A Study on Science Popularization Projects for Rural Youth in China

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Abstract--**As the status quo that rural population is half the population in China, science and technology communication to rural youth, which can lead them to know more about new technic and skills. The paper introduces some science communication and popularization projects for the youth in countryside, such as Rural informal science education project, Intel Learn program and extracurricular scientific activities for rural youth project. Through the analysis of the projects effect which have been carried out and the role that plays in science education of young people in rural China, the findings and suggestions of the study are: 1) living environment has an important impact on the rural youth, 2) the projects have positive effect on rural youth, especially on their scientific literacy, and it is essential to keep the further exploration on new pattern of science popularization in rural area, , 3) Pay more attention to the rural left-behind children's living ability and employability training.**

I. INTRODUCTION

According to the China eighth civic scientific literacy survey in 2010, the growth of the rural population's scientific literacy is the fastest, the basic scientific literacy ratio increases from 0.72% in 2005 to 1.51% in 2010.[1] It shows some progress and achievements made in Chinese rural science communication and popularization undoubtedly. As young people under the age of 18 years are not covered in the survey, there is a briefly introduction of science popularization for rural youth below 18.

A. The basic situation of rural education

In recent years, China's rural education has gained the success that got worldwide attention. The development and popularization of rural compulsory education for nine years which laid the most important foundation to improve the scientific and cultural literacy of rural adolescents are great. According to Chinese Educational Statistics[2]，in 2012, the number of schools in the compulsory education stage was 28 ten thousand, 13600 schools less than the previous year. In compulsory education stage, there is a total number of 32.9 million new students and 144.6 million students at school, with 9.1millon is full-time teachers.

At the same year，the government of China invested over 5.1 billion RMB of special funds, to continue the implementation of rural compulsory education school improvement plan, which repair school buildings, provide teaching experiment instrument, books, teaching facilities, and install remote multimedia teaching equipment for each class configuration in 23 provinces in central and Western China.

One concern is, along with the rapid urbanization in China, a large number of rural residents move to the city to earn more money, with their children becoming or migrant children or left-behind children. In 2012, the number of migrant children at the national compulsory education stage is 13.9 million in the school, with 10.3 million in primary school and 3.4million in the junior high school. The number of rural left-behind children is 22.7 million. Among them, 15.2 million children attended primary school, that the number in the junior high school is 7.5 million. [2]

B. The present situation of science popularization in rural area

The results of an investigation conducted by China Association for Science and Technology(CAST) in 2005 show that about half of 14 to 18 years old rural youth think planting technic, breeding technic and computer technic are the most important needs associated with their living and development .The top six of their favorite science popularization book categories are: Science and culture (53.2%), health education (44.1%), health knowledge (40.7%), natural science (37%), agricultural technology (34.9%) and information technology (31.9%).[3]

The findings of the investigation also shows that more than half of the rural primary and middle school students agreed that school teachers can consciously train their main observation, analysis, judgment, imagination and other scientific methods and skills. However, the findings also show some problems, e.g. , mastering the methods of scientific inquiry is crucial to students' scientific literacy , but only 40.6% of students in rural primary school can experience the process of scientific inquiry through classroom teaching and experiments . At the same time, 65.1% of students think that "the majority of natural science teachers in class basically copy the content of the textbooks." [3] This contrast shows that a considerable gap is between students' demand of scientific knowledge and the teaching and guidance provided by the school in rural area. The results of another survey show that the rural adolescents have higher awareness of the importance of the popular science and diverse requirements to scientific knowledge and transmission ways.[4]

II. METHODOLOGY

In recent years, CAST conducted continuous work and research about science popularization for rural youth at a national range. In this paper, the mainly research method is document literatures which have been published publically, which we can made up the insufficient data from new aspects by reanalyzing data and results from other institutes. At the same time, statistical findings from CAST will be used.

Annual report on the development of outline of the national scheme for scientific literacy gave a review on the development of science popularization for rural youth.

III. THE DEVELOPMENT OF SCIENCE POPULARIZATION PROJECTS FOR RURAL YOUTH

Two directions will be followed in this section about the development of science project for rural youth, that one is for the out of school youth and the other is for school students.

A. The Projects for the non-school youth

In rural China, a large number of students leave school to work at the age of 15 years after they finish 9 years of compulsory education, therefore there is in Chinese rural area a large part of students who leave school at age 15. There are some science popularization projects designed for this group, such as rural informal science education project and Chinese young migrant workers program.

1. Rural informal science education project

The rural informal science education project is a cooperative work undertaken by CAST and the United Nations Children's Fund (UNICEF). The collaborative partners work to provide the education for the young person in poverty area of China. The project is funded by UNICEF and managed by CAST.

In 2011-2015, the project covers 22 impoverished counties of middle-west China, and aim to help the14-17 years old country youth achieve the shift from school stage to working stage, to guide them to grow into the responsible citizen. With the performance of the project, the youths' recognition and adaption on the work and the society will be improved; their sense of involving social issues will be enhanced.

Through the establishment of "training center for the youth's development ", the project organizes work team of experts, to carry out the training course "step to society------life, employment, development", which attracts young people effectively. In 2012, the project holds "step to society------life, employment, development" in 155 counties in of 19 towns in10 provinces, which trains a total number of 5600 of junior high school and vocational high school students, including the workers training from catering industry, hotel, retail industry in 6 towns. Henan, Hunan, Gansu, Inner Mongolia and other places carry out curriculum related activities to promote community residents and youth to participation in.[5]

2. Chinese rural young migrants program

With the rapid economic and social development, as well as industrialization and urbanization rapid advance, more attention is paid on the rural young people under 18 years old who are migrant with having difference learning demand .

As the program supported by Millennium Development Goals funded by the UN, Chinese rural young migrants program has a period of three years (2009-2012), which supported by 9 UN agencies including International Labour Organization, the United Nations Development Programme, combined with China Ministry of Commerce, China Ministry of Human Resources and Social Security and other Organizations.[6]

The sub-projects conducted by CAST and UNICEF is "improve the opportunity to informal education of Chinese young migrant workers project, prevent them to entry into the labor force untimely" , which focuses on the rural youth population needs, developing informal education suitable to them, and offering flexible curriculum .The courses "interpersonal communication" and "information provide literacy" provide training to the young people leaved school not long ago, very helpful for them to step into the society and better dealing with others.

On account of the unfavorable living situation of the rural young migrants, the project group has carried out "baseline survey on offering the rural young migrants informal education in the experimental areas" in Beijing, Hunan, Shanxi, Tianjin, and Hebei. [7]As a result, the rural young migrants, who are different from their elder generation, have already had certain learning skills and possessed increasing desire to improve their living conditions by diversified learning. It has been found out that it is the successful mode of improving their living conditions to offer the rural young migrants informal education on the basis of guaranteeing their learning rights, with the core of capacity building, and comprehensively taking up fine experience.

B. The Projects for school students

Two typical Projects for school students will be introduce, which are Intel Learn program and the pilot project of extracurricular scientific activities for rural youth.

1. Intel Learn program

Intel Learn program is the one that Intel companies carry out in collaboration with governments and educational institutions in developing countries. The program extends learning beyond the classroom with an engaging, project-centered approach. Intel Learn is an informal education program that teaches youth the skills they need to succeed in our increasingly knowledge-based economy, with a focus on technology literacy, problem-solving, critical thinking, and teamwork.

Since 2003, Intel Learn has been built more than 400 projects in 31 provinces and cities of China, by the end of 2008 more than 1600 teachers and 290 thousand students received training. According to implementation assessment data of the project: more than 95% of the teachers think that the project is useful to cultivate and improve students' computer skills, writing skills and ability to solve practical problems.

In 2012, the program adjusts and optimizes the funds allocation and task management. Learning program is carried out in 27 provinces and cities of the 585 primary and

secondary schools, the science and technology museums, and training centers, 200 science and Technology Museums are included than the last years, with a total of 46 thousand teenagers being trained whic includes 30% of students from rural areas. Table Ⅰ is the training statistics of Intel Learn program from 2008 to 2012 in China.[5]

2. Pilot project of extracurricular scientific activities for rural youth

In 2013 ，the pilot project of extracurricular scientific activities for rural youth begins which are developed by CAST. It encourage schools to " design and participation by yourself " as the theme, design and carry out favorite scientific practice in accordance with regional characteristics ,which goal is to stimulate students' interest in science, as well as the experience of scientific research. This project is limited to primary and secondary schools in rural areas, and the goal is to develop extracurricular scientific activities for rural schools, train teachers and assistants, and improve the scientific literacy of rural students. In 2013, through the way of recommended by the provincial association for science and technology , 40 schools from 5 provinces: Yunnan, Inner Mongolia, Xinjiang, Henan, Hunan , are chosen as pilot schools.

The activity named "the wild herbs resources exploitation and protection of Baiyang town" is a good case. This activity is carried out by a school in Sichuan Province focusing on the protection of rare wild Chinese herbal medicine resource. In recent years, because of the rising price of wild medicinal material , the villagers in order to get economic interests, unauthorized and wasteful mining wild Chinese herbal medicines, which leads to resource depletion threats, species and quantities of wild herbs decrease sharply and environment degradation. Therefore, the school decides to launch status of wild medicinal plant resources in Baiyang town. The target consists of 3 parts: (1) make the villagers be conscious of protection of wild Chinese herbal medicines, (2) make the villagers get the specific methods, rational utilization and protection of local wild Chinese herbal medicine, (3) cultivate students' exploring and practice ability. Through the activity, the students and villagers feel the seriousness of wild Chinese herbal medicines in Baiyang town is destroyed, recognize the urgency of the protection of wild herbs.

C. Science wagons served in towns and villages

In towns and villages, it will provide science education through science wagons. CAST began to make and develop science wagons from 2000, more than 100 vehicles are provided annually to provinces and cities. The audience of science wagons includes the youth, farmers and the community resident, especially for the poor and the remote areas. Some characteristics are listed in Table II.

The exhibits in science wagons for rural primary and middle school students mainly consists of 3 parts, the first is the auxiliary display for school science curriculum of different grades . The second is the systemic demonstration of different courses (such as physics, chemistry, etc.), the third is a reflection of different natural science themes (such as water, air, and etc.) .

IV. SUGGESTIONS

This study introduces and analyzes science popularization of Chinese rural youth, and finds that some projects have important effect to the population, in addition some measures need to be implemented on this basis in the future.

A. The living environment has an important impact on the rural youth

The influence of rural living environment and traditional have a major impact on the youth .In Chinese rural, traditional and customary concept is still strong, such as an important purpose of reading is to get a good job, earn more money. Therefore, from the stage of school education, many works should be done to improve the quality of science education, to change the situation of lacking of educational resource and teacher. At the same time, a lot of people completed junior high school learning begin to do simple work, which makes them lose opportunities to improve their scientific literacy from the classroom, on the other hand also bring more poor for their future life.

TABLE I.THE TRAINING STATISTICS OF INTEL LEARN PROGRAM FROM 2008 TO 2012

Years	2008	2009	2010	2011	2012
training centers	450	430	403	362	585
number of teachers be trained	100	92	46	132	-
number of students be trained	71634	60000	56800	50000	46000

TABLE II. FEATURE OF SCIENCE WAGONS

Items	Features
The target population	the youth, farmers and the community resident
Suitable areas	Schools, towns and villages in poor and remote areas
Advantage	Easy to operate and update, lower cost, flexible
Defect	less exhibits, and less attractive

B. Exploration new pattern of science popularization in rural area.

The projects mentioned above have positive effects on rural youth, especially on their scientific literacy. What's next is to explore new pattern of science popularization to the youth in rural area . The main measures should be increasing their scientific awareness, improving the role of information technology in science, carefully selecting the content and focusing on the local features of the science web site. School, community and family are the basic units to learn science forrural youth, Which can be combined with the reform of rural education, exploring how to make training or spread practical technology knowledge.

C. Pay more attention to the rural left-behind children's living ability and workforce training.

At present, because of large number China rural teenagers will be still increase as well as the mentioned problems, which needs to improve step by step rather than to solve the problems at one stroke. Chinese government and various civil society and organizations recently do a lot to the development of children left-behind, also designed a lot of projects to help them. As the inevitable consequences of urbanization, left-behind children in the future is insurmountable, that more attention should be paid on this group, especially on their living ability and workforce training.

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