An Approach to the Extended TPB Model of Proenvironmental Production Behavior: A Case Study of New Types of Chinese Agricultural Business Entities

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Abstract: The issue of food safety has increasingly become the focus of the Chinese government and people, and the production process of agricultural products is a vital link to ensure food safety. In this research, we focus on examining the effects and mechanisms of antecedents of proenvironmental production intention. Under the framework of the extended theory of planned behavior, the research is empirically tested using a face to face survey of 162 new types of agricultural business entities from Chengdu and Guangyuan City of Sichuan Province. Our study indicates that moral obligation, subjective norms and environmental attitude significantly affect proenvironmental production intention of new types of agricultural business entities. However, perceived behavioral control does not have a direct significant effect on intention. Moreover, our extended TPB model including moral obligation has a stronger explanatory power than that of the original TPB model. Furthermore, the mediation effect test shows that environmental attitude and subjective norms promote proenvironmental production behavior by enhancing intention. Finally, insights and suggestions are discussed. In the future, local governments should use various media to strengthen environmental protection propaganda in rural areas and vigorously publicize the obligation and responsibility of proenvironmental production.

1. Introduction

Over the past few decades, the extensive use of pesticides, fertilizers and farm implements have undoubtedly increased China's crop production, fulfilled the growing needs for food and promoted the rural economic growth. However, at the same time, environmental pollution has become a major issue in rural areas of China, where the pollution caused by agricultural production is particularly severe. Even worse, the non-point source pollution in these areas continues to expand. The National Survey of soil pollution in 2014 shows that China's farmland soil pollution exceeds the standard by 19.4%, and agriculture has surpassed industry as the largest non-point source pollution industry in China.

The inefficient use or disposal of chemical fertilizers, pesticides and livestock feces have caused serious rural environmental pollution and China is suffering from frequent food safety problems. According to the China Rural Statistical Yearbook 2017, China used 59.841 million tons of chemical fertilizers and 1.74 million tons of pesticides in 2016 while the utilization rate of pesticides and chemical fertilizers in China is only approximately 80 percent of that of developed countries and only 20% of fecal sewage has been properly treated. At for the food safety, Rui Li found high occurrences of food safety incidents in Chinausing big data mining tools, There were 18,190 of them in 2013, 25,006 in 2014 and 26,131 in 2015. Although the number declined in 2016, it remains high at 18,641, with an average of 51 food safety incidents per day (Li et al. 2017). Therefore, the inefficient use and treatment of pesticides, fertilizers and livestock feces not only caused a great waste of resources but also had a serious impact on the rural environment, farmers' lives and the food safety of the entire society.

The Chinese government has attached great importance to rural environmental protection. In January 2018, the government published the No.1 document, "Opinions of the Central Committee

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of the Communist Party of China and the State Council on Implementing the Rural Revitalization Strategy," which stressed four dimensions of comprehensive management of environmental issues. In February, the “Three-Year Action Plan for the Rehabilitation of Rural Habitat Environment” proposed to strengthen the treatment of rural waste and improve the environment of villages. In September, the Strategic Plan for Rural Revitalization (2018-2022) proposed that the main investment directions were rural sanitation, garbage treatment and domestic sewage treatment. In November, the Agricultural and Rural Pollution Control Action Plan emphasized the prevention, protection, detection and control of water sources and pollution in rural areas. Clearly the Chinese government has paid more attention to rural environmental governance recently, but rural environmental pollution remains serious, and food safety problems remain numerous.

Most studies on proenvironmental behavior within the framework of the theory of planned behavior are carried out using a background of western culture, but relatively few researches are based on developing and transition countries including China (Dolnicar et al. 2017; Pronello and Gaborieau 2018; Swenson and Wells 2018; Sachdeva et al. 2019). In addition, most literatures in China aimed at ordinary farmers’ environmental behavior (Wu et al. 2017; Wang et al. 2018, 2019; Zeng et al. 2019). Therefore, the shortcomings of previous studies provide an opportunity for this paper to focus on the proenvironmental production behavior of new types of agricultural business entities (hereafter NTABE). At the end of 2017, the Chinese government proposed to make every effort to cultivate NTABE, especially family farms and professional cooperatives because the development of NTABE can reduce the financial constraints, improve the utilization efficiency of ecological resources and bring new opportunities to the cause of agricultural environmental protection (Xinhua News Agency 2016). According to the principle of "whoever causes pollution is responsible for its treatment" determined by China's Environmental Protection Law, and the "polluter pays" principle put forward by the Organization for Economic Cooperation and Development (OECD), NTABE must perform and undertake more environmental responsibilities for the treatment and protection of the rural environment as they are important participants in agricultural production and producers of agricultural environmental pollution.

To address the abovementioned research gaps, we identify the predictors of proenvironmental production intention and their influences are analyzed. Second, we confirm the moral obligation that contributes to intention of NTABE. Third, we extend the TPB model. It is found that the explanatory power of the extended TPB model including moral obligation is higher than that of the original model, which confirms the necessity of considering moral obligation in the study of proenvironmental behavior. Furthermore, the mediation role of intention in the path between antecedents of intention and proenvironmental production behavior are tested and verified. Lastly, based on these results, the theoretical contributions and implications of this study are synthesized and discussed. The new insights derived from the current study will provide valuable contributions to the literature and stakeholders in the proenvironmental production field, and specifically, to Chinese government that is supposed to take measures to improve the quality of environment in rural areas.

2. Literature Review and Research Hypothesis

2.1. Theory of Reasoned Action

The theory of reasoned action (TRA) assumes that most people's behavior is under the control of their rational will. TRA shows that people's behavioral intention is influenced by their attitude and subjective norms, while human behavior is determined by behavioral intention. Therefore, based on behavioral intention, most people's behaviors are predictable. It is also because of its strong predictive power that TRA is widely used in the study of market and consumer behavior. However, Ajzen (1985) puts that TRA is too simple to apply to the study of individual rational behavior and an individual's ability to control his or her behavioral intention is not only affected by internal psychological factors but also by external environmental factors. Therefore, according to Ajzen (1985), “TRA's explanatory power for behavior beyond personal will is limited.” To improve the

explanatory power of the theory of reasoned action, Ajzen (1985) added perceived behavioral control into TRA and developed it into the theory of planned behavior.

2.2. Attitude

Fishbein and Ajzen (1975) define attitude as "a psychological emotion or a positive(negative) evaluation that induces a certain behavior." According to the theory of planned behavior, people's attitude toward specific behaviors will affect their behavioral intention. Although proenvironmental production is generally believed to be beneficial to environmental protection, people may still hold different views about it. In general, we assume that the more positive the attitude of NTABE toward the environment, the stronger their intention to carry out proenvironmental production. Previous research has also shown that if individuals have a positive attitude toward environmental issues, they will carry out proenvironmental behaviors (Lao 2013). Therefore, the environmental attitude of NTABE has a positive impact on proenvironmental production intention.

2.3. Subjective Norms

Subjective norms are social pressures that are perceived when performing or not performing certain actions. People will get information and evaluations from neighbors, relatives and other intimate or prestigious people. According to TRA, people tend to abide by social or general standards of conduct and consider pressure or expectations from those who are important to them. They have a huge impact on the individual's intention and ultimately prompt him or her to decide whether to do something (Ajzen 1991). According to the theory of planned behavior, one's subjective normative factor is one of the determinants of their behavioral intention. Proenvironmental production behavior should be no exception. When pressure from various parties perceived by NTABE is greater, the proenvironmental production intention tends to be stronger. Therefore, the subjective norms of proenvironmental production will have an impact on proenvironmental production intention, and the impact is positive.

2.4. Perceived Behavioral Control

The meaning of perceived behavioral control (PBC) can be expressed that a person makes judgements on the degree of difficulty in carrying out a particular action. The most important difference between the theory of planned behavior and the theory of reasoned action is that the former that one's percieved behavioral control of a particular behavior positively affects the person’s behavioral intention. It means that human behavior is controlled not only by personal will, but also by other factors. These non-motivational factors include time, money, skill, and cooperation with others. When individuals act, the resources and opportunities in their hands should also be taken into account (Ajzen 1985). The NTABE believe that the better the conditions they have in favor of environmental production, the stronger their willingness to implement environmental production will be. Thus, perceived behavioral control has a positive impact on proenvironmental production intention.

Hypothesis 1a: Environmental attitude, subjective norms and perceived behavioral control positively affect proenvironmental production intention.

Hypothesis 1b: Environmental attitude, subjective norms and perceived behavioral control positively affect proenvironmental production behavior via intention.

2.5. Theory of Planned Behavior

According to TPB, attitude, subjective norms and perceived behavioral control together affect people's behavioral intention, which ultimately determines human behavior. Some scholars have verified that the addition of perceived behavioral control enhances the explanatory power of difficult-to-implement behaviors (Leonard et al. 2004). The TPB model has been applied to various fields including the environment and green behavior. For example, Han et al. (2010) used the theory of planned behavior to study the formation of people's choice of green hotels. Based on the TPB model, Liu et al. (2017) explored the relationship between some travelers' intention of choosing low-carbon travels and a range of psychosocial factors. Chen (2016) used TPB to explain the

behavioral intention of people to save energy and reduce emissions to mitigate climate change in Taiwan. However, the theory of planned behavior has been heavily criticized for neglecting moral considerations. Gorsuch and Ortberg (1983) reckon that in real life, one's intentions before carrying out specific behaviors are usually related to moral obligation or ethics, and other scholars support this statement, suggesting that at least in some cases, not only should subjective norms and other factors be considered but also moral obligation. Beck and Ajzen (1991) and Leonard et al. (2004) also proved that the addition of moral obligation variable significantly improved the ability of their models to predict the behavioral intention.

2.6. Moral Obligation

Moral obligation is the sense of responsibility that an individual feels when making moral (or unethical) choices in a moral context (Beck and Ajzen 1991). Some scholars believe that the ability to predict behavioral intention can be significantly improved when factors such as moral obligation, attitude, subjective norms and perceived behavioral control are applied simultaneously to the prediction (Beck and Ajzen 1991; Leonard et al. 2004). For example, an individual's moral obligation affects his or her intention to participate in piracy (Yoon 2011). In predicting the intention to recycle waste, personal moral obligation is positively correlated with recycling intention (Tonglet et al. 2004), The results from Chen and Tung (Chen and Tung 2010) also suggest that moral obligation can be used to effectively predict the behavioral intention to recycle waste. Another study by Chen and Tung (2014) found that an individual's moral obligation can be used to predict one's intention to stay in a green hotel. However, there is currently no relevant research on the impact of moral obligation on the proenvironmental production behavior of NTABE.

Hypothesis 2a: Moral obligation positively affects proenvironmental production intention.

Hypothesis 2b: Moral obligation positively affects proenvironmental production behavior via intention.

2.7. Intention

Warshaw and Davis (1985) define behavioral intention as the degree to which a person has formulated conscious plans to perform or not perform some specified future behavior. Measurement of behavioral intention can be used to predict the generation of actual behavior (Ajzen 1985); the stronger the proenvironmental production intention, the more likely one is to carry out proenvironmental production behavior. Therefore, proenvironmental production intention has a positive impact on proenvironmental production behavior.

Hypothesis 3: Proenvironmental production intention positively affects proenvironmental production behavior.

Proenvironmental production behavior is an act that is influenced by personal ethics and social responsibility. In real life, the intention of an individual to carry out a specific behavior is usually related to moral obligation or moral norms. Previous studies have shown that the addition of the moral obligation significantly improves the ability to predict behavioral intention (Leonard et al. 2004; Yoon 2011). To enhance the explanatory power of the proenvironmental production intention of NTABE, it is reasonable to include moral obligation into the TPB model. This study assumes that the explanatory power of the extended TPB model containing the moral obligation variable should be higher than that of the original TPB model.

Hypothesis 4: The addition of moral obligation raises the explanatory power of the theory of planned behavior.

For the proenvironmental production behavior that is rational and subject to external environmental conditions, the mechanism of the factors is as follows: environmental attitude, subjective norms, perceived behavioral control, and moral obligation jointly affect behavioral intention, and behavioral intention affects proenvironmental production behaviour.

3. Questionnaire and Survey Method

3.1. Questionnaire

To make the questionnaire easier to read and understand, and at the same time make the study more in line with the actual situation and requirements, the questionnaire of this study defines proenvironmental production as less (or no) pesticides, less (or no) common fertilizers and comprehensive use and treatment of livestock and poultry manure. There are three reasons why the proenvironmental production behavior is specific to the above behaviors: First, the behaviors mentioned above can reduce pollution, shortages in atmosphere, land, and water resources, and improve resource efficiency; second, on August 20, 2017, the Ministry of Agriculture of China issued the "Action Plan for the Utilization of Livestock and Poultry Resources (2017-2020)" and the "List of Tasks for Implementing the Plan for Quality Improvement Actions in Sichuan Province." These government documents emphasized the treatment of pesticides, fertilizers, livestock and poultry manure. Third, proenvironmental production behavior has obvious positive externalities. When NTABE conduct actual production, they must generally consider the objective environment and the constraints of economic conditions. Therefore, it is realistic and reasonable to clarify the proenvironmental production behavior to these specific behaviors.

In addition to basic information such as the gender, age, education and family income of the respondents, this questionnaire designed three to four questions (variables) for each variable of the extended theory of planned behavior (see appendix). All questions (indicators) excep those set for proenvironmental production behavior have been used by previous researchers, whose studies have show that these indicators are effective. The variables of environmental attitude X_{11}, X_{12} and X_{13} are based on the social psychology theory by Taylor and Todd (1995), which reflect the likeness, importance and support of proenvironmental production behavior, respectively. According to the theory of Cialdini et al. (1991), subjective norms comprise personal norms (including ethics and self-identification), exemplary norms and prescriptive norms; the X_{21} in this questionnaire reflects the ethics and self-identification of the personal norm, and variables X_{22} and X_{23} embody the exemplary norm and directive norm, respectively. Ajzen and Fishbein (2005) believe that perceived behavioral control should comprise internal control beliefs (including personal shortcomings, skills, abilities, and emotions) and external control beliefs (including information, opportunities, dependence on others, obstacles); therefore, in the setting of the perceived behavioral control variables in this questionnaire, the variables X_{31} and X_{33} are set according to the internal control beliefs to reflect economic ability, and the variable X_{32} is set according to the external control belief of perceived behavioral control, which focuses on the perspective of information. In terms of moral obligation, the setting of the observed variables refers to the study of Brody et al. (2012), and the three variables X_{41}, X_{42} and X_{43} are set to measure. Gollwitzer (1999) divided behavioral intention into two phases: the motivation formation phase followed by the planning formation phase. The proenvironmental production intention of this questionnaire is measured according to the two stages. The X_{51} and X_{52} variables are used to measure the proenvironmental production intention intensity of the motive formation stage, and the last variable X_{53} of this part is used to measure the intensity of the proenvironmental production intention at the formation stage of the planning. As mentioned above, according to the current situation of agricultural development in Sichuan Province and the requirements of the Sichuan Provincial Government for rural environmental governance, this questionnaire uses X_{61}, X_{62} and X_{63} to measure proenvironmental production behavior. The answer to this questionnaire is based on the five-point Likert scale. The questionnaire reflects environmental attitude (X_{11}, X_{12} and X_{13}), subjective norms (X_{21}, X_{22} and X_{23}), perceived behavioral control (X_{31}, X_{33} and X_{32}), moral obligation (X_{41}, X_{42} and X_{43}) and proenvironmental production intention (X_{51}, X_{52} and X_{53}), where the choices of questions (variables) are as follows: very inconsistent with my actual situation, not in line with my actual situation, unclear, in line with my actual situation, very consistent with my actual situation. The questions (variables) set for proenvironmental production behavior are X_{61}, X_{62} and X_{63}. The choices are: never, rarely,

sometimes, often, and very frequently.

3.2. Survey Method

This study takes NTABE in Sichuan Province as the research object. The questionnaire data of this study were collected from the special survey on the status of proenvironmental production in Sichuan Province from July 2018 to August 2018. This survey selected six representative districts (counties), covering the plain areas with a higher level of agricultural development and the hilly and mountainous areas with a lower level of agricultural development. The specific locations are Chaotian District, Wangcang County and Cangxi County under the jurisdiction of Guangyuan City the locations also include Wenjiang District, Pengzhou City and Chongzhou City and in Chengdu City. The output value of primary industry in Chengdu in 2016 was 47.494 billion RMB(1 dollar = 6.88 RMB), ranking first out of 21 cities (states) in Sichuan Province, while the it was only 10.644 billion RMB in Guangyuan City, ranking sixth from the bottom. The output value of primary industry in Pengzhou City, Chongzhou City and Wenjiang District of Chengdu ranked 2nd, 6th and 13th among the 20 districts (counties) of Chengdu. The output values of the primary industries in Cangxi County, Chaotian District and Wangcang County of Guangyuan City rank 1st, 3rd and 7th, respectively, in the 7 districts (counties) of Guangyuan City. We adopted the method of typical sampling, and our principles of selection are as follows: (1) including samples with considerable profits and samples that cannot cover their costs. (2) including samples with a large production scale and a small scale. The specific executors of the survey were 8 members of the project team, and the research team was divided into two groups: one responsible for research tasks in Chengdu and one for those in the Guangyuan area. The investigation was conducted via face-to-face interviews with the individual in charge of the NTABE (president or vice president, main family members). The quality control of questionnaires and surveys is shown in the appendix. In this study, 200 questionnaires were sent out and a total of 200 were collected. After removing uncompleted questionnaires and perfunctorily answered ones, 162 valid questionnaires were obtained, with an effective recovery rate of 81.00%.

The respondents came from Sichuan province of China, covering Chengdu and Guangyuan City. Thanks to the agricultural and economical features of the two cities, they typically represented the entire province and varied hugely by gender, age, educational level and their annual household income. Table 1 shows the demographic profile of the sample. The respondents mainly covered various NTABE groups, which could be used for further analysis.

As shown in Table 1, Gender, education level, type and marital status are classified variables, while annual household income, age and family size are continuous variables. we obtained answers from 48 women and 114 men. Among the interviewees, 24.69%, 43.83% and 23.46% of the respondents were educated in primary school, junior middle school and senior high school, respectively, while only 7.41% and 0.62% of the respondents had studied in Junior college, undergraduate and above, respectively. Of the 162 samples, family farms and professional cooperatives accounted for half each. In terms of marital status, 93.80% of the samples were married, and only 6 respondents were unmarried and 4 respondents were divorced. The statistical results of annual household income, age and family size show that the average values are 80640.12, 50.35 and 4.358, respectively.

3.3. Representativeness of the Sample

Hair et al. (2011) noted that when there are no more than 7 constructs in a study, the minimum sample size is 150. In this study, the maximum number of latent variable is 6 and the number of the effective sample is 162, meeting the requirements for SEM analysis. Therefore, the original survey data collected in this study can bring theoretical and practical significance to this empirical study.

4. Data Analysis and Results

Structural equation modeling (SEM) has received widespread recognition in the social sciences (Bentler and Dudgeon 1996), where it can calculate the relationship between unobserved structures

(latent variables) and observable variables; therefore, its use is usually reasonable. SEM also integrates regression analysis, factor analysis, path analysis and other methods to transform the test ability of variable relations from exploratory analysis to confirmatory analysis while processing the multiple correlations of variables, and gives powerful theoretical support to statistical hypothesis testing. SEM also allows measurement errors for independent and dependent variables, making it possible to analyze the structural relationships among latent variables.

Table 1 Respondent profile.

Variable	Frequency	Percentage
Gender		
Female	48	29.63%
Male	114	70.37%
Educational level		
Primary school	40	24.69%
Junior high school	71	43.83%
High school	38	23.46%
Junior college	12	7.41%
Bachelor's degree and above	1	0.62%
Type		
Family farms	81	50.00%
Professional cooperatives	81	50.00%
Marital status		
Unmarried	6	3.70%
Married	152	93.80%
Divorced	4	2.50%

Variable	Std Dev	Average	Min	Max
Annual household income	160648.83	80640.12	0.00	1800000.00
Age	10.84	50.35	21.00	75.00
Family size	1.51	4.36	2.00	11.00

Therefore, to achieve the purpose of this study, this paper uses SEM analysis to test hypotheses relating to the theory of planned behavior to predict proenvironmental production intention. Next, the moral obligation variable is added to the original TPB to further test the explanatory power of the extended model.

Confirmatory factor analysis (CFA) is part of the SEM analysis. Thompson (2004) proposed that because the measurement model can correctly reflect the constructs or factors of the study, SEM researchers should analyze the measurement model before performing the analysis of the structural model. The CFA measurement variable reduction in this study is based on the two-stage mode correction of Kline (2005). Before the structural model evaluation is performed, the measurement model is tested. If the measurement model compatibility is found to be acceptable, then the second step is performed to complete the SEM model evaluation.

4.1. Verification of Convergence Validity

This study conducts CFA analysis for all constructs. The six constructs of the model are environmental attitude, subjective norms, perceived behavioral control, moral obligation, intention, and proenvironmental production behavior, and the factor loadings of all constructs except perceived behavioral control are almost greater than 0.50 and statistically significant. The entire compositional reliability (CR) of every construct except the perceived behavioral control is greater than 0.6, while the proenvironmental production behavior is slightly lower than 0.6. The average variance extracted (AVE) are all greater than 0.36, while the AVE values of perceived behavioral control and proenvironmental production behavior are slightly below 0.36 (as shown in Table 2). Overall, it basically met the acceptable standards proposed by Fornell and Larcker (1981) and Hair et al. (2011): First, the factor loading is greater than 0.5; second, the SMC is greater than 0.36; third, the composition reliability (CR) is greater than 0.6; and fourth, the AVE is greater than 0.36. Therefore, the model has convergence validity.

4.2. Verification of Differential Validity

The differential validity analysis verifies whether there are significant differences between the two constructs. In this study, the SEM estimation method is used to set the correlation coefficient, and the rejection of the null hypothesis indicates that there is a discriminant validity. According to the analysis results, the correlation coefficient test of environmental attitude, subjective norm, perceived behavior control, intention and proenvironmental production behavior rejects the null hypothesis, indicating that the discriminant validity is good. According to the above test results of convergence validity and differential validity, we can assert that the survey data of this study can pass the validity test, and the effect is ideal.

4.3. Fitness Index

When applying SEM as a theoretical model, the acceptable goodness of fit is a necessary condition for SEM analysis (Wu 2009). The better the goodness of fit, the closer the model matrix is to the sample matrix. References for this study are given in studies by Hoyle and Panter (1995) , Boomsma (2000) , McDonald and Ho (2002), Schreiber (2008) and Jackson et al. (2009). This paper selected several indicators to evaluate the fitness of the overall model, including χ^2 verification, χ^2 to degree of freedom, Goodness of Fit (GFI), Adjusted Goodness of Fit (AGFI), Root Mean Square Error of Approximation (RMSEA), Normed- Fit Index (NFI), Non-Normed Fit Index (NNFI), Increasingly Fit Index (IFI), and Comparative Fit Index (CFI). The data from the 162 questionnaires obtained in this study were fitted with the hypothetical model. Under the original TPB model framework, the results are: chi-square value = 185.612, degrees of freedom = 83, chi-square to degree of freedom (CHI/DF) = 2.236, P-value = 0.000, GFI=0.872, AGFI=0.815, RMSEA=0.088, NFI=0.864, IFI=0.92, CFI=0.919, NNFI =0.897. As for the extended TPB model, the results are: chi-square = 312.968, the degree of freedom = 124, the chi-square to degree of freedom (CHI/DF) = 2.524, P = 0.000, GFI = 0.830, AGFI = 0.766, RMSEA = 0.097, NFI = 0.83, IFI = 0.89, CFI = 0.888, NNFI = 0.862 (see Table 3). The standard chi-square (CHI/DF) less than 5 is considered to be an acceptable level (Marsh and Hau 1996). According to Wu (2009), RMSEA is the most important index of fitness evaluation. The RMSEA value is ideal when it is less than 0.1. Homburg and Baumgartner (1995) and Doll et al. (1994) suggested that GFI and AGFI values should be greater than 0.8. In this study, most of the indicators meet the criterion, which means that the survey data match the theoretical frameworks well.

Table 2 Reliability Analysis.

Construct	Indicator	Standardized β	S.E.	SMC	1-SMC	C.R.	AVE
Environmental Attitude	EA1	1		0.627	0.373		
	EA2	1.108***	0.107	0.638	0.362	0.863	0.677
	EA3	1.202***	0.102	0.766	0.234		
Subjective Norms	SN1	1		0.503	0.497		
	SN2	1.287***	0.116	0.933	0.067	0.889	0.73
	SN3	1.260***	0.119	0.753	0.247		
Perceived Behavioral Control	PBC1	1		0.005	0.995		
	PBC2	5.546	6.82	0.192	0.808	0.494	0.33
	PBC3	11.269	13.915	0.794	0.206		
Proenvironmental Production Intention	PPI1	1		0.425	0.575		
	PPI2	1.681***	0.164	0.962	0.038	0.9	0.755
	PPI3	1.576***	0.155	0.878	0.122		
Proenvironmental Production Behavior	PPB1	1		0.284	0.716		
	PPB2	0.6***	0.175	0.154	0.846	0.546	0.295
	PPB3	0.992***	0.354	0.448	0.552		
Moral Obligation	MB1	1		0.74	0.26		
	MB2	0.982***	0.074	0.746	0.254	0.886	0.722
	MB3	0.839***	0.07	0.681	0.319		

4.4. Structural Model Analysis

This study first examined the explanatory power of the TPB model. Subsequently, the moral obligation variable was included in the TPB model to compare the explanatory power.

The TPB estimates indicate that three variables, environmental attitude, subjective norms, and perceived behavioral control, can account for 58.4% of the variation in proenvironmental production intention. The results of the path coefficient analysis are shown in Table 4. Environmental attitude (b=0.548, t=5.223) and subjective norms (b=0.269, t=3.440) have positive effects on intention, but perceived behavioral control (b=0.084, t=0.656) is not in line with our expectations; that is, perceived behavioral control cannot exert a significant impact on intention.

The extended TPB model estimates show that environmental attitude, subjective norms,

perceived behavioral control, and moral obligation can account for 60.8% of proenvironmental production intention. Environmental attitude (b=0.510, t=5.036) and subjective norms (b=0.169, t=1.999) have positive effects on intention. However, perceived behavioral control (b=0.078, t=0.646) did not exert a significant impact as expected. In addition, moral obligation (b=0.198, t=2.368) positively affects intention which means that the main positive influencing factors of intention include not only environmental attitude and subjective norms but also the important variable of moral obligation.

Table 3 Fit indices of TPB and extended the TPB model.

Fitness Index	TPB Model	Extended TPB Model
Degrees of freedom	83	124
chi-square value	185.612	312.968
chi-squared/d.f. ratio	2.236	2.524
P	0.000	0.000
GFI	0.872	0.83
AGFI	0.815	0.766
RMSEA	0.088	0.097
NFI	0.864	0.83
IFI	0.92	0.89
CFI	0.919	0.888
NNFI	0.897	0.862

It is observed that in terms of squared multiple correlation (SMC), the explanatory power difference between the original TPB model (SMC = 58.4%) and the extended TPB model (SMC = 60.8%) reached 2.4%. The empirical results are consistent with the results of Harland et al. (2010), that is, the addition of moral obligation increases the explanatory power of behavioral intention by 1% to 10%. The chi-square difference test shows that there is a statistically significant difference in the explanatory power between the two models: the original TPB model vs. the extended TPB model ($\Delta\chi^2$=127.356, d.f.= 41, p <0.0001). The P value is less than 0.0001, which is considered of high statistical significance according to traditional standards and means that the extended model is more suitable for explaining proenvironmental production intention. Based on the results of this empirical study, when predicting proenvironmental production behavior, the extended TPB model is a more ideal theoretical model.

Table 4 Competitive model coefficient path.

Variable	TPB Model			Extended TPB Model		
	Standardized β	S.E	Conclusion	Standardized β	S.E	Conclusion
EA→Intention	0.548***	0.109	Yes	0.510***	0.105	Yes
SN→Intention	0.269***	0.084	Yes	0.169***	0.089	Yes
PBC→Intention	0.084	0.757	No	0.078	0.717	No
MO→Intention				0.198***	0.088	Yes
Intention→Behavior	0.401***	0.161	Yes	0.403***	0.161	Yes
R^2	0.584			0.608		

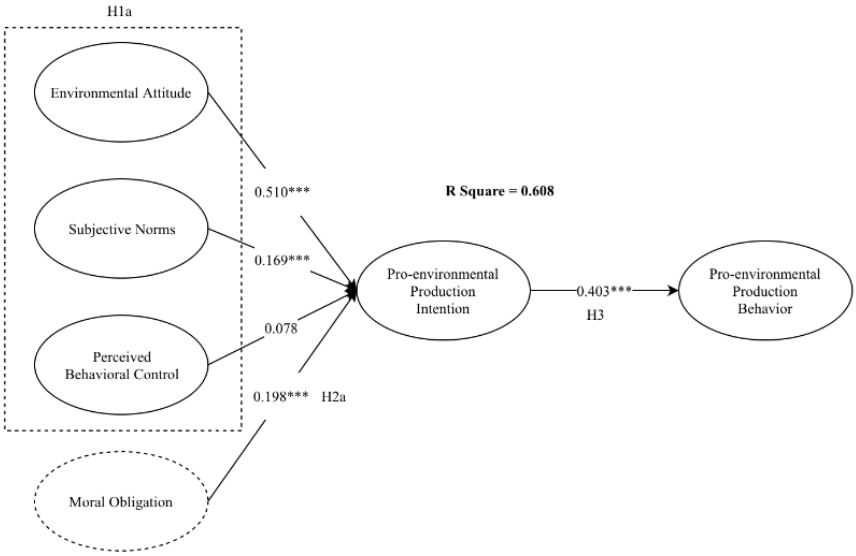

Figure 1 Coefficient path.

To further test how various factors affect proenvironmental behavior, we use the Bootstrapping method to verify the existence of the mediation effect. Simulation research shows that Bootstrapping is more powerful than the Sobel test and the causal steps approach to testing intervening variable effects (MacKinnon et al. 2004; Williams and MacKinnon 2008); in addition, Hayes (2009) indicated that reporting Boostrapping results is enough. Therefore, this paper only uses the Boostrapping method to analyze the mediation effect, and the results are shown in Table 5.

Table 5 Mediation effect.

Variable	β	SE	Z	Bias-Corrected P	Percentile P
				Total effect	
EA→Behavior	0.404	0.170	2.376	0.002***	0.002***
MO→Behavior	0.530	0.214	2.477	0.001***	0.002***
SN→Behavior	0.207	0.207	1.000	0.196	0.146
				Indirect effect	
EA→Behavior	0.346	0.312	1.109	0.024**	0.05**
MO→Behavior	0.230	0.130	1.769	0.052*	0.108
SN→Behavior	0.335	0.161	2.081	0.011**	0.068*
				Direct effect	
EA→Behavior	0.058	0.345	0.168	0.672	0.895
MO→Behavior	0.301	0.248	1.214	0.145	0.179
SN→Behavior	-0.128	0.250	-0.512	0.320	0.671

Table 5 shows that using the Bias-Corrected method and Percentile method, the total effect of environmental attitude on production behavior is significantly positive, indicating that environmental attitude promotes proenvironmental behavior. Specifically, the indirect influence test shows that the regression coefficient is significantly positive. However, the direct impact is not significant, indicating that environmental attitude does promote proenvironmental production behavior by enhancing proenvironmental intention. Similarly, subjective norms also promote proenvironmental production behavior by enhancing proenvironmental intention. Moral obligation

does not pass the indirect effect test under the Percentile method, so there is no mediation effect.

In short, the results of this empirical study show that environmental attitude, moral obligation and subjective norms have a significant positive impact on proenvironmental production intention. In addition, environmental attitude and subjective norms promote proenvironmental production behavior by enhancing intention.

4.5. Statistical Characteristics of Moral Obligation

To explore the statistical characteristics, the 162 questionnaires were divided into groups according to the gender, age, annual income and other characteristics of the interviewees. First, the samples were divided into two groups according to sex, including 114 males and 48 females; second, with 54 years old as the median, the samples were divided into younger and older groups, with a sample size of 102 and 60, respectively. We also grouped the samples according to the annual household income with a median of 45000 RMB. We obtained 72 samples as low-income samples and 90 samples as high-income samples.. On this basis, this study calculates and compares the average values of moral obligation in different groups, and then fits the above grouped data with the theoretical model of this study. The standardization coefficient of pairwise comparison and its significance are then compared. Finally, the following statistical characteristics of moral obligations affecting proenvironmental production intention are summarized (see Table 6).

When the primary responsible persons have the characteristics of male, low income, low education level and younger age, the impact of moral obligation on proenvironmental production intention is more significant, although there is no significant difference between family farms and professional cooperatives. To be specific, the moral obligation of the NTABE with men as the primary responsible persons have a stronger impact on proenvironmental production intention. The standardized influence coefficient is 0.599 in the male population, higher than it is in the female group(0.464), and the result of the significance test is better. Second, the moral obligation of the low-income samples has a stronger impact on intention. At the same time, the influence coefficient of the group with lower education level is more significant than that of higher education level. Finally, in the younger group, the standardized influence coefficient is 0.619, while in the older group, the standardized influence coefficient is 0.440. A reasonable explanation for this conclusion is that because of the importance attached to men by social culture and family tradition, men tend to show a stronger sense of leadership and social responsibility than women. Therefore, it is easier for them to identify with environmental responsibility in agricultural production. Also, the normal life of the people with lower education level and lower income is more likely to be disturbed by environmental pollution and ecological degradation, and so they are more inclined to pay more attention to environmental protection in agricultural production. Young groups tend to have a higher desire for knowledge and a greater desire to change the status quo than older people and are more likely to accept novel environmental ideas, thus often reflecting a higher level of moral obligation.

5. Discussion

Our study shows that moral obligation has a positive effect on intention and this is consistent with the results of most literature focusing on moral obligation. However, the impact of moral obligation on intention is not stronger than that of attitude and subjective norms, which contradicts with the results from Brody et al. (2012) indicating that moral obligation is the strongest predictor of intention to engage in proenvironmental behaviors. According to the results of Arvola et al. (2008), the relative influences of the variables, including attitude, moral attitude and subjective norms, varied between the countries, such that in the UK and Italy moral attitude rather than subjective norms had stronger explanatory power. In Finland it was other way around. Moreover, moral norms have a larger effect than attitude while it is not the strongest predictor in the previous studies (Botetzagias et al. 2015).

Table 6 Coefficient and significance of moral obligation affecting intimate production intention.

	Group	Standardized β	S.E.	t
Gender	Male	0.599***	0.106	5.205
	Female	0.464***	0.291	2.503
Age	Younger	0.619***	0.115	5.04
	Older	0.440***	0.219	2.785
Education	Lower	0.663***	0.111	4.711
	Higher	0.294*	0.27	1.927
Annual Income	Lower	0.584***	0.144	4.463
	Higher	0.519***	0.141	3.886

It is worth noting that the empirical results obtained from both the original TPB and the extended TPB model indicate that the perceived behavioral control of NTABE is not an effective predictor. There may be three reasons. First, Kaiser and Gutscher (2010) said that when TPB is used to explain the general behavior, the effect of perceived behavioral control on behavioral intention has proven to be a negligible path. Second, the capabilities and resources possessed by NTABE make the causal relationship between perceived behavioral control and intention unclear. Third, adopting the proenvironmental production means that NTABE have to bear relatively high costs while the benefits stemming from the implementation of their measures are non-exclusive. As a consequence, rational individuals will prefer to be "free riders" and NTABE will be reluctant to engage in proenvironmental production even if they have more resources and stronger capabilities.

6. Conclusions, Implications and Future Research

Based on the survey data from the NTABE in Chengdu and Guangyuan City of China ,we analyzed the influencing factors and mechanism of proenvironmental production using the original and extended TPB models. The main results of this study are as follows: first, under the extended and original TPB models, perceived behavioral control has no significant effect on proenvironmental production intention. Therefore, when analyzing proenvironmental production behavior, the influence of perceived behavioral control on intention is a negligible path; second, environmental attitude and subjective norms promote proenvironmental production behavior by strengthening intention. Although there is no mediation effect, moral obligation still positively affects intention; third, the explanatory power of the extended model with moral obligation is 2.04% higher than that of the original model, and so the extended TPB model is a more ideal theoretical model; fourth, when the primary responsible persons of family farms and professional cooperatives have the characteristics of male, low income, low education level and younger age, the impact of moral obligation on intention is more significant while there is no significant difference between family farms and professional cooperatives.

This study has some theoretical and practical significance for strengthening the proenvironmental production of NTABE:

First of all, because environmental attitude has the most significant positive impact on intention, efforts should be made to increase intervention in proenvironmental production intention, especially in environmental attitude. Local governments should use television, billboards, village radio and other forms of propaganda to strengthen environmental protection propaganda in rural areas.

Second, in view of the positive impact of subjective norms on intention, the family, relatives and friends of NTABE should encourage and persuade them to change their production behaviors and

choices from time to time so that they will probably actively recycle resources, reduce waste and choose raw materials and production modes that are less harmful to the rural environment.

Third, moral obligation has a significant and positive impact on intention, so the government should vigorously publicize the obligation and responsibility of proenvironmental production, as a result, NTABE can be deeply aware of the necessity and importance of proenvironmental production. For consumers, consumers can force NTABE to step up pro-environmental production by choosing agricultural products that do little damage to the environment, such as organic food.

Furthermore, as moral obligation exhibits different characteristics in different groups, the government and relevant propaganda agencies should selectively publicize and improve the efficiency of propaganda in the future. It means that the government and social institutions should pay more attention on strengthening the propaganda work of women, individuals with high income, and highly educated and older people.

Along with a few interesting conclusions and implications in the research, some limitations should be noted. First, our study focused on intention of proenvironmental production, while behavior is not completely determined by intention. Thus, future research may pay more attention to behavior rather than intention. In addition, due to time and cost constraints, the study samples are concentrated on samples from Chengdu and Guangyuan City, which may cause some deviation in the results. Although they are potentially the most representative NTABE, expanding the sources of the sample will make the conclusions more scientific and effective. Meanwhile, the sample size of this research was determined by the number of measurement items according to empirical rule rather than statistical method, thus there is a limitation in sample size and we must admit that the results cannot be generalized. In further research, we will calculate the sample size based on appropriate statistical method to make the results more generally applicable. Future studies should try to observe their samples repeatedly at a fixed time to see if their behaviors and other factors would change with the variation of external environment; future studies can also adopt the method of experimental economics, using well-controlled experiments to study various behaviors.

References

[1] Ajzen, I. (1991) The theory of planned behavior. Organizational behavior and human decision processes, 50, 179–211.

[2] Ajzen, I. and Fishbein M (2005) The influence of attitudes on behavior. The handbook of attitudes, 173, 31.

[3] Arvola, A., Vassallo, M. and Dean, M. (2008) Predicting intentions to purchase organic food: The role of affective and moral attitudes in the Theory of Planned Behaviour. Appetite, 50, 443–454.

[4] Beck, L. and Ajzen I. (1991) Predicting dishonest actions using the theory of planned behavior. Journal of research in personality, 25, 285–301.

[5] Bentler, P.M. and Dudgeon, P. (1996) Covariance structure analysis: Statistical practice, theory, and directions. Annual review of psychology, 47, 563–592.

[6] Boomsma, A. (2000) Reporting analyses of covariance structures. Structural equation modeling, 7, 461–483.

[7] Botetzagias, I. and Dima, A.F., Malesios, C. (2015) Extending the theory of planned behavior in the context of recycling: The role of moral norms and of demographic predictors. Resources, conservation and recycling, 95, 58–67

[8] Brody, S., Grover, H. and Vedlitz, A. (2012) Examining the willingness of Americans to alter behaviour to mitigate climate change. Climate Policy, 12, 1–22.

[9] Chen, M.F. (2016) Extending the theory of planned behavior model to explain people's energy savings and carbon reduction behavioral intentions to mitigate climate change in Taiwan–moral obligation matters. Journal of Cleaner Production, 112, 1746–1753.

[10] Chen, M.F. and Tung, P.J. (2010) The moderating effect of perceived lack of facilities on consumers' recycling intentions. Environment and Behavior 42, 824–844.

[11] Chen, M.F. and Tung, P.J. (2014) Developing an extended theory of planned behavior model to predict consumers' intention to visit green hotels. International journal of hospitality management, 36, 221–230.

[12] Cialdini, R.B, Kallgren, C.A. and Reno, R.R. (1991) A focus theory of normative conduct: A theoretical refinement and reevaluation of the role of norms in human behavior. Vol. 24. Academic Press, Cambridge, 201–234.

[13] Doll, WJ., Xia, W. and Torkzadeh, G. (1994) A Confirmatory Factor Analysis of the End-User Computing Satisfaction Instrument. Mis Quarterly, 18, 453–461.

[14] Dolnicar, S., Knezevic, Cvelbar, L. and Grün, B. (2017) Do pro-environmental appeals trigger pro-environmental behavior in hotel guests? Journal of Travel Research, 56, 988–997.

[15] Fishbein, M. and Ajzen, I. (1975) Belief, attitude, intention and behavior: An introduction to theory and research.

[16] Fornell, C. and Larcker, D.F. (1981) Structural equation models with unobservable variables and measurement error: Algebra and statistics. Journal of marketing research, 382–388.

[17] Fornell, C. and Larcker, D.F (1981) Evaluating structural equation models with unobservable variables and measurement error. Journal of marketing research, 18, 39–50.

[18] Gollwitzer, P.M. (1999) Implementation intentions: strong effects of simple plans. American psychologist, 54, 493.

[19] Gorsuch, R.L. and Ortberg, J. (1983) Moral obligation and attitudes: Their relation to behavioral intentions. Journal of Personality and Social Psychology, 44, 1025.

[20] Hair, J.F., Ringle, C.M. and Sarstedt, M. (2011) PLS-SEM: Indeed a silver bullet. Journal of Marketing theory and Practice, 19, 139–152.

[21] Han, H., Hsu, L.T.J. and Sheu, C. (2010) Application of the theory of planned behavior to green hotel choice: Testing the effect of environmental friendly activities. Tourism management, 31, 325–334.

[22] Harland, P., Staats, H. and Wilke, H.A.M. (2010) Explaining proenvironmental intention and behavior by personal norms and the theory of planned behavior. Journal of Applied Social Psychology, 29, 2505–2528.

[23] Hayes, A.F. (2009) Beyond Baron and Kenny: Statistical mediation analysis in the new millennium. Communication monographs, 76, 408–420.

[24] Homburg, C. and Baumgartner, H. (1995) Beurteilung von Kausalmodellen: Bestandsaufnahm und Anwendungsempfehlungen. Marketing Zeitschrift Für Forschung Und Praxis, 17, 162–176.

[25] Hoyle, R.H. and Panter, A.T. (1995) Writing about structural equation models in structural equation modeling. Structural equation modeling: Concepts, issues, and applications, 158-176.

[26] Jackson, D.L. and Gillaspy, J.J.A., Purc-Stephenson, R (2009) Reporting practices in confirmatory factor analysis: An overview and some recommendations. Psychological methods, 14, 6

[27] Kaiser, F.G. and Gutscher, H. (2010) The Proposition of a General Version of the Theory of Planned Behavior: Predicting Ecological Behavior. Journal of Applied Social Psychology, 33, 586–603.

[28] Kline, R.B. (2005) Principles and practice of structural equation modeling. 2nd Ed. New York.

[29] Lao, K. (2013) Research on Mechanism of Consumer Innovativeness In- fluences Green

Consumption Behavior. Nankai Business Review, 16, 106–113.

[30] Leonard, L.N., Cronan, T.P. and Kreie, J. (2004) What influences IT ethical behavior intentions—planned behavior, reasoned action, perceived importance, or individual characteristics? Information & Management, 42, 143–158.

[31] Li, R., Wu, L., Yi, S. and Chen, X. (2017) China Food Safety Development Report. Peking University, Beijing.

[32] Liu, D., Du, H. Southworth, F. and Ma, S. (2017) The influence of social-psychological factors on the intention to choose low-carbon travel modes in Tianjin, China. Transportation Research Part A: Policy and Practice, 105, 42–53.

[33] MacKinnon, D.P., Lockwood, C.M. and Williams, J. (2004) Confidence limits for the indirect effect: Distribution of the product and resampling methods. Multivariate behavioral research, 39, 99–128.

[34] Marsh, H.W. and Hau, K.T. (1996) Assessing goodness of fit: Is parsimony always desirable? The Journal of Experimental Education, 64, 364–390.

[35] McDonald, R.P. and Ho, M.H.R. (2002) Principles and practice in reporting structural equation analyses. Psychological methods, 7, 64.

[36] Pronello, C. and Gaborieau, J.B. (2018) Engaging in pro-environment travel behaviour research from a psycho-social perspective: A review of behavioural variables and theories. Sustainability, 10, 2412.

[37] Sachdeva, S., Boghrati, R. and Dehghani, M. (2019) Testing the Influence of Purity-Based Interventions on Pro-environmental Behavior. Sustainability, 11, 1811.

[38] Schreiber, J.B. (2008) Core reporting practices in structural equation modeling. Research in social and administrative pharmacy, 4, 83–97.

[39] Swenson, M.R. and Wells, W.D. (2018) Useful correlates of pro-environmental behavior. 1st Ed. Psychology Press, London, 91–109.

[40] Taylor, S. and Todd, P.A. (1995) Understanding information technology usage: A test of competing models. Information systems research, 6, 144–176.

[41] Thompson, B. (2004) Exploratory and confirmatory factor analysis: Understanding concepts and applications. American Psychological Association, Washington DC, 50-61

[42] Tonglet, M., Phillips, P.S. and Read, A.D. (2004) Using the Theory of Planned Behaviour to investigate the determinants of recycling behaviour: a case study from Brixworth, UK. Resources, conservation and recycling, 41, 191–214.

[43] Wang, Y., Liang, J. and Yang, J. (2019) Analysis of the environmental behavior of farmers for non-point source pollution control and management: An integration of the theory of planned behavior and the protection motivation theory. Journal of environmental management, 237, 15–23.

[44] Wang, Y., Yang, J. and Liang, J. (2018) Analysis of the environmental behavior of farmers for non-point source pollution control and management in a water source protection area in China. Science of Environment, 633, 1126–1135.

[45] Warshaw, P.R. and Davis, F.D. (1985) Disentangling behavioral intention and behavioral expectation. Journal of experimental social psychology, 21, 213–228.

[46] Williams, J. and MacKinnon, D.P. (2008) Resampling and distribution of the product methods for testing indirect effects in complex models. Structural equation modeling: a multidisciplinary journal, 15, 23–51.

[47] Wu, L., Qi, Z. and Huang, W. (2017) The influence of environmental perception and

institutional context on pig farmers' internalization of environmental cost behavior an example of waste disposal. Journal of Huazhong Agricultural University (Social Sciences Edition), 5, 28–35.

[48] Wu, M. (2009) Structural Equation Model: Operation and Application of AMOS. Chongqing University Press, Chongqing, 124-129

[49] Xinhua News Agency. (2016) Outline of the 13th Five-Year Plan for the National Economic and Social Development of the People's Republic of China. Xinhua News Agency, Beijing, 75-80

[50] Yoon, C. (2011) Theory of planned behavior and ethics theory in digital piracy: An integrated model. Journal of business ethics, 100, 405–417.

[51] Zeng, Y., Tian, Y., He, K. and Zhang, J. (2019) Environmental conscience, external incentives and social norms in rice farmers' adoption of pro-environmental agricultural practices in rural Hubei province of China. Environmental technology, 50, 1–15.

Appendix

In the questionnaire and research quality control, we began by combining the relevant scales provided by the existing literature and formed the questionnaire items according to the investigation and in-depth interview of the president or other primary responsible persons and policy documents issued by the government of Sichuan Province. On the basis of reading and analyzing the literature in proenvironment field, we draw lessons from the theoretical conception of classic research and the scale in the widely cited empirical research literature. Combined with the requirements of environmental policies and the results of in-depth interviews with the president or other responsible persons, the questions were designed to form a draft of the initial survey questionnaire. Second, the questionnaire was revised by consulting experts from academia, family farms and cooperatives. At an academic seminar carried out by the project team, we conducted in-depth discussions and exchanges on the logical relationship between the variables to be studied and the indicators, sorted out the wording and classification of specific problems, and added and deleted some problems, thus forming the initial questionnaire. Third, we carried out a "pre-test" to purify the questions and then construct a final formal questionnaire. The specific method involved distributing the initial questionnaire to 50 cooperative presidents and family farm leaders through random sampling, and then we carried out a preliminary test and analysis according to their feedback information. We then further modified and improved the questionnaire, and on this basis constructed a formal questionnaire. A typical sample survey of cooperatives and family farms in Chengdu and Guangyuan City was conducted using the formal questionnaire. Before our investigation, investigators were trained for a total of 25 hours over seven days. In the process of the survey, the following measures were adopted to solve the deviation caused by the social expectation effect: one was that the participants didn't need to write down their real names as contacts, and the other was to assure participants that each questionnaire would be highly confidential and used for academic research only. To ensure the quality, the formal questionnaire was sent out face-to-face. Missing data can be filled in by participants during face-to-face interviews. After the questionnaire was collected, the collected data were tested for common method biases and unanswered biases. Finally, data processing and hypothesis verification were carried out.

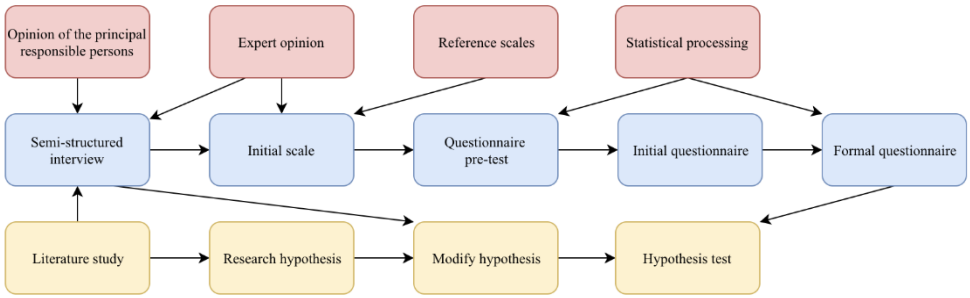

Figure 2 Questionnaire and research quality control.

Table 7 Questions (variables) included in the questionnaire.

Construct	Variable	Measurement Items
Environmental Attitude	X_{11}	I think proenvironmental agricultural production is good for everyone.
	X_{12}	I think we should find ways to promote proenvironmental agricultural production.
	X_{13}	I feel that I am very happy to carry out proenvironmental agricultural production.
Subjective Norms	X_{21}	Most people who are important to me think that I should try to participate in proenvironmental production.
	X_{22}	I feel that proenvironmental agricultural production is in line with the trend of social development.
	X_{23}	I feel that proenvironmental agricultural production is in line with national industrial policies.
Perceived Behavioral Control	X_{31}	I think that proenvironmental agricultural production is not much more expensive than ordinary production.
	X_{32}	I feel that it is not difficult to find the technology needed to master proenvironmental agricultural production.
	X_{33}	I feel that the cost of proenvironmental agricultural production has not increased significantly.
Moral Obligation	X_{41}	It is my moral obligation to carry out environmentally friendly agricultural production.
	X_{42}	Choosing proenvironmental agricultural production is my duty to future generations.
	X_{43}	Conducting proenvironmental agricultural production is my duty as a citizen
Proenvironmental Production Intention	X_{51}	I am willing to collect information on and learn more about proenvironmental agricultural production.
	X_{52}	I am willing to recommend eco-friendly agricultural production to my relatives and friends.
	X_{53}	I will carry out proenvironmental production if needed.
Proenvironmental Production Behavior	X_{61}	Comprehensive use and treatment of livestock and poultry manure
	X_{62}	When using fertilizer, strictly follow the fertilizer instructions (or use organic fertilizer)
	X_{63}	When using pesticides, strictly follow the pesticide instructions (or give up pesticides)