Prediction of Rural Women Empowerment receiving Microcredits through Carbon Sequestration Project (CSP) in South Khorasan Province (Iran)

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Abstract

One of the goals of the International Carbon Sequestration Project in South Khorasan Province is to study the sustainability of natural resources, especially in the rehabilitated areas, by reducing the reliance of villagers to the natural resources of the region, creating alternative livelihoods with job empowerment and solving the problems of villagers in the region, especially rural women. The purpose of this study was to predict the rural women' empowerment who received microcredits during the project. The research was done through a descriptive-correlational method. Statistical sample includes 188 rural women who were members of the microcredit Fund. The validity of the questionnaire was confirmed by panel of research committee experts and the reliability was confirmed by calculating Cronbach's alpha coefficient to 0.95. The results of study showed that there is positively a significant correlation between rural women empowerment and variables of Membership Years, Loan Amount, and Loan adequacy, Age, Literacy Level and Income per month. But rural women empowerment could be predicted by three variables of Loan adequacy, Literacy Level and women Age. Also, Loan adequacy was known as the most powerful predictor of rural women empowerment. Given the positive impact of microcredits on rural women empowerment, as well as rural women empowerment to reduce pressure on ecosystems and improve carbon sequestration, it is proposed to increase the microcredit program and its amount.

Keywords: Carbon Sequestration Project; Microcredit; Loan; Rural women

1. Introduction

In developing countries, especially in rural areas, the productivity of women-managed units is lower than those managed by men, and women remain disempowered, and even if society is changing, there is gender disparity (Silberschmidt, 2001; World Bank, 2012; Aguilar *et al*., 2014; Ayalew *et al*., 2015; Lecoutere, 2017).

Low rural women's empowerment and gender inequality are two factors that can disrupt the sustainability of agricultural production and, on the other hand, limit the ability of rural women to adapt to climatic changes (Goh, 2012; Lecoutere, 2017). The effects of the climatic change are worsening social inequalities that already exist, and because women's access to resources is limited and their livelihoods depend on natural resources and agriculture, rural women are more vulnerable (Alston, 2013; UN Women Watch, 2011; Ngigi *et al*., 2017).

Studies show that by reduction of gender inequality, economic growth improves, poverty is reduced and productivity improves, especially in agriculture. In addition, studies show that gender inequality and women's limited activity have a negative impact on the health, nutrition and education of children, especially girls (Quisumbing *et al*., 2003; Smith *et al*., 2003; WHO, 2013; Lecoutere, 2017).

Credits for poor people, especially for women, caused the problem that can create self-

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employment or productive jobs or incomes (Khandker, 1998). In these countries, microcredit for women is used as a way to reduce the poverty of women and empower them (Ganle *et al*., 2015). Today's agreement is that Microcredit for poor women is a key to the sustainable economic and social development of the twenty-first century (Norwood, 2005; UN, 2011).

The warm and dry area of Hossein Abad Ghinab in South Khorasan Province has been involved in successive droughts and dust storms in recent decades, due to the long-term droughts and destruction of pastures has increased the deprivation and poverty of rural households of this area. The International Carbon Policy Project, with the formation of rural development groups and microcredit funds, has placed the rural communities in a better position to improve the socio-economic status of these communities. Hossein Abad area Sarbisheh city is the project implementation site that is located near the Afghanestan border in South Khorasan Province. This warm and dry area has been affected by successive droughts and dust storms in recent decades, so that the occurrence of successive and long-term droughts and destruction of pastures has increased the deprivation and poverty of rural households, especially the vulnerability of rural women (Golmohammadi., 2013).

The International Carbon Sequestration Project (CSP) initiative joint between the government of the Islamic Republic of Iran, the United Nations Development Program (UNDP) and Global Environmental Facilities (GEF) by the global goal of reducing greenhouse gases and the effects of climatic change, the national goal of desertification and dust reduction, and the regional target, Local communities and the empowerment of rural communities have begun to work to improve the social and economic status of these communities and eliminate poverty and rural immigration (Rezaie, 2007; Fallahi *et al*., 2015). The reason of unsuccessful works in combat desertification is lack of consideration on human factors as well as socio-economics issues (Mehrabi *et al*., 2008).

The Carbon Sequestration Project has mobilized and empowered the local community as a key tool for managing rangelands and economic activities, and has relied on it as a permanent contributor to managing and rehabilitating the rangelands of the region, drawing on specific strategies such as involving rural women (Fallahi *et al*., 2015).

Rural reclamation activities of rural women include reinstated activities such as seeding, clamping, picking up pasture, planting seedlings in the treasury. In order to reduce pressure on natural resources and to improve the economic situation of local communities, the project in the fields of agriculture, cattle breeding, crafts and tourism has established its activities in the form of rural development groups by carrying out activities such as cultivation of forage plants, construction of wind turbine, production of vermicompost fertilizers, promotion of women's handicraft activities and handicraft products marketing. The main objective of this project is the sustainability of natural resources, especially in the rehabilitated areas, by reducing rural residents' dependence on the natural resources of the region through training and non-skill training, creating alternative livelihoods with job empowerment and solving the problems of villagers in the region, especially rural women (Abdolhosini *et al*., 2014; Rezaie, 2007).

According to the local goals of the project by using the bottom-up planning strategy, and transfer planning responsibilities and local management we set up rural development groups and microcredit funds that prioritize rural poor and help empower their families, through their skills training, provide access to micro-loans and thereby facilitate the sustainable empowerment of rural women. The theory of empowerment of women is based on studies by Agarwal (1997) and Kabeer (1999).

Evidence from case studies shows that group work and co-operatives (microcredit funds) can influence women's empowerment process (Jones *et al*., 2012). Low rural women's empowerment and gender inequality are two factors that can disrupt the sustainability of rural life and, on the other hand, limit the ability of rural women to adapt to climatic change, such as droughts and dust storms (Goh, 2012; Lecoutere, 2017). The effects of climate change are worsening social inequalities that already exist, and because women's access to resources is limited and their livelihoods depend on natural resources and agriculture, rural women are more vulnerable (UN Women Watch, 2011; Alston, 2013; Ngigi *et al*., 2017). In countries with low per capita income, low savings and lack of access to credit for poor people, especially for women, make it difficult to create self-employment or productive jobs or income-generating businesses (Khandker, 1998). In these countries, microcredit is used as a way to reduce the poverty of women and empower them (Ganle *et al*., 2015). Today, there is an agreement that microcredit for poor women is a key to the sustainable economic and social development of the twenty-first century

(Norwood, 2005; UN, 2011). By using long-term data, by the end of 2010, around 2.5 million households were able to survive poverty altogether using microcredits (Khandker *et al*., 2016). microcredit program was the solution to both rural women's problems that are low saving and lack of access which leads to reduce poverty and empower women (Hashemi *et al*., 1996). Some evidences showed that increasing access to credit and savings has a positive impact on empowering women, reducing poverty, increasing income and returning capital (Mahmud and Osmani, 2016). Research result of Osmani *et al*., (2015) also showed that 29 percent of micro-credit fund borrowers have been able to reliably survive poverty. Rezaie (2007) in shies master thesis by using the qualitative method, she examined the role of microcredit of Carbon Sequestration Project on empowerment of rural women. She questioned empowerment by components of increasing the participation of the local population, following the demands of the people from the accountable institutions, raising the assets and the state of subsistence and household income and mobility and self-confidence. The result of shies research suggests that the villagers have begun a kind of empowerment process by formed a microcredit fund and access to financial services (savings and loans) and non-financial (education, partnership, decision-making, accountability and management). The aim of this study was to predicting rural women empowerment that microcredit received from the Carbon Sequestration Project in the Hossein Abad area of Sarbisheh in South Khorasan Province.

2. Materials and Methods

2.1. Study Area

The spatial range of the implementation of the international carbon sequestration project, Hossein Abad Ghinab plain (32º N, 59º E, 1700 m above sea level) are in the political boundary of Sarbisheh city of South Khorasan Province. The climate of this area is characterized by semi-arid climate with an average annual precipitation of 188 mm and a mean annual temperature of 14.5 ºC (Max. 40.5 ºC, Min. – 16 ºC). study area includes the villages of Nazdasht, Kaserab, Hasan Kolangi, Gazdez, Chah Shahid Isfahani, Chah Modares, Hemmatabad, Ebrahim Abad and Hojjat Abad which, there are 11 women's active Microcredit funds with 265 members.

2.2. Methods

The present research is a descriptive-analytical study. The statistical population of the research includes rural women who were members of the microcredit fund of the Carbon Sequestration Project. The statistical sample includes 188 rural women who were members of microcredit fund received loan. The sampling method is the census or the total number of women receiving the credits. The data gathering tool in this research is a researcher-made questionnaire. The first part of the questionnaire is related to the information related to individual characteristics of respondents the microcredit funds, such as the duration of membership in microcredit funds, the amount of loans received, loan adequacy, age, literacy level, spouse literacy level, number of family member and Household income per month. The second part of the questionnaire includes each dimension of empowerment (impact on family decision making, 10 Items, marital relations, 9 Items, community status, 5 Items, political, 4 Items, economic, 9 Items, impact on self-confidence, 5 Items), which were designed in the Likert domin. In order to ensure the validity of the questionnaire, the expert of research committee examined and verified the various dimensions of the questionnaire. The reliability level of the questionnaire was obtained using Cronbach's alpha (0.952), which indicates a high reliability. Data analysis was done in SPSS software. In order to predict the empowerment of rural women who receiving microcredit, the effect of independent variables on the dependent variable was estimated through Pearson correlation and multivariate regression using the same method (ENTER).

3. Results

3.1. Descriptive results

According to Table 1 research show that the average age of rural women receiving microcredit is 31 years old of which 76. 6% are married and 23.4% are single. Based on Table 2 average number of family members of the responsive women is 4 people. The job is more than 70% of the rural women's cattle breeding and agriculture. Table 3 showed only 1.1 percent of rural women have university literacy. According Table 4 average number of women's membership in microcredit funds is 6 years. All rural women in charge of this research have used microcredit. In the context of sustainable rural occupation, rural women have spent the

loan of Carbon Sequestration Project on microcredit funds to create jobs in crafts, agriculture, and cattle breeding, with 14.4 percent of women do weaving doll, 22.9 percent

carpet weaving, 10.1 percent cattle breeding, 18.1% embroidery and towels weaving, and 9% for native chickens breeding.

Table 1. Frequency distribution of Rural Women based on age

Age (year)	Frequency	Frequency Percent	Cumulative Frequency Percent
Under 20	36	19.1	19.1
20 – 30	73	38.9	58
30 – 40	46	24.5	82.4
40 – 50	23	12.2	94.7
50 – 60	8	4.3	98.9
Over 60	2	1.1	100.0
Total	188	100.0	

Mean= 31 years' old

Table 2. Frequency distribution of Rural Women based on number of family members

Number of family member	Frequency	Frequency Percent	Cumulative Frequency Percent
1–5 people	154	81.9	81.9
5–10 people	34	18.1	100.0
Total	188	100.0	

Mean= 4 peoples

Table 3. Frequency distribution of Rural Women based on literacy level

Literacy level	Frequency	Frequency Percent	Cumulative Frequency Percent
Illiterate	46	24.5	24.5
Read & write	89	47.3	71.8
Primary	41	21.8	93.6
Diploma	10	5.3	98.9
University education	2	1.1	100.0
Total	188	100.0	

Table 4. Frequency distribution of Rural Women based on membership years

Membership years	Frequency	Frequency Percent	Cumulative Frequency Percent
Under 2 year	19	10.1	10.1
2 - 4 year	52	27.7	37.8
4 – 6 year	59	31.4	69.1
6 – 8 year	6	3.2	72.3
8 – 10 year	28	14.9	87.2
10 – 12 year	24	12.8	100.0
Total	188	100.0	

Mean = 6years

3.2. Results of Correlation between Rural Women Empowerment and Independent Variables

Results of correlation between rural women empowerment and independent variable of rural women receiving Microcredit loans (membership years, age, literacy level, family

income per month, amount loan, adequacy loan) showed in Table 5. According this table correlation between rural women and membership years, age, literacy level, adequacy loan significant at 1% level and significant at 5% in amount loan and family income per month.

Table 5. Correlation Matrix between Rural Women Empowerment and Independent Variables

Independent variables	Empowerment		
	N	R	Sig
Membership Years		0.228	0.002 **
Loan Amount		0.155	0.034*
Loan adequacy	188	0.510	0.000 **
Age		0.307	0.000 **
Literacy Level		0.285	0.000 **
Income per month		0.161	0.027*

$P < 0.01$* * $P < 0.05$ *

3.3. Results of Regression Model for Predicting Rural Women Receiving Microcredit

In order to predict the empowerment of rural women receiving microcredit, the effect of independent variables on dependent variable was investigated through multivariate regression (ENTER). A general explanation of the regression model is made by using the F value. Table 6 shows that the regression model predicts the level of empowerment of rural women in terms of F value is significant at 1% level and therefore, the empowerment level of rural women who receiving rural microcredit based on individual variables is predictable. To investigate the lack of self-correlation of residues (independence of observations) in the multivariate regression model, Durbin-Watson was used that varies between zero and four. Usually, if Durbin-Watson be less than 2, there is no problem with self-correlation of the remnants (independence of observation). The amount of Durbin-Watson expresses the lack of self-correlation of the residuals (independence of observation) in the multivariate regression model of predicting the empowerment of rural women. The results of the t-statistic in the Table 7 indicate the significance of the constant coefficient and the effect of independent variables on the adequacy of the loan, the age, and the variable of literacy level. In other words, among the eight individual variables of rural women who used microcredit, three variables such as loan adequacy, age, and literacy level of rural women had a significant effect on empowerment of these women. The value of R^2 also indicates that 44.9% of the variance of the dependent variable of empowerment of rural women is explained by the independent variables of the adequacy of the loan, the age and the level of literacy of rural women. The positivity of the coefficient B variables of the adequacy of the loan, age and level of literacy of rural women indicate the positive effect of these three variables on the empowerment of rural women.

Table 6. F values and significant level of prediction model for empowerment of rural women

Model	Df	F value	Significant	Durbin–Watson statistic
1	8	14.852**	0.000	1.508

$P < 0.01 * *$ $\qquad$ $P < 0.05 *$

Table 7. The Effect of Individual Variables of Rural Women's Microcredit Borrower on the Empowerment of Rural Women

Model	R^2	Unstandardized Coefficients		standardized Coefficients	t	Sig.	VIF
		B	Std.Error	Beta			
(Constant)		1.261	0.317	--	3.975	0.000	--
X_1 : Membership Years		0.029	0.018	0.109	1.626	0.106	1.195
X_2 : Loan Amount		0.035	0.000	0.057	0.904	0.368	1.052
X_3 : Loan adequacy	0.449	0.321	0.057	0.397	5.650 *	0.000	1.309
X_4 : Age		0.016	0.006	0.209	2.529 **	0.012	1.814
X_5 : Literacy Level		0.316	0.071	0.038	4.427 *	0.000	1.281
X_6 : Income per month		0.029	0.000	0.112	1.775	0.078	1.060

$P < 0.01 * *$ $\qquad$ $P < 0.05 *$

According to the presented content and the results presented in Table 7 the linear equation derived from the multivariable regression analysis, empowerment of rural women receiving Microcredit loans, can be represented by the equation (1-1):

Equation 1-1;

$Y = 1.261 + 0.321 X_3 + 0.016 X_4 + 0.316 X_5$

Y = Empowerment of rural women

X_3 = Loan adequacy

X_4 = Age

X_5 = literacy level

This equation (1-1) states that each 1unit increase in standard deviation of the variables of the adequacy of the loan, the age and the level of literacy is 0.321, 0.016, 0.316, respectively that Increases the empowerment of rural women.

4. Discussion

The results of the research show that the regression model predicts the level of empowerment of rural women according to the amount of F statistics at one percent significance level and hence empowerment level of rural women that receiving microcredit fund is predictable based on individual variables. The results of the research showed that among the individual characteristics of the respondents, such as the history of membership in the microcredit fund, age, marital status, literacy level, spouse literacy level, monthly income, loan amount and loan adequacy, three variables of loan adequacy, age and literacy level of rural women have the most important effect on the empowerment of these women, so that about 45% of the variance of the dependent variable

of empowerment of rural women is explained by independent variables of loan adequacy, age and literacy level of rural women. The beta (β) values of these three variables indicate the positive effect of these three variables on the empowerment of rural women which is the most important variable for predicting the empowerment of rural women and loan adequacy variable. Loan adequacy variable indicates a sufficient amount of a loan to set up a job.

In the process of microcredit lending of the Carbon Sequestration Project are determined by the type of occupation of the local communities in rural development groups, and then approved by the experts of the project. Studies by Raihan *et al*. (2017) and Ganel *et al*. (2015) are similar to those. Therefore, if the loan amount is appropriate according to the desired job, the initial capital is to be paid for the purchase of equipment and supplies. The level of literacy is important because if the rural women have higher level of literacy they will be more awareness then leads to their more participation in carbon sequestration project (Golmohamadi, 2013). As it was reported in the research, empowerment level of rural women who had literacy was higher than that of women with lower literacy, as well as the empowerment of women with lower literacy rates than those who were illiterate. Studies by Mahmud *et al*. (2012) and Hassanshahi *et al*. (2015) also highlight the number of years of school-leaving for women as a positive factor in women empowerment.

The variable of rural women's age is one of the most important variables in predicting the empowerment of rural women because during the first years of micro-fund that create by carbon sequestration project, those rural women who have older age have been member of microcredit and have active participation in developmental groups, also they encouraged young people to become members of rural development groups. They have been more empowered by more income and a history of membership than the rest of the members that means age variable indicates more women's experience and more rural women's skills. Studies by Raihan *et al*. (2017) and Ganel *et al*. (2015) are similar to these results.

5. Conclusion

According to empowerment of rural women, international carbon sequestration project by goal of sustainable livelihoods for rural women has set up microcredit funds to create a job and make money for rural households and reducing the increasing economic power from economic dependence of desert ranges and increases the amount of carbon dioxide.

All rural women in this research have used of microcredit. 76.6% of rural women and 23.4% familiar with microcredit fund by carbon finance project and by their families respectively 52.7 % of rural women received loans from microcredit for business prevalence, 20.2% for business development and 17.1% from their loans for welfare issues such as home appliances, girls' dowry or for the cost of school children which this group has spent more on the Carbon Sequestration Project than others. Pearson correlation test was used to examine the relationship between empowerment of rural women and individual characteristics of rural women. The results showed that age variable, the number of years of membership in funds, the level of literacy and the adequacy of the loan at 99% level, and the amount of loans and monthly income are significant at 95%. Rural women of higher age have a greater membership record, meaning they have begun the process sooner through active participation in the welfare fund. The eligibility variable that represents the adequacy of a job loan is part of the participatory group management process for rural women in the carbon sequestration project, which determines the amount of low-level, low-cost credits from rural development groups to carbon submission project. But because of the amount of savings of members in microcredit funds is low, the time to switch to long loans and, on the other hand, when they go to government banks to get a loan, they are not able to provide a guarantee, this issue needs the help of major management of the country in order to developing the villages and make easy access to the facilities and at the end solve these problems.

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