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## Implementation of Rural Domestic Waste Classification Regulations and Living Environment Based on Empirical Test of 229 Residents

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### *Abstract:*

Effective disposal of rural domestic waste is the foundation and key to improving village appearance and living environment. In this paper, firstly the theoretical function model of regulation implementation and living environment improvement is constructed based on the theory of system performance enforcement and the implementation process model from the four dimensions of explanation propaganda, organizational work, daily application and reward and penalty, to explore the internal logic and path of action. Then, hierarchical regression is conducted to verify the theoretical hypotheses based on sample data of 229 residents obtained after in-depth investigation of 21 villages in Jinhua City. Finally, the study found that (1) Explanation, publicity, organizational work and daily application in the implementation of the laws and regulations on classification of domestic waste have a promoting effect on the the improvement of rural living environment, that is, improving rural living environment requires the cooperation of all parties concerned. (2) There is no significant impact on the improvement of rural living environment by the penalty and reward system of domestic waste classification regulations in Jinhua City. (3) The code of conduct plays a mediating role in the relationship between explanation propaganda, organizational work, daily application and living environment in the implementation of laws and regulations, completely mediates the relationship between organizational work and living environment, and partially mediates between explanation

propaganda, daily application and living environment.

**Keywords:** *Rural living environment, Classification of domestic waste, Implementation of laws and regulations, Villagers' code of conduct.*

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## I. INTRODUCTION

Improving the living environment is the foundation and key to the revitalization and development of rural areas, which is reflected in the flourishing industry, livable ecology, civilized rural customs, effective governance and affluent life. Among them, livable ecology is the basic condition for flourishing industry, the proper connotation of civilized rural customs and affluent life, and the important embodiment of effective governance. Since academia pays great attention to the strategy of rural revitalization and the construction of rural living environment, many different plans and countermeasures are put forward to improve rural living environment, mainly focusing on rural economic transformation, innovation of governance mechanism and enhancement of environmental protection awareness. To improve the living environment in rural areas, it is necessary to establish an ecological form of rural economic development on the macro level, to innovate the supply and management mechanism of public services on the medium level, and to enhance the villagers' awareness of environmental protection on the micro level [1]. At the same time, the guarantee should be provided for rural living environment governance from planning and construction, capital investment, infrastructure and technical mode starting from the top-level design [2]. In terms of governing subjects, a network governing mode should be established in which multiple governing subjects participate and cooperate with each other through consultation[3].

Since the Rural Revitalization Strategy was put forward, local governments have actively responded to the call, and actively carried out a large number of beneficial exploration in promoting the construction of beautiful villages and improving the rural living environment by vigorously promoting the implementation of the Rural Revitalization Strategy and strengthening the construction of rural living environment, to form a rural living environment governance model with local characteristics. Among them, Jinhua City, Zhejiang Province has established a waste classification and disposal mode of "four-sorting by two times, no waste falling and local recycling", and implemented the *Regulations on the Classification and Management of Rural Domestic Waste of Jinhua City*, which has achieved good practical results, formed a local, innovative and effective path for rural living environment protection, and effectively improved the appearance and living environment of local rural villages in Jinhua.

The practice of rural waste classification and disposal in Jinhua has become popular nationwide, attracting many places across the country to learn from it. Among them, the method of "four-sorting by two times, no waste falling and local recycling" is simple and easy to learn, but it has not achieved the same good results as Jinhua in waste classification and governance in various places, mainly because they have ignored the corresponding laws and regulations on rural waste classification and governance and the effectiveness of system implementation. In many places, there is a problem of "emphasizing system formulation over system implementation". To improve the living environment in rural areas, not only a set of good technical schemes for the classification and disposal of rural waste is needed, but also a good legal system is needed to confer responsibilities and rights on relevant subjects to implement. Therefore, from the perspective of the implementation of laws and regulations, it is of great theoretical and practical significance to study the impact mechanism of the implementation of laws and regulations on the classification and disposal of rural domestic waste.

## II. THEORETICAL BASIS AND RESEARCH HYPOTHESES

### 2.1 Theory of System Performance Implementation and Model of System Implementation Process

After the system is confirmed and published in the process of legalization, it will enter the implementation stage, which is the most important link in the system process and the only way to transform the system goal into the system reality. Scholar Chales O. Jones [4] proposed that system implementation is all the activities that put a system into execution, among which explanation propaganda, organizational work and daily application are the three most important activities. Explanation and publicity refer to the transformation of the system content into acceptable and feasible plans and instructions for the general public; organizational work refers to the establishment of the system implementation agencies, and the formulation of measures to make the system content effective, so as to achieve the system objectives; daily application refers to the provision of daily services and equipment by the implementation, and the payment of various fees, so as to achieve the established system objectives[4].

After the mid-1970s, system researchers began to analyze the factors that affect the implementation of the public system from different perspectives based on their own different professional backgrounds, and established a variety of theoretical models of system implementation, with a view to helping system makers and enforcers to better understand, discover and solve system problems. One of the most famous is the Smith policy implementation model[5]. Smith believed that system implementation involves four elements, i.e., ideal system, system implementation organization, system target group and system

environment factors.

In this study, the concept of system implementation of Chales O. Jones, an American scholar, is used for reference to analyze the implementation of the rural domestic waste classification regulations. Similarly, the implementation of the regulations will be analyzed mainly from the aspects of interpretation, publicity, organizational work and daily application. In addition, the Smith model will also be used for reference, and it is believed that the implementation of laws and regulations not only includes the laws and regulations themselves, but also needs the interaction with system target groups (villagers and their behaviors), so as to achieve the goals of local laws and regulations and system implementation.

## 2.2 Effect of the Implementation of Classification Regulations of Rural Domestic Waste in improving the Living Environment

The effective improvement and promotion of the rural living environment in Jinhua City, Zhejiang Province, results from the formulation and implementation by the local government of a series of related laws and regulations such as the *Regulations on the Classification and Management of Rural Domestic Waste in Jinhua City*. Among them, the implementation of laws and regulations is the key link, which is to directly interact with the villagers and other waste disposal subjects, and then achieve the fundamental goal of improving the rural living environment by regulating their specific behavior norms. Based on the theory of system implementation by Charles.O.Jones, it is held in this paper that the *Regulations on the Classification and Management of Rural Domestic Waste in Jinhua City* can be regarded as a special system, including three main activities, namely, explanation propaganda, organizational work and daily application. Moreover, as it is also a legal system, whose implementation should also include punishment and reward, so the implementation structure of the system is composed of 4 dimensions, namely, explanation propaganda, organizational work, daily application and penalty and reward.

### 2.2.1 Impact of Interpretation and Publicity on Rural Living Environment

Interpretation and publicity refers to the transformation of the contents of the *Regulations on the Classification and Management of Rural Domestic Waste in Jinhua City* into acceptable and feasible plans and instructions for the general public, including the interpretation of the provisions, actual publicity and relevant education. Generally speaking, the better the explanation propaganda of the implementation subject, such as the government active guidance and publicity on the classification of rural domestic waste, social organizations frequent popularization on the knowledge of waste classification, and schools active organization of

various public welfare practice activities on waste classification, the stronger the local rural residents' awareness of protecting the living environment, and the more likely the living environment will be effectively improved; otherwise, the worse the effect. Thus, the following hypothesis is made:

H1: The explanation propaganda factor of regulations has a significant positive impact on the improvement of rural living environment.

## 2.2.2 Impact of Organizational Work on Rural Living Environment

The organizational work refers to the collective activities carried out by the government, the village committee, the villagers, social forces and other relevant subjects on the waste classification and governance organization. Generally speaking, the better the organizational work is, for example, the village committee actively organizes the villagers to carry out the classification and investment of domestic waste in an orderly manner, actively organizes the villagers to formulate the corresponding village rules and regulations, and the government actively organizes the technical guidance on the fertilizer treatment of domestic waste, the more active the local residents are in the waste classification work, the more likely the rural living environment will be effectively improved; otherwise, the worse the effect. Thus, the following hypothesis is made:

H2: The organizational work factor of regulations has a significant positive impact on the improvement of rural living environment.

## 2.2.3 Impact of Daily Application on Rural Living Environment

Daily application factors refer to the stable implementation of local laws and regulations, and the daily service, guidance and equipment maintenance of relevant subjects in accordance with laws and regulations, such as regular collection, transportation and disposal of waste, and some practical guidance made by relevant subjects. Generally speaking, the better the daily application, the more likely the local residents will be to normalize the waste classification, the more likely the rural living environment will be effectively improved; otherwise, the worse the effect. Thus, the following hypothesis is made:

H3: The daily application factor of regulations has a significant positive impact on the improvement of rural living environment.

## 2.2.4 Penalty and Reward and Rural Living Environment

Laws and regulations differ from general policies in that they have the function of penalty.

Therefore, in addition to the three mentioned by Charles.O.Jones, there are also reward and penalty factors in the system implementation structure, which include not only fines for illegal actors in accordance with laws and regulations, but also rewards for those who act in accordance with village rules and regulations. Generally speaking, the better the reward and penalty work is, the more binding the behavior of classifying and disposing local residents' waste, the more likely the local rural living environment will be effectively improved; otherwise, the worse the effect. Thus, the following hypothesis is made:

H4: The penalty and reward factor of regulations has a significant positive impact on the improvement of rural living environment.

### 2.3 Impact of Rural Domestic Waste Classification Regulations on Residents' Code of Conduct

The code of conduct for the classification of domestic waste refers to whether the local residents have classified the waste and whether they have formed standard behaviors. The implementation effect of the laws and regulations on classification of rural domestic waste is mainly achieved by affecting residents' willingness to participate and regulating residents' behavior. Whereas, the willingness of farmers to participate in domestic waste disposal will be affected by the recognition and trust of relevant systems and policies [6]. The more promising the prospect of domestic waste classification and governance is, the more they will actively participate in the cooperation on waste classification and governance to regulate waste classification and governance. It is an effective way for the residents to participate in the waste classification and disposal to improve the recognition and trust of the system and policy and improve the residents' understanding of the prospect of waste classification and disposal. The study shows that the government's activities such as the transmission of waste classification information and the publicity and education of waste classification can effectively improve the residents' awareness of waste classification[7], and further enhance their cognition of waste classification. Therefore, the better the explanation propaganda, organizational work, daily application and reward and penalty of the rural domestic waste classification regulations are, the more acceptable and trustworthy the residents are to the policies, and the more beneficial the residents are to effectively regulate their waste classification behaviors and habits. Thus, the following hypotheses are made:

H5: The explanation propaganda factor of the regulations is conducive to regulating the villagers' code of conduct;

H6: The organizational work factor of the regulations is conducive to regulating the

villagers' code of conduct;

H7: The daily application factor of the regulations is conducive to regulating the villagers' code of conduct;

H8: The penalty and reward factors of the regulations are conducive to regulating the villagers' code of conduct;

## 2.4 Impact of Rural Residents' Code of Conduct on Living Environment

In this paper, residents' code of conduct mainly refers to the behaviors of residents, such as actively classifying and putting domestic waste into designated classification containers, jointly protecting and maintaining the rural environment, due to their strong environmental protection awareness and responsibility for reducing unnecessary domestic waste. Any improvement of above awareness and behavior will reduce the phenomenon of "hitchhiking" in the process of sorting and putting domestic waste. At the same time, residents' behaviors are infectious to a certain extent, i.e. infecting other residents to have normative behaviors by creating positive external effects, improving environmental awareness, and changing the concept of individual waste classification and disposal. Above all, a positive cycle has been formed, which promotes the classification and disposal of domestic waste, and thus improves the rural living environment. Accordingly, the following hypothesis is proposed:

H9: Villagers' code of conduct has a significant positive impact on the improvement of rural living environment.

## 2.5 Mechanism Model: Regulation Implementation, Code of Conduct and Living Environment

The internal logic of the implementation effect of *Regulations on the Classification and Management of Rural Domestic Waste in Jinhua City* is roughly "regulation implementation structure-villagers' code of conduct regulation - rural living environment improvement" (Fig 1). Based on the theory of system implementation by Charles.O.Jones and combined with the actual situation of the *Regulations on the Classification and Management of Rural Domestic Waste in Jinhua City*, the implementation structure of the system is summarized into four dimensions, i.e., explanation propaganda, organizational work, daily application and penalty and reward. Theoretical analysis shows that, on the one hand, these four system implementation factors have improved and enhanced the rural living environment structurally, which has directly and significantly affected the living environment; on the other hand, they may also improve and enhance the rural living environment indirectly through structurally regulating the

specific code of conduct of the implementation object.

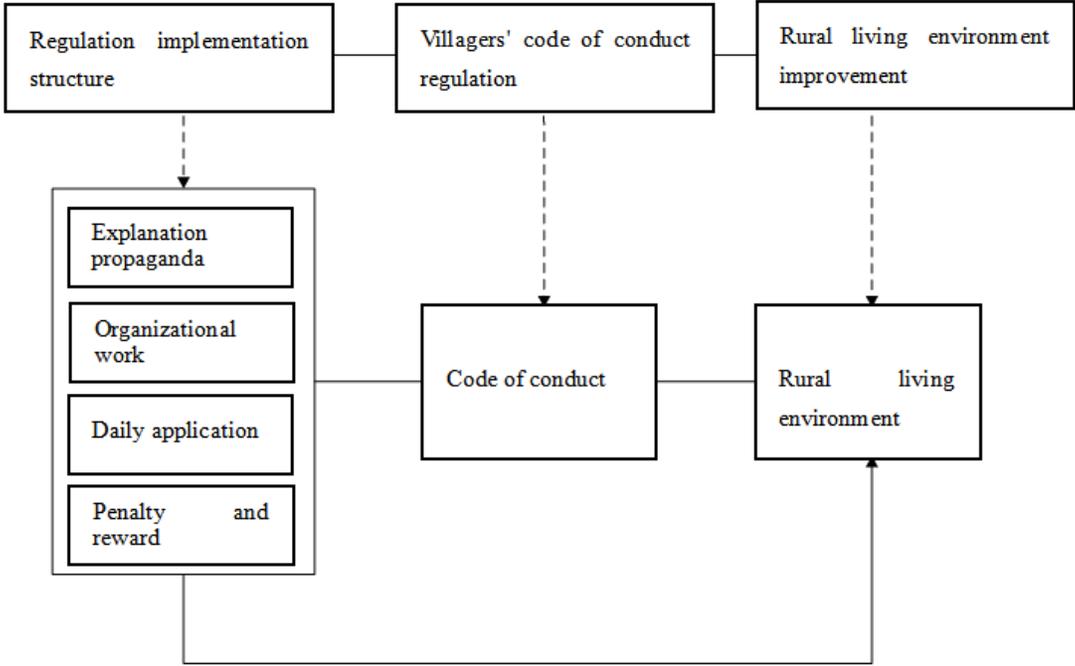


Fig 1: Model of action mechanism

III. DATA SOURCES AND RESEARCH METHODS

3.1 Sample Sources and Selection

The survey samples of rural residents were collected from 21 villages, including Luoping Village, Chayuan Village, Nanfang Village, Zhuyang Village, Gaoru Village, Tanbei Village, Zhoucun Village, Ligong Village, Qingcao Village and Shiwu Village, in Jinhua City, Zhejiang Province. After many years of attempts and explorations, Jinhua City, Zhejiang Province has gradually formed a local, characteristic and innovative rural living environment protection path. Specifically, the rural waste classification and disposal mode of "four-sorting by two times, no waste falling and local recycling" has been gradually promoted and applied in various villages within the scope of Jinhua City, thereby effectively improving the local rural living environment and village appearance. Therefore, the model of classification and disposal of rural domestic waste in Jinhua City, Zhejiang Province is well representative and typical, and has certain

advantages nationwide. In order to make the investigation and research more operable, rural residents are further selected as research samples to reflect the system implementation status and rural living environment status from the perspective of villagers.

From July to August, 2019, a questionnaire survey was conducted among 250 rural residents in 21 rural areas of Jinhua City, Zhejiang Province. 229 valid questionnaires were collected, with an effective recovery rate of 91.60%. The questionnaire mainly surveys the basic information of local rural residents, rural residents' awareness of the implementation of laws and regulations, the code of conduct of rural residents themselves, and the evaluation of rural residents on living environment. Basic information of rural residents includes 6 items of rural residents, such as area, gender, age, culture, occupation and media tools; 20 measurement indexes including 4 elements for the implementation of laws and regulations; 5 measurement indexes for their own code of conduct; and 3 measurement indexes for rural living environment, see TABLE I for details.

**TABLE I. Sample characteristics**

Items	Proportions
Gender	Male: 65.9%; female: 34.1%
Age	Age 17 and below: 0.9%; age 18-29: 14.4%; age 30-44: 37.1%; age 45-59: 32.3%; age 60 and above: 15.2%
Educational level	Primary and below: 26.2%; junior high school: 38.4%; secondary or high school: 18.8%; junior college, undergraduate and above: 16.6%
Experience	Cadres of village committee: 4.4%; business and entrepreneurship: 4.4%; ordinary farmers: 61.6%; students in school: 6.1%; migrant workers: 18.8%; others: 4.8%
Media tools	Broadcast and radio: 16.5%; Television: 81.7%; newspaper: 34.9%; WeChat: 55.5%; network: 23.6%; others: 5.2%

### 3.2 Variables and Measurement

The scale consists of six parts: Propaganda Explanation, Organizational Work, Daily

Application, Penalty and Reward, Code of Conduct and Living Environment. Firstly, the relevant measurement indexes are screened for each variable to form a measurement index database according to the *Regulations on Classification and Management of Rural Domestic Waste in Jinhua City*. Secondly, according to the established measurement index database, experts from theoretical and practical circles, including local legislative institutes, research centers, actual executives and executing objects, are invited to carry out research and evaluation to further improve the measurement index system. Thirdly, the preliminary measurement index system is preliminarily applied, and the inappropriate measurement indexes are further improved and eliminated through brief reliability and validity tests. Finally, the *Measuring Scale of Regulation Implementation, Behavior Standards and Rural Living Environment* is formed. Relevant measurement indexes are as follows:

The relevant indexes are measured by using the designed *Measuring Scale of Regulation Implementation, Behavior Standards and Rural Living Environment* by the Likert 5-level scale, with 1 point indicating very disagreement, 2 points for disagreement, 3 points for uncertainty, 4 points for consent, and 5 points for very consent. The scale consists of 6 parts (TABLE II) explanation propaganda factors (PE), organizational work factors (OW), daily application factors (DA), penalty and reward factors (PR), code of conduct factors (CC) and rural living environment (LE). Among them, explanation propaganda factors include 5 specific measurement indexes of PE1-PE5, organizational work factors include 5 specific measurement indexes of OW1-OW5, daily application factors include 5 specific measurement indexes of DA1-DA5, penalty and reward factors include 5 specific measurement indexes of PR1-PR5, and code of conduct factors include 5 specific measurement indexes of CC1-CC5, rural living environment factors include 3 specific measurement indexes of LE1~LE3. All measurement indexes are extracted and improved from *Regulations on Classification and Management of Rural Domestic Waste in Jinhua City* (referred to as *Regulations* in TABLE II).

**TABLE II. Research variable measurement scale**

Variables	No.	Measurement indexes	References
Propaganda Explanati	PE1	Better publicity and education on domestic waste classification carried out by local government departments	Paragraphs 1, 2, 3, 4 and 4 of Article 8 of the

on PE	PE2	Better knowledge learning and practice activities of domestic waste classification carried out by local schools	<i>Regulations</i>
	PE3	Frequent publicity and propaganda of domestic waste classification knowledge in the village by various local social organizations	
	PE4	Local TV, radio and newspaper publicity on domestic waste classification	
	PE5	Local WeChat and web-based active knowledge and news dissemination on domestic waste classification	
Organizational Work OW	OW1	Local government departments actively organize inspection and guidance on the classification and disposal of domestic waste	Article 4-5, Paragraph 2 of Article 5, Paragraph 1 of Article 6, Paragraph 2 of Article 6 and Paragraph 1 of Article 23 of the <i>Regulations</i>
	OW2	Local government departments actively organize technical guidance for fertilizer treatment of domestic waste	
	OW3	The local village committee actively organizes people to carry out orderly sorting and disposal of domestic waste	
	OW4	Local villagers are organized in an orderly manner to make village regulations for the classification of domestic waste	
	OW5	The local government actively organizes volunteers to enter the village to participate in the classification of rural domestic waste	
Daily Application DA	DA1	Local waste sorters conduct daily secondary sorting and disposal in strict accordance with regulations	Articles 15, 15, 17, 18 and 20 of the <i>Regulations</i>
	DA2	Local waste collection and transportation workers regularly come to collect wastes on time	
	DA3	Local waste collection and transportation operators strictly classify and recycle waste according to regulations	

	DA4	Local waste sorters and transporters persuade and communicate with the villagers patiently	
	DA5	Daily maintenance and construction of local domestic waste sorting facilities are well carried out	
Penalty and Rewards PR	PR1	Those who do not discharge domestic waste as required may be fined accordingly	Articles 26-28, 26-28, Paragraph 3 of Article 28, Paragraph 2 of Article 6 and Paragraph 2 of Article 6 of the <i>Regulations</i>
	PR2	The local punishment for the person responsible for the violation of the waste classification management regulations is appropriate	
	PR3	The local law implementation department will investigate and deal with the illegal acts in a timely manner	
	PR4	Local authorities publicly commend those responsible for the strict implementation of waste disposal in accordance with regulations	
	PR5	Material rewards are given to those who have made important contributions to the classification and management of waste in the village	
Code of Conduct CC	CC1	Local villagers or related units have strong responsibility and awareness of environmental protection	Articles 7, 7, 7, 3, 12 and 7 of the <i>Regulations</i>
	CC2	Local villagers or related units gradually reduce the generation of unnecessary domestic waste	
	CC3	Local waste producers put their domestic waste in designated containers in strict compliance with regulations	
	CC4	Local waste producers place and maintain waste sorting containers as required	
	CC5	Local villagers or related units gradually begin to jointly protect and maintain the rural environment	
Living	LE1	The living environment around your residence is cleaner	Article 1 of the

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environm ent		and orderly than before	<i>Regulations</i>
LE	LE2	The overall appearance of your village is more beautiful and livable than before	
	LE3	The domestic waste fertilizer handled in your village is beneficial to the development of green organic agriculture	

### 3.3 Validity and Reliability Test

(1) Reliability test. Corrected item total correlation (CITC) and Cronbach's coefficient (Cronbach's  $\alpha$ ) are used to reflect the reliability of the measurement scale for regulation implementation, code of conduct and rural living environment. The reliability test results show that the CITC values of six factors including explanation propaganda, organizational work, daily application, penalty and reward, code of conduct and rural living environment are all greater than 0.5. In addition, the Cronbach's  $\alpha$  values of the six factors are 0.935, 0.946, 0.946, 0.935, 0.936 and 0.904 respectively, and the Cronbach's  $\alpha$  values after deleting each measurement index are also lower than those of the corresponding variables. Therefore, the scale has a good reliability, as shown in TABLE III.

(2) Validity test. Exploratory factor analysis results are used to reflect validity. The KMO value is 0.893 greater than 0.7 and the statistical value of Bartlett test of sphericity is 0.000, less than 0.001, which indicates that the validity of the data used is good and suitable for factor analysis. The factor load of the related measurement index on the corresponding common factor is greater than 0.5, and the load value on other factors is less than 0.5. Therefore, six common factors are extracted, including explanation propaganda, organizational work, daily application, reward and penalty, code of conduct and living environment. In addition, confirmatory factors are also used to verify the structural validity of the model and scale, and it is found that the combination reliability and AVE value are relatively high. Therefore, the scale has good validity, as shown in TABLE III.

**TABLE III. Reliability and validity test of the scale**

Variables	Indices	CITC	Item deleted $\alpha$	Cronbach' $\alpha$	Factor loading	Composite reliability	AVE
Explanation (EX)	EX1	0.844	0.917	0.935	0.873	0.935	0.743
	EX2	0.834	0.919		0.848		
	EX3	0.792	0.927		0.813		
	EX4	0.833	0.919		0.857		
	EX5	0.832	0.919		0.867		
Organizational Work (OW)	OW1	0.847	0.934	0.946	0.895	0.946	0.778
	OW2	0.859	0.932		0.882		
	OW3	0.851	0.933		0.886		
	OW4	0.848	0.934		0.885		
	OW5	0.856	0.933		0.881		
Daily application (DA)	DA1	0.879	0.928	0.946	0.908	0.946	0.778
	DA2	0.810	0.940		0.863		
	DA3	0.855	0.933		0.878		
	DA4	0.880	0.928		0.901		
	DA5	0.837	0.935		0.877		
Penalty and	PR1	0.848	0.915	0.935	0.873	0.937	0.749
	PR2	0.847	0.916		0.878		

Reward (PR)	PR3	0.852	0.916	0.936	0.869	0.936	0.747
	PR4	0.858	0.914		0.880		
	PR5	0.739	0.938		0.808		
Code of Conduct (CC)	CC1	0.834	0.920	0.936	0.866	0.936	0.747
	CC2	0.859	0.915		0.873		
	CC3	0.832	0.920		0.832		
	CC4	0.865	0.914		0.894		
	CC5	0.750	0.935		0.744		
Living Environm ent (LE)	LE1	0.814	0.863	0.904	0.855	0.906	0.762
	LE2	0.805	0.867		0.862		
	LE3	0.818	0.859		0.842		

## IV. MODEL TEST RESULTS AND RESULT ANALYSIS

### 4.1 Analysis on the Correlation among the Regulation Implementation, Code of Conduct and Living Environment

Firstly, the Pearson correlation coefficient is used to analyze the correlation among the key variables such as the implementation of regulations, the villagers' code of conduct and the rural living environment. According to the results of TABLE IV, the correlation analysis of living environment shows that the living environment is significantly positively correlated with code of conduct, with a correlation coefficient of 0.468; the living environment is also significantly positively correlated with explanation propaganda, organizational work, daily application, penalty and reward, with a correlation coefficient between 0.248 and 0.328; the code of conduct is also significantly positively correlated with explanation propaganda, organizational work, daily application, penalty and reward, with a correlation coefficient between 0.275 and 0.366. Further regression tests are conducted to investigate the impact of each variable.

**TABLE IV. Descriptive statistics and Pearson correlation coefficients of scales**

Variables	Mean	Standard Deviation	EX	OW	DA	PR	CC	LE
EX	4.14	1.06	1					
OW	4.01	1.11	0.195**	1				
DA	4.09	1.07	0.266**	0.183**	1			
PR	4.09	1.02	0.379*	0.251**	0.216**	1		
CC	4.17	1.01	0.366*	0.311**	0.283**	0.275**	1	
LE	4.13	1.10	0.328**	0.270*	0.289**	0.248**	0.468**	1

Note: \* and \*\* indicate significant correlations at the 0.05 and 0.01 levels, respectively

## 4.2 Analysis on Influencing Factors of Rural Living Environment

In this section, explanation propaganda, organizational work, daily application, and penalty awards are taken independent variables, occupation, gender, age and education level as the control variables, and living environment as the dependent variable, the influence of explanation propaganda, organizational work, daily application, penalty and reward on living environment, as well as the mediating effect of code of conduct of mediating variables in the above influence relationships are studied, as shown in TABLE V.

**TABLE V. Hierarchical regression model of rural living environment**

	Dependent variable: living environment		Dependent variable: code of conduct		Dependent variable: living environment	
Independent	Model I	Model II	Model III	Model IV	Model V	Model VI

variables						
Gender	0.003 [0.043]	-0.006 [-0.089]	0.148* [2.355]	0.140* [2.439]	0.003 [0.043]	-0.054 [-0.914]
Age	0.072 [0.798]	0.034 [0.411]	0.219* [2.584]	0.184* [2.372]	0.072 [0.798]	-0.030 [-0.372]
Educational level	-0.147 [-1.618]	-0.076 [-0.894]	-0.194* [-2.271]	-0.126 [-1.583]	-0.147 [-1.618]	-0.033 [-0.400]
Occupation	-0.027 [-0.383]	-0.066 [-0.997]	0.103 [1.522]	0.065 [1.059]	-0.027 [-0.383]	-0.088 [-1.409]
Explanation propaganda		0.209** [3.083]		0.192** [3.032]		0.142* [2.171]
Organizational work		0.166** [2.625]		0.181** [3.070]		0.103 [1.685]
Daily application		0.190** [2.979]		0.194** [3.258]		0.123* [1.982]
Penalty & Reward		0.050 [0.729]		0.042** [0.654]		0.035 [0.545]
Code of conduct						0.346*** [5.062]
R <sup>2</sup>	0.046	0.209	0.147	0.308	0.046	0.292
Δ R <sup>2</sup>	0.029*	0.180***	0.131***	0.283***	0.029*	0.263***

Note: \* indicates a significant correlation at the level of 0.05, \*\* indicates a significant correlation at the level of 0.01, \*\*\* indicates a significant correlation at the level of 0.001. T values are shown in brackets.

## 4.2.1 Analysis on the Impact of Regulation Implementation on Rural Living Environment

From model I and model II: the adjusted R-square value of model II is 0.18; the analysis of variance shows that the value of F is 7.257, the corresponding significance probability is 0.000, less than 0.05, reaching a significant level, indicating a good model fitting effect and the significantly effective regression results.

Explanation propaganda has a standard regression coefficient of 0.209, sig value of 0.002 less than 0.05, reaching a significant level, which indicates that explanation propaganda has a significant positive impact on the dependent variable of living environment (H1 is verified).

Organizational work has a standard regression coefficient of 0.166, sig value of 0.009 less than 0.05, reaching a significant level, which indicates that organizational work has a significant positive impact on the dependent variable of living environment (H2 is verified).

Daily application has a standard regression coefficient of 0.19, sig value of 0.003 less than 0.05, reaching a significant level, which indicates that daily application has a significant positive impact on the dependent variable of living environment (H3 is verified).

Penalty and reward have a standard regression coefficient of 0.05, sig value of 0.467 greater than 0.05, failing to reach a significant level, which indicates that penalty and reward have no significant impact on the dependent variable of living environment (H4 is not verified).

## 4.2.2 Analysis on the Impact of Regulation Implementation on Villagers' Code of Conduct

From model III and model IV: the adjusted R-square value of model IV is 0.283; the analysis of variance shows that the value of F is 12.225, the corresponding significance probability is 0.000, less than 0.05, reaching a significant level, indicating a good model fitting effect and the significantly effective regression results.

Explanation propaganda has a standard regression coefficient of 0.192, sig value of 0.003 less than 0.05, reaching a significant level, which indicates that explanation propaganda has a significant positive impact on the code of conduct.

Organizational work has a standard regression coefficient of 0.181, sig value of 0.002 less than 0.05, reaching a significant level, which indicates that organizational work has a significant positive impact on the code of conduct.

Daily application has a standard regression coefficient of 0.194, sig value of 0.001 less than 0.05, reaching a significant level, which indicates that daily application has a significant

positive impact on the code of conduct.

Penalty and reward have a standard regression coefficient of 0.042, sig value of 0.0514 greater than 0.05, failing to reach a significant level, which indicates that penalty and reward have no significant impact on the code of conduct.

#### 4.2.3 Mediating Effect of Codes of Conduct between Regulation Implementation and Living Environment

From model V and model VI: the adjusted R-square value of model VI is 0.263; the analysis of variance shows that the value of F is 10.02, the corresponding significance probability is 0.000, less than 0.05, reaching a significant level, indicating a good model fitting effect and the significantly effective regression results.

The mediating variable of code of conduct has a standard regression coefficient of 0.346, sig value of 0.000 reaching a significant level, which indicates that code of conduct has a significant positive impact on the rural living environment, and the mediating effect of code of conduct is tenable (H9 is verified).

Also, explanation propaganda has a significant positive impact on the code of conduct, thus code of conduct plays a significant mediating role in the relationship between explanation propaganda and living environment, partially (H5 is verified).

Also, organizational work has a significant positive impact on the code of conduct, thus code of conduct plays a significant mediating role in the relationship between organizational work and living environment, fully (H6 is verified).

Also, daily application has a significant positive impact on the code of conduct, thus code of conduct plays a significant mediating role in the relationship between daily application and living environment, partially (H7 is verified).

As penalty and reward has no significant impact on the code of conduct or the living environment, they have no mediating effect on the penalty and reward (H8 is not verified).

#### 4.3 Results Discussion on the Impact of Regulation Implementation and Code of Conduct on Rural Living Environment

Based on the empirical research results of the paper, combined with the actual situation, the regulation implementation on the classification and governance of rural domestic waste in Jinhua, and the impact of the code of conduct on the rural living environment are discussed and

analyzed to explain the mechanism, laying a foundation for summarizing the research conclusions and putting forward countermeasures and suggestions.

(1) The study found that the explanation propaganda, organizational work, daily application and other factors in the regulation implementation have a significant positive impact on the improvement of rural living environment, while the penalty and reward have no significant effect on the improvement of rural living environment, which indicates that promoting the classification and disposal of rural domestic waste and improving rural living environment are the results of collaborative work of all relevant parties. The good effects of the regulation implementation on the classification and control of rural domestic waste in Jinhua are not due to the simple fine imposed on the villagers in violation of the law and regulations, but to the responsibilities, rights and resources assigned by the *Regulations on Classification and Management of Rural Domestic Waste in Jinhua City* to the relevant executing bodies at the county, town, village and grass-roots levels for explanation propaganda. To investigate the actual classification and disposal of domestic waste in Jinhua, relevant government departments, township governments and grass-roots organizations in various districts and villages have established a working mechanism for the organization of laws and regulations on classification and disposal of rural domestic waste. Laws and regulations are carried out in accordance with the division of labor and cooperation among relevant subjects, some of whom are responsible for publicity and education, some are responsible for evaluation and improvement of organization, and some are responsible for waste classification, collection, transportation and disposal. According to the actual situation and corresponding empirical results, the reason why the classification and control of Jinhua domestic waste has achieved good results and become popular throughout the country is that the government has played a major role in the overall implementation of laws and regulations such as "explanation propaganda, organizational work, and daily application".

(2) It is found in this paper that the factors such as explanation propaganda, organizational work and daily application in the regulation implementation mediate the regulation on the code of conduct of rural domestic waste classification, in which organizational work plays a full mediating role, explanation propaganda and daily application play a part of mediating role, and reward and penalty have no mediating role in the regulation of villagers' domestic waste classification behavior, which shows that the implementation of the laws and regulations on the classification of rural domestic waste in Jinhua plays a role in regulating the behavior standards of rural domestic waste classification by means of propaganda and education, organizational work and daily application, so as to make the villagers consciously abide by the code of conduct for rural domestic waste classification and improve the rural living environment as a whole. The

investigation on the regulation implementation on the classification and disposal of rural domestic waste in Jinhua has also been verified: in terms of publicity and education on the implementation of the laws and regulations, governments at all levels and grass-roots organizations at the village level in Jinhua use radio, television, WeChat, cultural walls and other media to explain and publicize the knowledge, norms and regulations on the classification of rural domestic waste, organize village cadres and villagers to visit the demonstration villages, and praise advanced models, so that the villagers gradually establish the awareness of rural domestic waste classification and disposal. In terms of organizational work for the regulation implementation, cadres are dispatched from township and village organizations to supervise the various stages of classification and disposal of rural domestic waste, and village cleaners are demonstrating and guiding the villagers how to classify and dispose of domestic waste in various aspects and forms so as to make the villagers "embarrassed" and consciously observe the behavioral norms of sorting and disposing rural domestic waste. In the aspect of daily application of regulation implementation, the township government makes it very convenient and easy to classify the domestic waste of the villagers by investing in free waste bins for classification and disposal, providing services for waste sorting, transportation and disposal, constructing sunshine composting houses, arranging the cleaning staff to handle the waste sorting and collection, etc. In a word, Jinhua governments at all levels and grassroots organizations play a persuasive and guiding role in the implementation of laws and regulations on the classification and disposal of rural domestic waste, such as propaganda and education, organizational work, daily application, etc., which makes villagers willing to cooperate with the government-initiated action on classification and disposal of rural domestic waste and become the code of conduct that villagers are used to and take part in.

(3) The study found that the penalty and reward in the implementation of Jinhua regulations has no significant impact on the regulation of the villagers' code of conduct for the classification of rural domestic waste and the improvement of the rural living environment, which was unexpected in the formulation and implementation of the *Regulations on the Classification and Management of Rural Domestic Waste of Jinhua City*. The possible reasons are: first, although there are penalty provisions in the regulations, no law implementation personnel have been arranged to implement them at all; second, the relevant subjects are "shy" to implement the penalty provisions even some of the villagers do not act in accordance with the rural domestic waste classification standards as the rural society is a close-knit organization; third, it is not necessary to take penalty measures since the villagers have accepted the regulations on the rural domestic waste classification and disposal mentally as the publicity and education, organizational work, daily application and other factors in the regulation implementation have worked even though some of them may violate due to negligence but timely correct after

warning and persuasion by supervisors. However, the reward has had some effect in the initial implementation stage for a strong sense of honor of villagers, but they are accustomed to it as time goes by. Besides, no case of penalty is found in investigation. Thus it is clear that in rural areas where the villagers are closely related, taking simple penalty measures will make the villagers feel humiliated and have conflicts with law enforcement personnel, which will have negative effects instead. To prevent and put an end to the villagers' illegal behavior of rural domestic waste classification, it is necessary to improve publicity and education, organizational work, daily application and other legal factors, and effectively regulate the villagers' waste classification and disposal behavior through regulation.

## V. RESEARCH CONCLUSIONS AND COUNTERMEASURES

Firstly, based on the theory of system implementation and other public policy theories, a questionnaire survey was conducted on sample data of 229 villagers from 21 villages in Jinhua City, Zhejiang province. Secondly, correlation analysis, hierarchical regression model analysis and typical case study were used to analyze the impact of the implementation of rural domestic waste classification regulations on the living environment of rural villages and its mechanism. Finally, the main conclusions are as follows:

### 5.1 Research Conclusions

(1) The key to achieve good results in Jinhua rural waste classification and disposal is to formulate and implement the corresponding local laws and regulations. That is to say, emphasis should be paid on implementation in addition to formulation of regulations on the classification and disposal of rural waste. Moreover, *Regulations on Rural Waste Classification and Management in Jinhua City* have been formulated scientifically, rationally, practically and effectively to achieve good results in the treatment scheme and technical process of "four-sorting by two times, no waste falling and local recycling". To learn and popularize the practical experience of classification and disposal of waste in Jinhua rural areas, not only should the process and technical scheme adopted there be understood and mastered, but also the effective regulation implementation on classification and disposal of waste in rural areas be paid attention to.

(2) Regulations on rural waste classification and disposal are effectively enforced in Jinhua, in which explanation propaganda, organizational work, daily application and other regulation implementation factors play a direct and indirect role, thus improving the rural living

environment. The theoretical model established in this paper shows through empirical analysis that the effective implementation of laws and regulations has significant effect on improving rural living environment. Among them, explanation propaganda factors, organizational work factors and daily application factors in the regulation implementation have significant positive effects on the improvement of rural living environment. Explanation propaganda factors, organizational work factors and daily application factors in the regulation implementation indirectly improve rural living environment by regulating villagers' code of conduct. The effective implementation of the laws and regulations on the classification and disposal of rural waste in Jinhua is mainly due to the fact that the laws and regulations formulated give responsibilities and rights to the relevant executive bodies at all levels, such as the city, county, township and village grassroots, and provide resources for the relevant implementation links such as publicity and education, organizational work and daily application.

(3) The effect of regulation implementation on the improvement of rural living environment is achieved through the logic mechanism of "regulation implementation structure (system) - villagers' code of conduct regulation (behavior) - rural living environment improvement (objective)". This study found that there exists a mechanism for the regulation implementation "regulation implementation structure-villagers' code of conduct regulation - rural living environment improvement", that is, the relevant elements of regulation implementation can improve the rural living environment structurally or indirectly through structurally regulating the villagers' code of conduct. This logical chain also has implications for the implementation of classification and management of rural waste in other places: First, laws and regulations on the classification and management of rural waste should be formulated according to the logical framework of "system structure - behavior regulation - realization of goals" so as to bring into play the role of structured implementation and standardization of villagers' code of conduct. Second, relevant laws and regulations for the classification management of rural waste should be formulated in view of the local actual situation, focusing on the villagers' code of conduct so as to improve the applicability and enforceability of them; the reason why the penalty and reward factors in the rules and regulations for the classification and management of rural waste have not played a role is mainly because they were separated from the actual situation in rural areas and the villagers' code of conduct. Third, responsibilities and rights should be conferred on relevant subjects in the formulation of regulations and systems for the classification and management of rural waste so as to give full play to their effectiveness in publicity and education, organization, daily application, etc.

## 5.2 Countermeasures

(1) Increase the propaganda of classification and disposal of rural domestic waste. The empirical test of the regulation implementation effect on the classification and disposal of rural domestic waste in Jinhua shows that the publicity and education factors play an obvious role in the classification of rural domestic waste in Jinhua. Therefore, the propaganda and education efforts for the classification and control of rural domestic waste should be further strengthened to further enhance the rural residents' awareness of ecological and environmental protection and their participation in waste classification. First, government departments and grassroots organizations in villages should take the primary responsibility to innovate ways and means of explanation propaganda and education of rural waste classification and disposal regulations, explain and publicize relevant regulations of waste classification laws and regulations easily and actively carry out domestic waste classification and publicity and related education. Second, relevant social organizations, including students and geriatric associations, should be mobilized to actively carry out science popularization of waste classification and promote awareness of environmental protection by multi-subjects. Third, the forms of propaganda should be innovated and enriched, such as the use of rural broadcasting, cultural walls and television, WeChat and other media, to carry out propaganda and education activities on the classification and control of rural waste through multiple levels and channels.

(2) Improve and perfect the system and strengthen the organization working mechanism. A scientific and reasonable system can only be implemented to the local level through organizational work by the relevant subjects. According to the empirical test on the effect of implementation time of Regulations on Rural Waste Classification and Disposal in Jinhua, organizational work has a significant impact on standardizing domestic waste classification and disposal behavior and improving rural living environment, and plays a complete intermediary role between them. In other words, a strong implementation organization is the key to promote the classification and resource, localization and harmless treatment of rural domestic waste. Therefore, it is necessary to improve the relevant system and strengthen the organizational work technology for the classification and control of rural waste. First, the organizational leadership mechanism should be further improved and perfected. The responsibility mechanism of county-level government responsible for assessment, town-level government responsible for implementation and village-level organization responsible for implementation should be implemented. Work division and cooperation should be carried out to promote the process of sorting and controlling rural waste rather than buckpassing. Second, organizational responsibilities of relevant subjects in sorting, collecting, transporting and disposing of rural waste should be improved and perfected, and a scientific and reasonable evaluation and reward mechanism should be established to ensure the organization of relevant works. Third, the ways and methods of organizational work of relevant subjects should be enriched and improved to

form an organizational working atmosphere of division of labor and cooperation, mutual support, harmony and efficiency, and to prevent simple and rough organizational working methods, leading to contradictions and disputes in rural areas due to waste classification and treatment.

(3) Optimize the daily application paradigm of rural waste disposal. According to the Rules for the Classification and Management of Rural Domestic Waste, the daily application refers to the regular collection, transportation and resource utilization of waste, local and harmless treatment, as well as the daily maintenance of waste sorting equipment and facilities. According to the empirical test on the implementation effect of Regulations on Rural Domestic Waste Classification and Disposal in Jinhua, the daily application and disposal of rural refuse has significant effect on standardizing household behavior and improving rural living environment. Therefore, it is necessary to further optimize and standardize the scheme, process and technology of daily application and disposal of rural waste, and play a basic, process and technical role in promoting the classification and disposal of rural waste. First, the responsibilities of the relevant subjects in daily application and disposal of waste should be carried out, and an evaluation and reward system should be implemented to ensure that the relevant subjects conduct daily disposal of rural waste according to the schemes, processes and technologies set up, and guide and support peasant households to standardize their behavior of classifying and controlling domestic waste. Second, the assessment of the daily application and disposal process of waste should be strengthened, the problems in the process of waste classification, collection, transportation and resource utilization, in-place and harmless daily application and disposal should be diagnosed, and the schemes, processes and technologies should be further optimized to improve the ability and efficiency of daily application and disposal of waste. Third, the investment of funds for daily application and disposal of rural waste should be guaranteed, the facilities for classifying domestic waste should be maintained on a daily basis, and the composting houses should be maintained regularly, especially the development of waste disposal technology, so as to further improve the level of resourcing, localization and harmless disposal of rural waste.

(4) Use more humanized means of penalty and reward. According to the empirical test of the practical effect of the implementation of the classification and disposal of rural domestic waste in Jinhua, the reward and penalty have no significant impact on the regulation of rural waste classification and the improvement of rural living environment, probably because enforcement of simple penalty and reward measures would affect the villagers' relationship and generate hostile feelings as the rural society is a close-knit organization. Therefore, it is recommended not to take simple penalty measures, but to use more humanized soft penalties

and incentives through firstly, establishing a system for assessing the sanitary environment of rural households' courtyards and giving them public praise and spiritual rewards for their excellent sanitary environment; secondly, properly linking the environmental sanitation of the farmers with their welfare, and combining the positive and negative items to encourage the villagers to regulate the behavior of garbage classification and disposal; thirdly, giving full play to the responsibility of the village cleaner, setting up the bonus or subsidy grade system for the cleaner, giving different grades of bonus and subsidies according to the maintenance of the village's living environment, and using the "sentiment" to influence the villagers to comply with the regulations on the rural domestic waste classification and disposal; fourthly, imposing more severe punishment measures such as fines on individuals who deliberately or maliciously break the rules and regulations if the education and persuasion of good faith fail.

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