

## Shell Petroleum Development Company (SPDC) Agricultural Corporate Social Responsibility (CSRs) and livelihood of Farmers in Rivers state, Nigeria: Canonical Analysis Approach

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### Abstract

*The study was carried out to determine the effect of Shell Petroleum Development Company Corporate Social Responsibility on Livelihood of farmers in Rivers State, Nigeria. The specific objectives of the study were to; examine the pattern of agricultural CSR projects of Shell in Rivers State and determine the effect of agricultural CSRs on livelihood of farmers in Rivers State. Data for the study were obtained through the administration of questionnaire. Multistage sampling procedure was used to select 120 respondents from the sample frame of five communities. Data were analyzed using factor analysis and canonical correlation analysis. Factor analysis was used on the patterns of agricultural CSR projects yielded five dimensions namely; agro processing projects, agricultural infrastructure and credit scheme projects, fisheries projects, agricultural capacity building projects and extension service support project. Variables on livelihood activities were also subjected to factor analysis which yielded two major dimensions namely: farm activities and non-farm activities factor. Effect of SPDC agricultural CSR projects on livelihood of the farmers was determined using canonical analysis. The result from the analysis showed that the predicted livelihood activities (factor II: non-farm activities) had a canonical loading of 0.51 and it correlated with factor II: Agricultural infrastructure and credit scheme project. Most of the SPDC corporate social responsibilities did not significantly affect farm activities livelihood rather it impacted significantly on non-farm activities. It was recommended that SPDC should improve the Agricultural extension services of the CSRs*

**Keywords:** *agricultural corporate social responsibility, livelihood activities, Shell Petroleum Development Company.*

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### 1. INTRODUCTION

Agriculture is a fundamental component of the Nigerian economy contributing significantly to employment, income generation, and food security (Akpabio et al 2020 and Aminu and Anono, 2012). In the Niger Delta region, which includes Rivers State, agriculture remains a critical livelihood activity for the majority of the rural population. However, the activities of oil companies, particularly Shell Petroleum Development Company (SPDC), have had profound impacts on the agricultural sector and the livelihoods of farmers in this region.

The Shell Petroleum Development Company (SPDC) has been a significant player in Nigeria's oil industry for decades (Tawari and Davies, 2010). With its extensive operations in the Niger Delta, including Rivers State, SPDC has been both a boon and a bane for the local communities. While the company has contributed to the national economy, its activities have also led to environmental degradation, loss of farmland, and adverse health impacts on the local population (Okonta and Douglas, 2001). According to Nwilo and Badejo, (2005), the extraction and production processes of oil and gas have led to environmental pollution, including oil spills, gas flaring, and land degradation, which have severely affected agricultural productivity and the livelihoods of local farmers. The environmental degradation caused by oil exploration activities has led to loss of fertile land, contamination of water bodies, and reduction in fish and crop yields, thereby threatening food security and the economic well-being of farming communities in Rivers State (UNDP, 2006).

In response to the negative environmental impacts of their operations, SPDC has implemented various Corporate Social Responsibility (CSR) initiatives aimed at mitigating the adverse effects on local communities. These CSR activities include community development projects, environmental remediation, and agricultural support programs (Frynas, 2009). Agricultural corporate social responsibility (CSR) refers to the practices and policies implemented by companies to manage their impact on the social, economic, and environmental dimensions of the communities in which they operate, particularly in the agricultural sector (Luhmann, and Theuvsen, 2016). In recent years, there has been a growing recognition of the need for large corporations to contribute positively to the livelihoods of local communities, especially in regions where their activities have significant environmental and social implications. Despite these efforts, there is ongoing debate about the effectiveness of SPDC's CSR initiatives in improving the livelihoods of farmers and enhancing agricultural sustainability in the region.

Previous studies have examined the impact of oil exploration on agricultural productivity and the environment in the Niger Delta. For instance, Okonta and Douglas (2003) highlighted the socio-economic challenges faced by local communities due to environmental degradation caused by oil spills and gas flaring. Additionally, Naanen (1995) discussed the role of multinational oil companies in community development and the paradox of corporate philanthropy in the face of environmental damage.

The concept of Corporate Social Responsibility (CSR) in the context of multinational oil companies involves a commitment to ethical behavior, economic development, and improvement of the quality of life of the workforce, their families, the local community, and society at large (Carroll, 1999). The effectiveness of CSR initiatives, particularly in the agricultural sector, is crucial for sustainable development and improving the livelihoods of farmers affected by oil exploration activities.

Shell Petroleum Development Company (SPDC) is a major multinational oil company in Nigeria that started the implementation of Corporate Social Responsibility. These projects are meant to significantly affect the livelihood of the people. Abali et al (2010), Ekanem et al (2014) and Etuk et al (2017) have opined that multinational oil companies in Nigeria have established some

agricultural Corporate Social Responsibility projects to cushion the effect of deprived major and primary occupation resulting from massive land, oil spills and oil exploitations. These projects are embedded with the aim of developing, stimulating and sustaining wealth generating activities (livelihood) in the region (Obot et al 2024 and Uduji and Okolo-obasi, 2019).

Agriculture remains a vital component of the livelihoods of communities in Rivers State, Nigeria. However, the extensive oil exploration and production activities by multinational corporations, particularly the Shell Petroleum Development Company (SPDC), have significantly impacted the region's environmental and socio-economic landscape. Oil spills, gas flaring, and other industrial activities have resulted in soil degradation, water pollution, and the loss of arable land, thereby threatening the primary source of income for many local farmers (Nwilo and Badejo, 2005).

Sequel to these challenges, SPDC has implemented various agricultural corporate social responsibility (CSR) initiatives aimed at mitigating the adverse effects of their operations and enhancing the livelihoods of farmers. These initiatives include training and capacity building, provision of agricultural inputs, infrastructure development, and financial support. Despite these efforts, there remains a significant gap in understanding the actual effectiveness of these CSR programs in addressing the specific needs and challenges faced by farmers in Rivers State. Furthermore, Etuk et al (2017) have listed some of the agricultural corporate social responsibility projects to include: agro-enterprise training, agribusiness support, supply of farm inputs, extension service support etc. Ekanem et al (2014) observed that SPDC's sustainable community development approaches through CSRs have been developed. If these projects are developed, what is the pattern of the CSR projects and do they significantly affect livelihood of the people? Rivers State of Nigeria is noted as one of the states in the Niger Delta Region that is involved in fishing and agricultural activities but few studies such as Ekanem et al (2014), Etuk et al (2017), Umoh et al (2019) and Abbas et al (2024) have linked livelihood to SPDC's CSR in Rivers State. Etuk et al (2017) recommended a multidimensional study on agricultural CSRs of SPDC and livelihood, hence this study is geared towards filling the research gap by examining the effect of agricultural CSRs on livelihood of farmers in Rivers State.

### **Objectives of the study**

The main objective of this study was to examine the effect of agricultural CSRs on livelihood of farmers in Rivers State, Nigeria.

The specific objectives of the study were to:

- (i) examine the pattern of agricultural CSR projects of SPD in Rivers State
- (ii) determine the effect of agricultural CSRs on livelihood of farmers in Rivers State.

### **Theoretical Framework**

#### **Stakeholder Theory**

Stakeholder theory, initially proposed by Edward Freeman in 1984, posits that organizations should consider the interests and influences of all their stakeholders in their decision-making processes, not just the shareholders. Stakeholders are defined as any group or individual who can affect or is affected by the achievement of the organization's objectives. This theory is crucial for understanding the CSR initiatives of multinational companies like Shell Petroleum Development Company (SPDC) in the context of their operations in Rivers State, Nigeria.

In the case of SPDC, key stakeholders included local farmers, community leaders, environmental groups, government entities, and the broader public. The theory suggests that for SPDC's CSR initiatives to be effective, they must address the needs and concerns of these diverse groups. This involves engaging with stakeholders through consultations and collaborations to ensure that CSR programs are designed and implemented in ways that genuinely benefit the community. For example, SPDC's agricultural support programs should be tailored to the specific needs of the local farmers, taking into consideration the environmental damage caused by oil exploration activities (Freeman, 1984).

The effectiveness of SPDC's CSR initiatives can be evaluated by examining the degree to which they incorporate stakeholder input and address stakeholder concerns. According to Donaldson and Preston (1995), stakeholder theory emphasizes the importance of ethical treatment and the balancing of interests among stakeholders. This approach aligns with the need for SPDC to mitigate the negative impacts of its operations while contributing positively to the livelihoods of farmers in Rivers State. By adopting stakeholder theory, SPDC can enhance its social license to operate and foster sustainable development in the region.

### **Sustainable Livelihood Framework Theory**

The Sustainable Livelihood Framework (SLF) provides a comprehensive approach to understanding the factors that influence the livelihoods of individuals and communities. Developed by the Department for International Development (DFID), this framework identifies five key assets or capitals that are essential for sustainable livelihoods: human, social, natural, physical, and financial capital (DFID, 1999).

In the context of SPDC's CSR initiatives, the SLF theory is instrumental in assessing the impact of these programs on the livelihoods of farmers in Rivers State. The framework allows for a holistic evaluation of how SPDC's activities affect the various forms of capital that farmers rely on. For instance, oil spills and gas flaring adversely impact natural capital by degrading soil and water resources, which are critical for agricultural productivity. Conversely, SPDC's provision of agricultural inputs and infrastructure development can enhance physical and financial capital, thereby improving the farmers' ability to sustain their livelihoods.

The SLF also emphasizes the importance of understanding the vulnerability context, which includes the shocks, trends, and seasonality that affect livelihoods. In Rivers State, environmental degradation caused by oil exploration activities represents a significant shock to the livelihood systems of farmers. By incorporating the SLF theory, this study can evaluate how SPDC's CSR

initiatives address these vulnerabilities and contribute to more resilient and sustainable livelihood strategies for the farmers.

## 2. METHODOLOGY

The study was carried out in Rivers State, one of the thirty-six (36) states in the Federal Republic of Nigeria and specifically located in the Niger Delta Region. A multi-stage sampling technique was used in selecting the sample for the research. In the first stage, purposive sampling technique was used in the selection of five (5) core operational local government areas of SPDC. At the second stage, one community from each of the five local government areas where SPDC operates was randomly selected and the five communities selected were Umuechem, Aluu, Nchia, Rukpoku and Jonkarama. At the third stage, 24 respondents were randomly selected from the farmers in the five selected communities, thus, making a total of one hundred and twenty respondents were used for the study. Primary data were collected through the use of a well-structured questionnaire alongside interview technique. Multivariate analyses such as factor analysis (used to achieve parsimony in agricultural CSR and livelihood data sets and canonical analysis (used to establish the inter-relationship existing between linear combination of agricultural CSRs and livelihood activities data sets in the study) were used to analyze the objectives. The model specification for canonical correlation analysis and factor analysis are:

The CCA model as :  $CV_{X1} = A_1X_1 + A_2X_2 + A_3X_3 + \dots + A_nX_n$  and  $CV_{Y1} = B_1Y_1 + B_2Y_2 + B_3Y_3 + \dots + B_mY_m$  .... Equation (1).

Where  $CV_{X1}$  and  $CV_{Y1}$  = Canonical variates,  $a_1 \dots a_n$  and  $b_1 \dots b_m$  = Canonical Weights

Factor Analysis (FA) model is :

$$X_1 = b_{11}f_1 + b_{12}f_2 + b_{13}f_3 + \dots + \mu + e_1 \dots \dots \dots \text{Equation (2)}$$

$$X_1 = b_{21}f_1 + b_{22}f_2 + b_{23}f_3 + \dots + \mu + e_2 \dots \dots \dots \text{Equation (3)}$$

Where:  $\mu$  = the mean of  $X_1$ ,  $e_1$  = the residual to the  $i$ th test after taking account of the contributing factors,  $f_1, f_2, f_3, \dots, f_n$  = the values of the factors which vary from one subject to another, but have zero mean unit variance, and assumed to be uncorrelated with one another and the with the residuals,  $b_{ij}$  = constant like regression coefficients, indicating how much each test is affected by each factor. These  $b_{ij}$  are known as factor loadings.

## 3. RESULTS AND DISCUSSIONS

### 1) Agricultural Corporate Social Responsibility Projects of SPDC

The factor analysis procedure applied to data set of agricultural CSR and SPDC yielded a five-dimensional solution as indicated in Table 1. The communalities, which are indications of the importance of the variables in the analysis, are generally high, implying that the variables selected for the study were appropriate and relevant. The five factors altogether accounted for 66.8 percent of the total variance in the original 27 variables and therefore appropriately indicated agricultural CSR in the study area. These five factor components were named accordingly:

**Factor 1: Agro-commodity value chain Projects**

This factor was thus named because of the high positive loading on; farm input scheme, seed multiplication, and post-harvest project, oil palm nursery, out grower scheme, mushroom production and processing mill (cassava). This factor accounted for 28.7 percent of the variation within the distribution of the agricultural CSR variables. Based on the fact that these variables constituted Agro-commodity Value Chain, this factor was named Agro-commodity Value Chain. This implication is that one of the major agricultural CSR was on diverse Agro-commodity Value Chain.

**Factor II: Agricultural Infrastructure and Credit Scheme Projects**

The loading on this factor was dominated by variables associated with agricultural infrastructure namely market construction, electricity, road construction and water provision. The highest loading was on water provision (.806), which shows the importance of water in agricultural production. This factor accounted for 18.0 percent of the total variation in the original data set and was the second most important factor.

**Factor III: Fisheries Projects**

Factor III accounted for 9.8 percent of the total variation. This factor loaded highly on three variables namely: homestead or communal fish pond, fish hatchery and freshwater shrimp and culture projects. The variables in this factor had association with fish production hence it was named “Fisheries” factor.

**Factor IV: Agricultural Capacity Building Projects**

This factor load positively with two variables. They were agricultural training on crop, livestock and agricultural marketing. It accounted for 5.9 percent of the total variation in the data set. This fourth factor loaded positively with variables associated with training and it was named “Agricultural Capacity Building”.

**Factor V: Extension Service Support Project**

This factor was found to load highly on extension service support, and the factor was named “Extension service support” factor. This factor accounted for only 3.8 percent of the total variance in the data set.

**Table 1: Rotated factor matrix for Agricultural CSR projects of SPDC**

S/N	CSR projects	Factors of Agricultural CSR Projects					Communalities
		I	II	III	IV	V	
1	Farm input scheme	-	.716	-	-	-	.816
2	Micro Credit Scheme	-	.516	-	-	-	.716
3	Agro-enterprise training	-	-	-	.517	-	.814
4	Scholarship to agric. students (UNIV)	-	-	-	-	-	.767
5	Post-harvest project	.596	-	-	-	-	.718
6	Seed multiplication	.812	-	-	-	-	.729
7	Establishment of agribusiness	-	-	-	-	-	.794
8	Mini-livestock	-	-	-	-	-	.810

9	Oil palm nursery out-grower scheme	.510	-	-	-	-	.806
10	Processing mill (cassava)	.726	-	-	-	-	.706
11	Processing mill (rice)	.612	-	-	-	-	.813
12	Extension service support	-	-	-	-	.763	.764
13	Fish hatchery	-	-	.695	-	-	.741
14	Home seated or communal fish pond	-	-	.714	-	-	.838
15	Processing mill (oil palm)	.504	-	-	-	-	.756
16	Agric. Training on crop & livestock	-	-	-	.706	-	7.16
17	Mushroom production	.534	-	-	-	-	6.19
18	Bee keeping training	-	-	-	-	-	.916
19	Training on agric. Marketing	-	-	-	.612	-	.716
20	Freshwater shrimp and culture project	-	-	.519	-	-	.816
21	Market construction	-	.714	-	-	-	.859
22	Electricity	-	.702	-	-	-	.881
23	Road construction	-	.676	-	-	-	.824
24	Free medical service	-	-	-	-	-	.819
25	Mobile health care service in farm comm.	-	-	-	-	-	.842
26	Building health centres	-	.517	-	-	-	.822
27	Water provision	-	.806	-	-	-	.787
	<b>Eigen value</b>	<b>5.12</b>	<b>3.34</b>	<b>3.14</b>	<b>2.61</b>	<b>2.03</b>	
	<b>Percentage variance</b>	<b>28.7</b>	<b>18.6</b>	<b>9.8</b>	<b>5.9</b>	<b>3.8</b>	
	<b>Cumulative %</b>	<b>28.7</b>	<b>47.3</b>	<b>57.1</b>	<b>63.0</b>	<b>66.8</b>	

### Pattern of CSR projects of the host communities of SPDC

Pattern of CSR projects of the host communities of SPDC is shown in Table 2

#### Factor(F) I: Agricultural Value Chain Project

A total of three communities, namely Umuechem, Aluu and Nchia communities out of the 5 communities had significant and positive scores of about 0.50 indicating an average allocation of agro processing in these areas. It is an indication that agricultural value chain projects were averagely executed in these communities based on their factor scores

#### Factor(F) II: Agricultural Infrastructure and Credit Scheme Project

Only two communities were found to have positive score on this factor. They were Rukpoku and Nchia. Based on the factor scores of these two communities, agricultural infrastructure projects were averagely executed in these communities.

**Factor(F) III: Fisheries Project**

The matrix shows that only two communities had positive score on this composite index. These communities were Nchia and Aluu. This is an indication that fisheries projects were averagely executed in these communities.

**Factor(F) IV : Agricultural Capacity building Project:** This factor shows that only one community (Aluu) has positive score. This factor is indicative of the strength in Agricultural Capacity Building project in SPDC agricultural CSR. The people in this community had training programmes in agriculture of SPDC than other communities.

**Factor (F) V: Extension Service Support Projects**

Service support project was identified as one of the dimensions of agricultural CSR. Two communities were strongly involved in this factor; they were Umuechem and Aluu.

**Table 2: Factor scores of CSR projects for the 5 host communities of SPDC**

Dimensions of Agricultural CRS						
S/N	Communities	F1	F2	F3	F4	F5
1	Umuechem	0.61	0.34	0.45	0.51	0.53
2	Aluu	0.62	0.44	0.61	0.61	0.56
3	Nchia	0.60	0.66	0.46	0.40	0.41
4	Rukpoku	0.49	0.64	0.60	0.40	0.47
5	Jonkarama	0.40	0.47	0.43	0.38	0.41

**Livelihood activities in the study**

As indicated in Table 3, factor analysis procedure with varimax rotation applied to the original data of livelihood activities in the study area yielded a two dimensional solutions (factors), the communalities, which are regarded as indications of the importance of variables in the analysis were high. This shows that livelihood variables used in the study were relevant and appropriate. In total area, the two factor factors (dimensions) which accounted for 65.11 percent of the total variance in the 22 original variables may be regarded as composite indicators that define livelihood activities in the study area. The two major dimensions were:

**Factor 1: Farm Activities factors**

This factor accounted for 38.15 percent of the total variance and is without doubt, the most important factor. This factor loaded significantly on fishing, farming, fish trading, trading on farm produce, agro-trading and livestock, hence, it was named farm activities. Umoh et al (2019), Etuk et al (2014) Adepoju, and Obayelu (2013) Babatunde (2009), and Oluyide (2006) had indicated that farming still remains the important means of household livelihood in rural Nigeria.

**Factor II: Non-farm activities factor**

This factor loaded significantly on variables associated with non-farming activities such as petty trading, tailoring, carpentry, masonry and joinery and fashion design hence it was named non-farm activities factor. It accounted for 26.96 percent of the total variance in the original data set. Adepoju and Oyewole (2014) had earlier viewed that income from non-farm activities contributed



more to income inequality than any other livelihood strategy and could be attributed to the fact that non farming activities yield higher return than farm activities. For Shell communities, two dimensional solutions (farm activities and non-farm activities factors) were also derived with high communalities. These two factors contributed 64.50 percent of the total variation in the 22 original variables which are regarded as livelihood activities in the Shell communities. The first factor accounted for 36.89 percent of the total variation in the original data set while the second factor accounted 27.61 percent. These findings dominate agricultural activities as a major livelihood in the study area.

**Table 3: Rotated factor matrix for Livelihood activities**

Livelihood activities	SPDC		Communalities
	F1	F2	
Bead making	0.41	0.39	0.94
Fashion & design	0.48	0.63	0.81
Hair wearing	0.31	0.38	0.71
Production of local gin	0.28	0.41	0.68
Tailoring	0.34	0.71	0.76
Herbal medicine production	0.46	0.34	0.78
Hat making	0.38	0.41	0.88
Shoe making	0.21	0.39	0.91
Production of local lotion	0.29	0.19	0.84
Clothing & textiles	0.43	0.11	0.78
Juice making	0.41	0.38	0.69
Petty trading	0.44	0.89	0.77
Football/viewing Browsers	0.48	0.48	0.68
Carpentry	0.41	0.63	0.79
Soap making	0.38	0.43	0.71
Fishing	0.78	0.41	0.91
Farming	0.81	0.39	0.98
Fish trading	0.79	0.34	0.91
Agro trading	0.61	0.26	0.89
Livestock	0.59	0.14	0.88
Masonry and joinery	0.28	0.66	0.91
Trading on farm produce	0.73	0.13	0.92
<b>Eigen values</b>	<b>8.13</b>	<b>4.08</b>	
<b>Percentage variance</b>	<b>38.15</b>	<b>26.96</b>	
<b>Cumulative %</b>	<b>38.15</b>	<b>65.11</b>	

Keys: F1 = Farm activity factor; F2 = Non-farm activity factors.

#### **Effect of agricultural CSR projects of SPDC on livelihood activities**

The Canonical analysis was used to determine the effect of agricultural CSR projects of SPDC on livelihood activities as indicated in Table 4. The cut-off value of 0.5 was adopted for the

interpretation of canonical loading. In SPDC, Canonical variate I: The first canonical variate shows that the predicted livelihood activities (factor II: non-farm activities) had a canonical loading of 0.51 and it was related to factor II Agricultural infrastructure and credit scheme project, Agro capacity building projects of SPDC corporate social responsibilities but with average correlation. This first canonical variate, identified the inter-relationship between livelihood factor II and SPDC CSRs provision of factor II Agricultural infrastructure and credit scheme project and Agricultural capacity building project. This is an indication that most of the SPDC corporate social responsibilities did not significantly affect farm activities livelihood rather it impacted significantly on non-farm activities.

**Table 4: Canonical structure loading for CSRs of SPDC and Livelihood activities of farmers in SPDC Communities**

Livelihood activities		Canonical variates		
		I	.II	I.III
Y <sub>1</sub>	Factor 1 farm activities	0.41	0.51	.044
Y <sub>2</sub>	Factor 2 non-farm activities CRS provision	0.51	0.41	0.42
X <sub>1</sub>	Factor I Agricultural processing and improved crop technology project	0.41	0.56	0.34
X <sub>2</sub>	Factor II Agricultural infrastructure and credit scheme project	0.55	0.47	0.43
X <sub>3</sub>	Factor III fisheries project	0.39	0.34	0.58
X <sub>4</sub>	Factor IV Agricultural capacity building project	0.69	0.28	0.41
X <sub>5</sub>	Factor V Extension service support	0.34	0.18	0.28

  

Canonical Variate	Eigen value	Variance extracted	Cumulative variance extracted	Factor redundancy	Proportion of total redundancy
	Livelihood				
I	0.617	0.478	0.478	0.426	0.613
II	0.541	0.134	0.612	0.103	0.174
	SPDC CSR				
I	0.696	0.449	0.499	0.407	0.071
II	0.652	0.113	0.562	0.121	0.063
III	0.617	0.071	0.633	0.034	0.051

Table 4 further shows that the Components of redundancy for the two canonical variates of livelihood activities and SPDC corporate social responsibilities provision. The variance extracted showed that the two canonical variates explained 47.8% and 13.4% respectively in the criterion (dependent) variable sets. Similarly, the three variates accounted for 44.9 percent, 11.3 percent and 7.1 percent respectively of the variation in the predictor (independent) variable set. Factor Redundancies: the factor redundancies of 0.407, 0.121 and 0.034 were interpreted as meaning that canonical variates of the corporate social responsibility set predicted 40.7%, 12.1% and 3.4%

respectively of the total variate in the data set while the 3 canonical variates of the livelihood variables explained 42.6% and 10.3% respectively.

### **Conclusion and Recommendations**

The study concluded that the major agricultural CSR projects done by Shell were: agro processing projects, agricultural infrastructure and credit scheme projects, fisheries projects, Agricultural capacity building projects and extension service support project. These projects did not significantly affect farming activities but significantly affected the non-farming activities.

Based on the findings of this study, the following recommendations were made:

1. Proper consultations with the farmers in the study locations should be done and their major felt needs should be established before carrying any CSR project. This will help in stimulating farming activities.
2. Agricultural extension services were noted as the least implemented CSR project, without paying adequate attention to this factor, the attitude, knowledge and skills of the farmers will not improve and the improvement of livelihood may be a myriad. Therefore, is a need to improve the Agricultural extension services of the CSRs.

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