combination of online and offline methods is adopted to conduct scientific literacy training for farmers in ethnic areas. The goal is to enhance the overall scientific literacy of ethnic mountain farmers.

Integrate the current "XiangZhenTianDi" rural e-commerce talent training system with the "Qihang Financial Intelligence" education and training system. Establish a comprehensive "XiangZhenTianDi" digital new farmer training system, which includes the creation of four specific courses for farmers in the ethnic regions of Liangshan Prefecture. These courses cover mobile photography, short videos and live streaming, the operational techniques of XiangZhenTianDi platforms, and fundamental concepts of financial intelligence and entrepreneurship.

With the help of the XiangZhenTianDi project team, relying on the educational resources of the XiangZhenTianDi research center and Neijiang Normal University, as well as the alumni resources of Meigu County, Liangshan Prefecture, we have targeted the development of four farmers' scientific literacy courses, produced online courses (including teaching materials, course videos, practical cases and materials), and enriched the "XiangZhenTianDi" digital new farmer training system, Develop technology literacy courses based on local ethnic languages.

Relying on alumni resources in ethnic areas of Liangshan Prefecture and connecting with relevant government departments in ethnic areas, a three-level structure of "XiangZhenTianDi" is adopted. From top to bottom, village level administrators and township level stationmasters are trained on the XiangZhenTianDi platform and mountain farmers' scientific and technological literacy skills. Each village has one administrator and each township has one stationmaster, establishing a core backbone for improving the scientific and technological literacy of mountain farmers and leading the way in achieving technological prosperity.

Leveraging alumni resources in the ethnic areas of Meigu County, Liangshan Prefecture, and establishing connections with rural communities in these ethnic regions, we utilize the XiangZhenTianDi digital rural comprehensive service platform and the XiangZhenTianDi digital new farmer training system. We implement a three-tier training structure, encompassing "County-level service provider - township-level station master - village-level administrator." This structure, organized from bottom to top, includes village-level administrators and township-level station masters. In our daily interactions, both in life and work, we employ the language and customs most familiar to farmers in ethnic areas. Through case studies, we conduct practical skills training in e-commerce and scientific literacy. This approach aims to enhance the overall scientific and technological literacy of farmers in Liangshan.

Relying on administrators and webmasters, with the help of the "XiangZhenTianDi" digital rural comprehensive service platform, we help farmers in ethnic areas sell surplus products, increase their income, enhance their trust in webmasters and administrators, become leaders in wealth, and drive mountain farmers to improve their scientific and technological literacy, knowledge, and skills.

5. Conclusions

Among the constituent elements of productive forces, the human factor is the most active one. It is an important task to popularize scientific and technological knowledge, spread scientific ideas and carry forward scientific spirit. The remarkable promotion of STL in rural areas is of great practical significance for realizing agricultural and rural modernization and rural revitalization. In STL education, we should pay attention to the study of our national culture, such as social customs, beliefs, etiquette habits, cultural connotations and so on.There is still much room for improving the cultural level of farmers in Liangshan. Therefore, we should pay attention to the problems existing in the dissemination of science and technology for farmers, analyze the characteristics of this group of farmers, especially the structure of the media for farmers, and effectively realize the scientific communication function of the media, so as to understand scientific knowledge for farmers, improve STL, and make due contributions to social and economic development and modernization.

Acknowledgements

(1) Research on the Path to Improve the Scientific and Technological Literacy of Sichuan Ethnic Mountain Farmers (SDJJ202308), Sichuan Ethnic Mountain Economic Development Research Center, and Sichuan Provincial Department of Education Key Research Base for Humanities and Social Sciences.

(2) Practical Exploration of Infiltrating Financial Intelligence Education in the Cultivation of Innovative and Entrepreneurship Talents in Local Universities in the New Era (SJJG2218), Sichuan Provincial Department of Education.

(3) Financial Intelligence Education and Entrepreneurship Practice, the Fourth Batch of Provincial Innovation and Entrepreneurship Education Demonstration Courses in Sichuan Province

(SJJK2106), Sichuan Provincial Department of Education.

(4) Financial Intelligence Education and Entrepreneurship Practice, the second batch of provincial-level mixed online and offline first-class undergraduate courses in Sichuan Province (SK202120), Sichuan Provincial Department of Education.

(5) Research on the Construction and Pilot Demonstration of XiangZhen Tiandi Digital Rural E-commerce Platform (X20B0003), Science and Technology Achievement Transformation Project of Neijiang Normal University.

References

[1] Zhang Xiaogeng, Yang Daofu, & Zhang Yulian. (2010). Exploration on improving farmers' scientific and technological quality education in Fujian Province. Fujian Agricultural Journal, 25(6), 4.

[2] Sharla Cheung. (2016). The current situation of the new generation of migrant workers' scientific and technological quality and the selection of training paths. China Youth Research (2), 6.

[3] Wang Shaofang. (2010). The main constraints and countermeasures to improve farmers' scientific and technological quality in the process of new rural construction. Research on scientific and technological management (17), 4.

[4] Huiling Guo, Ziyang Li, & Nan Zhang. (2014). Using new media technology to improve farmers' scientific and technological quality. Heilongjiang Animal Husbandry and Veterinary (7), 2.

[5] Lin Guihong. (2012). College students' scientific and technological literacy training and rural economic and social development in Guangxi. Academic Forum, 35(3), 5.

[6] Chen Lingjun,&Fu Qingye. (2010). Enterprise education: the necessary choice and realistic path to improve the quality of farmers. Continuing education research (6), 2.

[7] Jia Gangtao & Wei Mengsi. (2018). Research on Cultivating Farmers' Scientific and Technological Quality in the New Era —Taking Shaanxi Province as an Example. China Vocational and Technical Education (15), 6.

[8] Zhang Mingli, & Chen Man. (2018). Improving farmers' financial literacy and promoting the effect of financial poverty alleviation. Economic Research Reference (55), 8.

[9] Guo Yi, Ma Renmiao, & Chen Xinmiao. (2017). Cultivation Path of Innovative Literacy of Higher Vocational Students under the Background of "internet plus". Vocational and Technical Education (5), 3.

[10] Du Zhongquan, & Zhao Zhijian. (2019). Research on information literacy training path based on multimodal and cross-cultural. Information Science (10), 6.

[11] Liu Aihong, Chen Zili, et al.(2022), Research and Practice on Rural Revitalization Assisted by XiangZhen Tiandi Platform [J]. Rural Economy and Technology, 33 (24): 249-252.