Gender Disparity in Food Security Status of Rural Households Based on Sustainable Livelihoods in Kermanshah County

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ABSTRACT

In this study, a gender analysis of various dimensions that affect the food security status of households in the villages of Kermanshah County was conducted based on a sustainable livelihood framework. The non-experimental research method involved data collection, which was performed to identify causal relationships. There were 25,671 households in the agricultural sector of the villages of Kermanshah County. Among them, 750 people (375 women and 375 men in 375 households) were selected as a proportional sample based on a stratified sampling method. A questionnaire was used for data collection. The validity of the questionnaire was confirmed by expert opinions, and its reliability was confirmed by sequential theta coefficients (0.714-0.838). Structural equation modeling was implemented based on the Multiple-Indicator, Multiple-Cause (MIMIC) Bayesian approach. Then, the structural MIMIC model was presented as the basis for comparison between two groups. The results of the research indicate that men had greater food security than women in terms of food availability, accessibility, and stability in the studied households. Men had more financial capital, social capital, and natural capital than women and were more affected by vulnerability and the transformation of structures and processes. Conversely, women had more human and physical capital and better livelihood strategies than men. Therefore, the economic empowerment of women and the professional training of men in the region should be prioritized to improve food security and development programs. These results can play a decisive role in the continuation or halting of programs for achieving food security and sustainable development.

Keywords: Assets, Gender analysis, Kermanshah County, Multiple-indicator multiple cause Bayesian approach, Sustainable livelihood framework.

INTRODUCTION

Food security has been a challenging, complex, and multifaceted problem for some time (Flora, 2011; Gowele, 2011; Smith, 2013; Lam, 2016). Notably, although more than enough food exists to feed each individual worldwide, the number of people affected by hunger and malnutrition is still unacceptably high (Lam, 2016), and one-third of all food produced globally is discarded or eliminated, never reaching consumers (Sholeye *et al.*, 2014; Singh, 2015). According to the FAO definition established in 2016, food security is physical and economic access to adequate, safe and nutritious food for all people to meet their needs and live a healthy, active and hygienic life. This definition has four dimensions including food availability, access to food (both economically and physically), food use (materials used and adaptation of the human body), and temporal stability (Singh *et al.*, 2012; Agnello and Caramia, 2013; FAO, 2016). The international processes of globalization and integration influence the food security development and state policy formation in this sphere (Pyagay *et al.*, 2018). Food security is one outcome of a sustainable livelihood framework, and it is influenced by elements in the framework (Gowele, 2011). The concept of *sustainable livelihood* is an important factor in food security and

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community development in developing countries. Livelihoods include the abilities, assets and activities that are essential for life as well as the social institutions, family relationships and mechanisms for access to resources throughout the life cycle. Specifically, livelihoods should be assessed in a sustainable livelihood framework (Cheway, 2003; Guillotrea *et al.*, 2012). A sustainable livelihood framework is a comprehensive approach to identifying the livelihoods and lifestyles of individuals. This framework provides resources for adjusting the livelihood strategies of individuals (Guillotrea *et al.*, 2012; Sharaunga *et al.*, 2015) and emphasizes a people-centered approach that includes five basic factors that influence most sustainable livelihoods (Phonepraseuth, 2012) (Figure 1). Sustainable livelihoods approach is one of the new analytical approaches in the arena of rural development, and is considered much in recent years in order to achieve rural development and poverty reduction (Nourozi and Hayati, 2017). In the livelihood approach, livelihoods assets are divided into five groups: human capital (skills, education,

and health), physical capital (tools, equipment, means of transport, and sales market), financial capital (money, post sizes, access to loans, and loans), natural capital (land, water, and livestock), and social capital (networks and unions), which household members have access to or own (Chambers and Conway, 1991; Nourozi and Hayati, 2017). The sustainable livelihoods framework considers people in vulnerable situations, and within this platform, they have the power to use certain assets that can help them alleviate poverty. There are institutional structures and processes that affect and interfere with the livelihoods of the local population, and people must be involved in the transformation of assets in a meaningful way. The methods people use to influence and access these structures and processes form their livelihood strategies, which help them achieve desirable livelihoods (Phonepraseuth, 2012).Women evaluate resources and assets differently from men. Therefore, they will have their own classifications and distinct ways of controlling the sociocultural issues in their environment, reflecting the increasing value
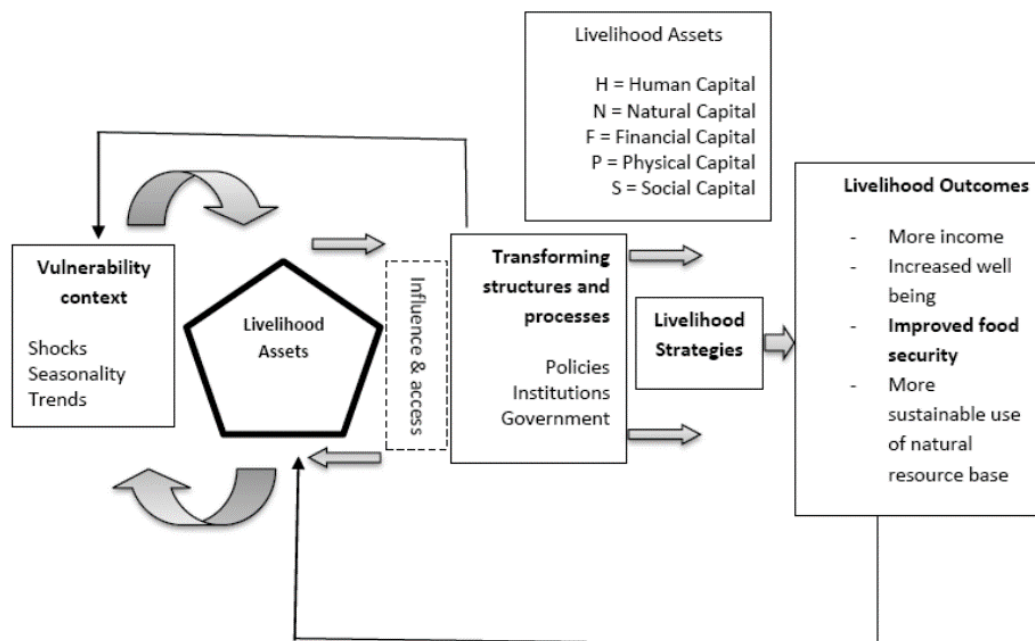

Figure 1. Sustainable livelihood framework.
Sources: (Gowele, 2011; Mondal *et al.*, 2012; Morse and Mcnamara, 2013).

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of analyses of food security based on the sustainable livelihood framework (Albis, 2002).

Women are often faced with a lack of access to and control of livelihoods and production resources. These inequalities and disproportionate relationships in power include issues such as the ability to participate, capitalism, increased poverty, hunger, malnutrition, abuse, dependence, discrimination, marginalization and various deprivations for women (Sholeye *et al*., 2014; Moffitt and Ribar, 2015; Singh, 2015). To enter a discussion of gender analyses, it is necessary to first provide a definition of sex and gender. Sex refers to the physiological characteristics of the individual and the biological differences between men and women (USAID, 2014). The concept of gender was formed in the 1990s. This concept refers to social-structural roles and the relationships between men and women, which can be broadly expressed in all cultures with specific characteristics. These structured social roles are often unequal in terms of power and decision-making in terms of controlling assets, freedom of action and ownership of resources (World Bank, 2009; USAID, 2014). Identifying these important factors, including *gender* and gender inequality, is one of the most important principles of rural studies (Omidi Najafabadi, 2014). Women play a key role in achieving the four pillars of food security as food producers and household income providers, thereby improving household food security and food security in rural areas (IASC, 2006). Gender analysis is a comprehensive analysis of the roles and relationships among men, women, boys and girls with regard to the division of labor, production and restoration activities, access to resources, control of resources, and achievement of benefits (WFP, 2009).

Singh (2015) stated that women often work as unpaid family workers on farms and account for approximately 43% of the agricultural labor force in developing countries, even though they do not acquire or control assets and vital production resources.

The results of the studies conducted by Gowele (2011) in South Africa showed that respondents were mainly affected by rising food prices, drought, livestock death, robbery, increased food production costs, and severe injury to or chronic illness in a family member. In a study conducted in Ethiopia by Nahusnay and Tessfaye (2015), the results showed that women were more involved in reducing widespread poverty and were food producers and suppliers in the Delaneta region. Generally, women had limited access to diet-related compounds in meals. Sharaunga *et al*. (2015) found that the empowerment of women in sociocultural dimensions was accompanied by a reduction in barriers in agriculture and a reduction in the likelihood of vulnerability to food insecurity in their households. In a study conducted by Rostami *et al*. (2015) in the village of Carnachi, Kermanshah, the research findings indicated a positive and meaningful relationship between the social and economic status of a household and the food security of a household. In a study by Sraboni *et al*. (2014) in Bangladesh, household wealth, formal education, and employment for all individuals were more important than empowering women as factors in determining the nutritional status of adults. Fawehinmi and Adeniyi (2014) reported that female-headed households in Nigeria had better access to production resources than their counterparts who were not heads of the household, and that this access improved their food security. Several studies of nutrition in Iran have shown that Kermanshah Province is in a relatively unsafe state of food security (Damari, 2015; Morshedi, 2015). Kermanshah Province has always faced problems of food availability related to domestic market regulation policies, lack of capital in production units, increased prices of agricultural products, use of old technology in the food industry, and the lack of packaging facilities. Additionally, food security is threatened by the economic access to food in Kermanshah. From the perspective of food stability, issues such as climate change, rainfall reduction and

consequent droughts, salinity and soil erosion threaten food security and livelihoods in Kermanshah Province (provincial coordinator of FAO projects in Kermanshah Province, personal communication via interview, January 30, 2016). Additionally, utilization of food in this province has not been based on nutritional principles. In this regard, 80% of heart disease, 90% of diabetes, and a large proportion of cancers are directly related to nutrition, and this suggests the need for proper nutrition in the province. According to available statistics, over 60% of the people in the province are overweight and have obesity problems, which can lead to various illnesses (ISNA, 2015). In a case study of Sarein village in Kermanshah, rural women were found to play an important role in rural development. In fact, from an economic perspective, rural women produce more than half of all food produced in rural areas (Coordinating Headquarters of Karkheh Dam Basin, 2015). According to a study by Rostami *et al*. (2014) in rural communities of Kermanshah County, five factors including mental health, educational and welfare poverty, social pathology, economic poverty, and marital challenges contributed to 65.53% of the problems girls and rural women face in the region. Regarding the aforementioned problems about the four dimensions of food security and existing differences based on gender in the studied area, the goal of this research was to conduct a gender analysis of various sources of livelihood that affect the food security status of households in the villages of Kermanshah based on a sustainable livelihood framework.

The specific objectives of this study were as follows:

1) Does gender affect the dimensions of food security in rural households in the study area?

2) Is there any difference between the impacts of sustainable livelihoods (human, social, natural, physical, and financial) on the food security of rural households in the region studied by gender?

3) Is there any difference between the dimensions of vulnerability, transforming structures and processes, livelihood strategies, and their effects on the food security of rural households in the region studied by gender?

MATERIALS AND METHODS

Considering the goals of this research, the research method focused on data collection as a non-experimental approach to determine causal relationships that provide both a logical and long-term perspective. There were 25,671 households in the agricultural sector of Kermanshah County. In this research, a questionnaire was distributed (between 30 people; including 15 women and 15 men in 15 households) in a preliminary test of agricultural sector households. After inserting the data in the Cochran formula for the analysis of ratios (due to the existence of gender analyses), the sample size was chosen.

$$n = \frac{\frac{t^2 pq}{d^2}}{1 + \frac{1}{N}\left(\frac{t^2 pq}{d^2} - 1\right)}$$

N: Statistical Population: 25671 households, t: Trusty Level: 1.96, d: Trusty Distance: 0.05, p: 0.5, q: 0.5

Based on the Cochran formula, 750 people (375 women and 375 men in 375 households) were selected by stratified sampling as a proportional sample. The research was conducted using a questionnaire. The validity of the questionnaire was confirmed by expert opinions, and its reliability was confirmed by sequential theta coefficients (0.714-0.838). The research was conducted in 2016-2018.

The dependent variable in this research was food security in the form of the Likert spectrum, and 25 items were analyzed in four categories, including availability, access, safety/use and stability, based on the separate results of the questionnaire for women and men.

The factors in the sustainable livelihood framework are as follows. The variables of livelihood assets are uniformly classified in the majority of regions. Thus, the first is

livelihood assets, which include five types of capital: financial (access to capital, access to financial facilities, access to production resources and the availability of appropriate economic opportunities), social (social participation, social solidarity, social security, belonging to the village, government and local institutions), human (labor, knowledge, and skills), natural (agricultural land, animal husbandry, access to natural resources, environmental health, and natural landscapes) and physical (having basic infrastructure, having social services, ease of access, having equipment and residential space).

Because of the vulnerability context, transforming structures and processes, and because sustainable livelihood strategies can be different according to variety conditions, the effects of these factors on the food security status of rural households in Kermanshah province were identified and prioritized from the perspective of change agents using the Delphi technique in a separate qualitative study. A total of 15 change agents participated in the Delphi process, which was performed in a series of steps using the results of those research stratification variables formed and employed. The vulnerability context includes three dimensions: unanticipated shocks (anthropogenic-related shocks, e.g., economic, legal, sociopolitical and crime shocks as well as natural shocks, e.g., climate, health and safety shocks), trends and seasonality. The transformation of structures and processes includes two dimensions: social and cultural relationships, laws and policies (macroeconomic, macro social and macro political policies). Livelihood strategies can be divided into coping strategies and adaptive strategies.

The frequent distribution, frequent, cumulative percentage, mean, median, mode and standard deviation were used as descriptive statistics. Additionally, structural equation modeling was implemented based on the Multiple-Indicator Multiple Cause (MIMIC) Bayesian approach (Figure 2). By using the structural equation modeling method, we could compare two statistical groups based on a single structure. As with the comparison test method, the homogeneity test (herein referred to as the "reliability test") was first performed. If the assumption of reliability was accepted, the comparison was performed according to the MIMIC method; otherwise, the SMM alternative method was performed, because when every missing item
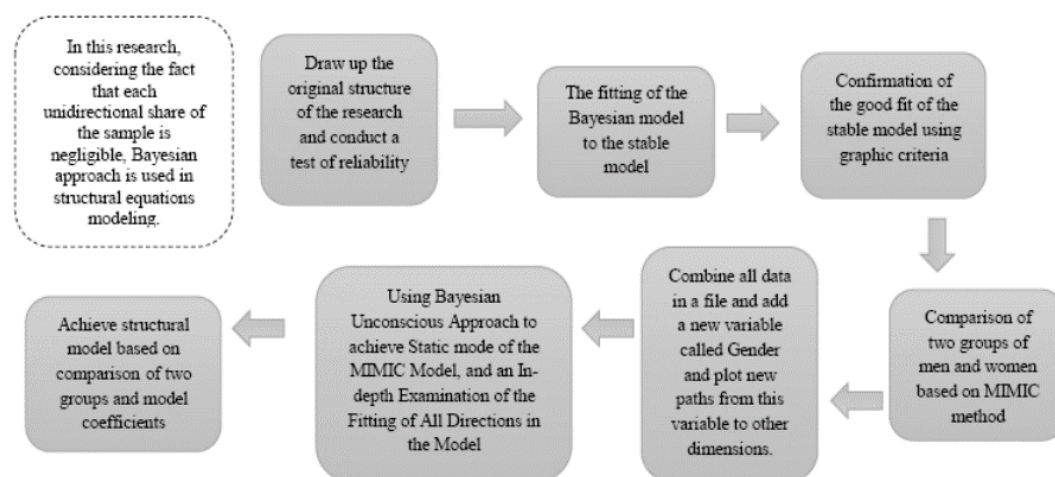
Figure 2. Using the structural equation modeling approach to compare two statistical groups. Source: (Payandeh Najafabadi *et al.*, 2013; Bruyneel *et al.*, 2017)

has a small share of the sample size ($\frac{n}{Npar} = \frac{375}{116} \ll 4$), a Bayesian approach is used in the analyses (Payandeh Najafabadi *et al.*, 2013). Recently, Bruyneel *et al.* (2017) showed that the MIMIC Bayesian approach to structural analysis can be used to compare two groups in a structure. Prior to the publication of Bruyneel *et al.* in 2017, a comparison of two groups based on a single structure was justifiable only for the classical approach. Therefore, in this research, two groups of men and women were compared according to the MIMIC Bayesian approach. To this end, first, the main structure of the research in the software was drawn. Then, a model was fitted to the data of the two groups, all of which were identical for both groups; this is referred to as the reliable model. After fitting the stable model, all of the data were merged into a file and a new variable called Gender was added. The value of this variable was considered 1 for men and 2 for women. Then, the structural model was presented, and it was the basis for comparison between the two groups. Positive standardized MIMIC coefficients indicated that the factor benefits women, and negative standardized MIMIC coefficients suggests that the factor favors men. Data processing and filtering analyses were performed using SPSSV18 and AMOSV23 software.

RESULTS

Table 1 shows the demographic data for the individuals included in this study.

According to the results, participation rate of men in the stages of protection, harvesting, and marketing of agricultural products is greater than that of women in the household. Additionally, significant differences exist between the groups of men and women in the studied area based on the quantity of agricultural land, wage levels, and degree of participation in home-based activities. The difference in some of these cases may be justified; for example, many women spend the majority of their time participating in activities at home, for which they do not receive wages. However, the difference associated with the ownership of agricultural land is based on the attitude of the studied community.

To prioritize and determine the gender effects on food security, the standardized MIMIC coefficients presented in Table 2 were used in this study. A positive coefficient indicates that the factor benefits women, and a negative coefficient suggests that the factor favors men. On this basis, household food security, availability, accessibility and stability favor men, and food utilization favors women. In other words, women have better nutritional knowledge and diets than men (Figure 3).

Additionally, based on the standardized coefficients of the food security path to its four dimensions, in the empirical model obtained in the MIMIC Bayesian approach, the contribution of each dimension to the formation of food security status in the region has been measured. Among the dimensions of food security in the studied households, stability (standardized path coefficient of 0.738) had the greatest effect on food security, and food utility (0.737) and food availability (0.735) had the highest standardized path coefficients.

Among the dimensions of food security, the highest coefficients were associated with ensuring that sufficient food is available to feed the household (0.610; availability), subsidy allocation for agricultural production (0.611; access to food), self-consumption of agricultural products produced by households (0.611; food utility), and damage to products due to sudden client changes (0.611; stability).

According to Table 2, there is a significant difference between food security for men and women based on the five types of investments. Notably, men have more financial capital (sufficient economic opportunities, with a standardized coefficient of -0.175), social capital (government institutions, with a standardized path coefficient of -172.0) and natural resources (agricultural land, with a standardized path

Table 1. Demographic characteristics of the respondents (n= 750).

Items	Statistical society of women	Statistical society of men
Age (Year)	Mean: 39.5867 Standard deviation: 9.49147	Mean: 44.3413 Standard deviation: 8.98458
gender	Frequency: (50%) 375	Frequency: (50%) 375
History of agricultural activities (Year)	Mean: 20.7387 Standard deviation: 8.68929	Mean: 27.8933 Standard deviation: 8.41976
Education	Mode= Diploma and lower	Mode= Diploma and lower
How many hours in a day to care for your home and family	Median= 15	Median= 4
How many hours in a day work without pay or low wages	Median= 14	Median= 5
Approximate agricultural land area	Mean: 0.1253 Standard deviation: 1.20506	Mean: 12.1440 Standard deviation: 8.06428
Participation rate at the stage of planting agricultural products	Median= Medium	Median= Medium
Participation rate at the stage of protecting agricultural products	Median= Medium	Median= High
Participation rate at the stage of harvesting agricultural products	Median = Low	Median= Medium
Participation rate at the stage of processing agricultural products	Median= medium	Median= Medium
Participation rate at the stage of marketing agricultural products	Median= Low	Median= Medium
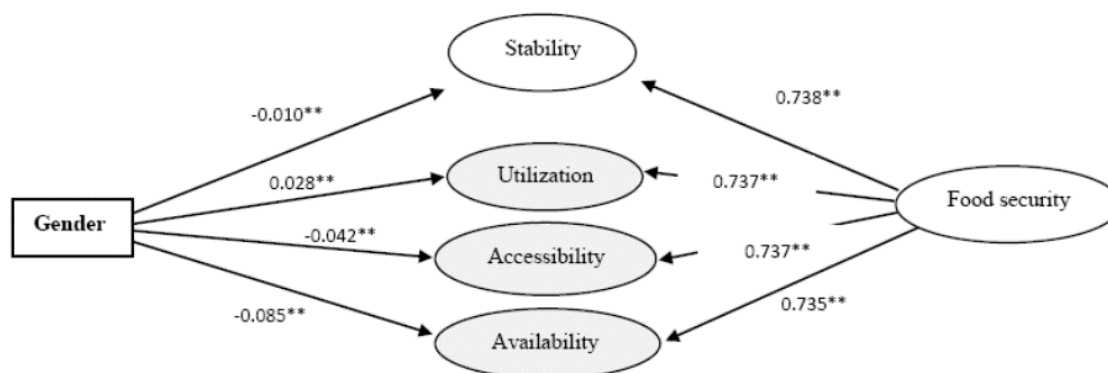
Figure 3. MIMIC standardized coefficients of gender for the different dimensions of food security.

coefficient of -0.114) than women, and these factors generally improve their food security. Women have more human capital (standardized labor, with a standardized coefficient of 0.024) and physical capital (residential space, with a standardized coefficient of 0.276). There is a significant difference between the food security scenarios of men and women based on the vulnerability, transformation of structures and processes, and livelihood strategies. Specifically, men are more vulnerable than women (in unpredictable shock or crisis situations, with a standardized path coefficient of -0.049), and they have more transformation structures and processes (in

Table 2. Coefficients and valid confidence intervals for the MIMIC model.

Direction		Standardized coefficient	Reliable confidence interval 95%	Path coefficient
Gender	Stability	-0.010	(-0.018, -0.011)	-0.014
Gender	Accessibility	-0.042	(-0.066, -0.059)	-0.062
Gender	Availability	-0.085	(-0.129, -0.125)	-0.126
Gender	Utilization	0.028	(0.037, 0.045)	0.041
Gender	Adaptive Strategies	0.054	(0.073, 0.079)	0.076
Gender	Social and cultural relations	-0.073	(-0.138, -0.081)	-0.104
Gender	Copping Strategies	-0.044	(-0.064, -0.06)	-0.062
Gender	Policies	-0.125	(-0.145, -0.143)	-0.144
Gender	Labor	0.024	(0.029, 0.037)	0.033
Gender	Knowledge and skill	0.014	(0.018, 0.022)	0.020
Gender	Social participation	-0.037	(-0.055, -0.049)	-0.053
Gender	Social solidarity	-0.030	(-0.044, -0.039)	-0.042
Gender	Social security	-0.056	(-0.080, -0.077)	-0.079
Gender	Belonging to the village	Not meaningful	(-0.001, 0.006)	0.002
Gender	Government institutions	-0.172	(-0.249, -0.245)	-0.248
Gender	Local institutions	Not meaningful	(-0.001, 0.005)	0.001
Gender	Existence of residential space	0.276	(0.369, 0.373)	0.371
Gender	Having equipment	-0.056	(-0.094, -0.054)	-0.080
Gender	Easy accessibility	-0.055	(-0.080, -0.074)	-0.077
Gender	Having social services	-0.064	(-0.092, -0.089)	-0.090
Gender	Having basic infrastructure	-0.047	(-0.070, -0.061)	-0.066
Gender	Presence of natural landscapes	-0.107	(-0.155, -0.150)	-0.153
Gender	Environmental health	-0.034	(-0.051, -0.045)	-0.048
Gender	Access to natural resources	-0.018	(-0.028, -0.024)	-0.026
Gender	Animal husbandry	-0.080	(-0.115, -0.111)	-0.113
Gender	Agricultural land	-0.114	(-0.166, -0.160)	-0.162
Gender	Access to production resources	-0.144	(-0.210, -0.203)	-0.206
Gender	Access to financial facilities	-0.080	(-0.118, -0.112)	-0.114
Gender	Access to capital	-0.020	(-0.032, -0.025)	-0.028
Gender	Enough economic opportunities	-0.175	(-0.254, -0.250)	-0.252
Gender	Shocks	-0.049	(-0.071, -0.069)	-0.070
Gender	Trends	-0.013	(-0.021, -0.015)	-0.018
Gender	Seasonality	-0.038	(-0.057, -0.049)	-0.054

the policy dimension, with a standardized coefficient of -0.125). However, women have more livelihood strategies than men (in the adaptive strategies dimension, with a standardized path coefficient of 0.054).

DISCUSSION

According to the results, men have more *food security* than women in the studied households based on three dimensions: availability, accessibility, and stability. However, women have more food security based on the utility dimension. These results

agree with those of Nahusnay and Tessfaye (2015), Sharaunga *et al*. (2015), Oluwatayo (2015) and Singh (2015).

In the study area, men have more *financial capital* than women, and the availability of appropriate economic opportunities can have the greatest effect on gender-based food security. Access to production resources, access to financial facilities, and access to capital in the form of financial assets are other factors that favor men. These results are relatively consistent with those of Gowele (2011), Oluwatayo (2015), Singh (2015), Sraboni *et al*. (2014), Sholeye *et al*. (2014), Ajani (2008), and Rostami *et al*. (2015).

Men had more *social capital* than women, and government institutions could have the greatest effect on gender-based food security. Social security, social participation and solidarity were more available for men. However, there was no meaningful difference between the food security statuses of men and women for two dimensions: belonging to the village and local institutions. These results are relatively consistent with those of Sharaunga *et al.* (2015), Oluwatayo (2015), Fawehinmi and Adeniyi (2014), Kabir *et al.* (2014), Lahteenkorva and Lahelma (2001), and Studdert *et al.* (2001).

Women had more *human capital* than men, and labor could have the greatest effect on gender-based food security. It should be noted that human capital refers to the experience and skill in doing work rather than the amount of active labor. Knowledge and skill were additional dimensions that favored women over men, and these results are relatively consistent with those of Gowele (2011), Oluwatayo (2015), Sraboni *et al.* (2014), Fawehinmi and Adeniyi (2014), Kabir *et al.* (2014), and Rostami *et al.* (2015).

Men had more *natural capital* than women, and the existence of agricultural land could have the greatest effect on gender-based food security. The presence of natural landscapes, animal husbandry, environmental health and access to natural resources are other factors that favored men. These results are relatively consistent with the results of Gowele (2011), Tibesigwa *et al.* (2015), Kassie *et al.* (2012) and Cheway (2003) and different from those of Fawehinmi and Adeniyi (2014).

Women had more *physical capital* than men in the residential space, which can have the greatest effect on gender-based food security. Social services, access to equipment and access to basic infrastructure are physical dimensions that are available for men, and these results are consistent with those of Nahusnay and Tessfaye (2015) and Sharaunga *et al.* (2015).

In the context of *vulnerability*, the shock type has the greatest effect on gender-based food security. Seasonality and trends are dimensions that favor male-led households

according to Gowele (2011) and Fawehinmi and Adeniyi (2014); however, Tibesigwa *et al.* (2015) presented different results.

In the context of *transforming structures and processes*, the existence of policies can have the greatest effect on gender-based food security. Additionally, social and cultural relationships are more pronounced in male households. This finding is generally consistent with the results of Nahusnay and Tessfaye (2015), Kassie *et al.* (2012), Ajani (2008), and MacMillan and Dowler, (2012).

In the context of *livelihood strategies*, adaptive strategies can have the greatest effect on gender-based food security. Coping strategies favor men and the nutritional status of men, which agrees with the results of Kabir Mohamad *et al.* (2014) and Olufayo (2012).

The limitations of this research include the breadth and complexity of the research, the proposed model based on its multidimensionality, and the use of a new statistical method of modeling structural equations using a Bayesian approach in MIMIC. On the other hand, the aspect of our research innovation refers to the use of the statistical method of structural equation modeling by the MIMIC Bayesian approach. Until now, gender analyses of various issues have been conducted through the means of comparative tests and regression models; however, in this research, the differences between the food security status of the two groups of men and women based on a sustainable livelihood framework are shown in a single model based on a structure.

The results and effects of this research can be used by financial supporters, support staff and experts to determine the food security status, improve the nutritional quality, formulate future plans, and develop effective macro policies in appropriate sectors. This information can also support decision-making regarding food security and sustainable development projects and goals. These results can play a decisive role in the continuation or halting of programs for achieving food security and sustainable development. The following suggestions can be made based on the results of this study.

Macro-Level Policy Suggestions

- Educate and inform men and women about the four dimensions of food security, increase individual knowledge regarding nutrition, and improve food quality at the community level.

- Teach and inform men and women about the dimensions of sustainable livelihoods and identify ways to protect capital, avoid vulnerabilities, and improve livelihood strategies.

- Create a culture centered on the production and consumption of healthy and organic products and increase the technical and managerial skills of farmers to produce organic products and improve the food security of the community.

Micro-Level Policy Suggestions

- Given that women in the region have a better status in the utility dimension than men, education, training and awareness regarding nutritional knowledge and behavior are essential when selecting, preparing, and distributing food among households, especially for men, in the study area. This is because knowledge is an essential element of health promotion behaviors, healthy eating habits and practices, adequate childcare, proper and timely food choices, and participation in controlling food waste.

- According to statistical analyses, financial capital is more accessible to men than women. Therefore, providing various job opportunities for women, creating a variety of income generation methods, improving employment stability, and encouraging women to become entrepreneurs to increase their economic status can improve food security for women.

- Because social capital is more accessible to male households, empowering women, developing capacity, improving accountability, participation and social solidarity and creating a specific and accountable plan for increasing self-esteem

are advised to resolve any issues associated with the psychological empowerment of women.

- Expanding access to educational opportunities, such as extension services, advisory services, and technical information, for rural households, including men and women, could improve the livelihoods and sustainable food security status in the region.

- Because vulnerability has more effect on men in the region, workshops should be organized to increase the technical skills of households and train individuals on how to address vulnerabilities and achieve sustainable livelihoods.

- Because of differences based on gender, planners and policy makers are advised to consider gender differences in the region and reduce the existing differences and gaps. This can be achieved by informing men of these issues and adopting measures that accept and promote the status of women, as well as their active role in earning money and making decisions, to divide household resources and improve the household food security status. Additionally, adoption of laws and regulations in order to provide rural women with adequate access to health services and sources of production such as land and water, the choice and proper implementation of agricultural price policies, support policies in the agricultural sector, policies to stabilize the economy, health, and nutrition is recommended.

CONCLUSIONS

Achieving food security, eradicating hunger and improving nutrition are the heart of sustainable development goals. Sustainable livelihood in developing countries is a significant factor of food security and community development. The goal of this research was to conduct a gender analysis of various sources of livelihood that affect the food security status of households in the villages of Kermanshah based on a sustainable livelihood framework. The novelty of this study refers to the use of the

statistical method of structural equation modeling by the MIMIC Bayesian approach. In this research, the differences between the food security status of the two groups of men and women based on a sustainable livelihood framework are shown in a single model based on a structure. According to the results men had greater food security than women in terms of food availability, accessibility, and stability in the studied households. However, women have more food security based on the utility dimension. Men had more financial capital, social capital, and natural capital than women and were more affected by vulnerability and the transformation of structures and processes. Conversely, women had more human and physical capital and better livelihood strategies than men. Totally educate, teach and inform men and women about the four dimensions of food security, the dimensions of sustainable livelihoods, organic products and food quality are recommended. Therefore, the economic empowerment of women and the professional training of men in the region should be prioritized to improve food security and development programs. These results can inform the continuation or discontinuation of food security and sustainable development programs.

REFERENCES

1. Agnello, F. and Caramia, L. 2013. 4th European Microfinance Award Microfinance Food Security. *E-MFP*, **6**: 1-106.
2. Ajani, O Y. 2008. *Gender Dimensions of Agriculture, Poverty, Nutrition and Food Security in Nigeria*. Retrieved February 03, 2016, From: http://cdm15738.contentdm.oclc.org/utils/getfile/collection/p15738coll2/id/22646/filename/22647.pdf.
3. Albis, K. 2002. *No Security without Food Security no Food Security without Gender Equality.* Retrieved February 03, 2016, From: http://www.fao.org/wairdocs/ar259e/ar259e.pdf.
4. Bruyneel, L., Li, B., Squires, A., Spotbeen, S., Meuleman, B., Leasaffre, E. and Sermeus, W. 2017. Bayesian Multilevel MIMIC Modeling for Studying Measurement in Variance in Cross-Group Comparisons. *Med. Care*, **55(4):** 25-35.
5. Chambers, R. and Conway, G. R. 1991. *Suatainable Rural Livelihoods: Practical Concepts for the 21st Century*. Retrieved February 08, 2016, From: http://publications.iwmi.org/pdf/H_32821.pdf.
6. Cheway, T. G. 2003. Sustainable Livelihood as an Important Factor in Food Security and Community Development in Bogos Rigion-Eritrea. A Thesis Submitted to the Faculty of Graduate Studies of the University of Manitoba in Partial Fulfilment of the Requirements for the Degree of Master of Natural Resources Management, Retrieved February 03, 2016, From: https://www.umanitoba.ca/institutes/natural_resources/canadaresearchchair/thesis/tcheway%20masters%20thesis%202003.pdf.
7. Coordinating Headquarters of Karkheh Dam Basin. 2015. *Empowerment of Local Communities (Case Report: Sarein Village of Kermanshah)*. Retrieved February 03, 2016, From: http://setadkarkheh.ir/news/32-.html.
8. Damari, B. 2015. Kermanshah Province Is in the Relatively Unsafe Group of Food Security. *Jaam-Jam*, **4232**: 1.
9. FAO. 2016. *Climate Change and Food Security: Risk and Responses*. Retrieved February 08, 2016, From: http://www.fao.org/3/a-i5188e.pdf.
10. Fawehinmi, O. A. and Adeniyi, O. R. 2014. Gender Dimensions of Food Security Status of Households in Oyo State, Nigeria. *GJHSS*, **14(1):** 6-16.
11. Flora, C. B. 2011. The Politics of Food: The Global Conflict between Food Security and Food Sovereignty. *J. Agric. Environ. Ethics*, **24:** 545-547.
12. Gowele, V. F. 2011. Gender Analysis of the Food Security Status, Assets, Shocks and Coping Strategies among EFSP Beneficiaries in the Kwazulu Natal Province (South Africa). Master's Dissertation Submitted in Partial Fulfilment of the Requirements for the Degree of Master of Science in Nutrition and Rural development, Main Subject: Human Nutrition. Retrieved February 08, 2016, From: http://lib.ugent.be/fulltxt/RUG01/001/789/877/RUG01-001789877_2012_0001_AC.pdf.
13. Guillotrea, P., Campling, L. and Robinson, J. 2012. Vulnerability of Small Island Fishery

Economies to Climate and Institutional Changes. *Curr. Opin. Env. Sust.*, **4:** 287-291.

14. IASC. 2006. *Women, Girls, Boys and Men, Different Needs-Equal Opportunity in IASC Gender Handbook in Humanitarian Action*. Inter-Agency Standing Committee. Retrieved February 03, 2016, From: http://www.refworld.org/docid/46978c842.html.

15. ISNA. 2015. Revise Your Diet Plan. Retrieved February 02, 2016, From: http://kermanshah.isna.ir/Default.aspx?NSID=5&SSLID=46&NID=54633.

16. Kabir, M. S., Oliujjaman, M., Rahman. M. A. and Akther, R. 2014. Rural Women and Food Security in Mymensingh District. *J. Bangladesh Agril. Univ.*, **12(1):** 105-110.

17. Kassie, M., Ndiritu, S. W., and Shiferaw, B. 2012. Determinants of Food Security in Kenya, a Gender Perspective. Retrieved February 03, 2016, From: https://ccafs.cgiar.org/publications/determinants-food-security-kenya-gender-perspective#.VreheVIofZI.

18. Lahteenkorva, S. S. and Lahelma, E. 2001. Food Insecurity Is Associated with Past and Present Economic Disadvantage and Body Mass Index. *J. Nutr.*, **131(11):** 2880-2884.

19. Lam, M. E. 2016. The Ethics and Sustainability of Capture Fisheries and Aquaculture. *J. Agric. Environ. Ethics*, **29:** 35-65.

20. MacMillan, T. and Dowler, E. 2012. Just and Sustainable? Examining the Rhetoric and Potential Realities of UK Food Security. *J Agric. Environ. Ethics*, **25:** 181-204.

21. Moffitt, R. A. and Ribar, D. C. 2015. *Age and Gender Differences in Food Security in a Low-Income Inner-City Population*. Retrieved February 03, 2016, From: http://www.econ2.jhu.edu/people/Moffitt/food%20security.pdf.

22. Mondal, M. A. H., Ali, M. M., Sarma, P. K. and Alam, M. K. 2012. Assessment of Aquaculture as a Means of Sustainable Livelihood Development in Fulpur Upazila under Mymensingh District. *J. Bangladesh Agril. Univ.*, **10(2):** 391-402.

23. Morse, S. and Mcnamara, N. 2013. *The Theory behind the Sustainable Livelihood Approach*. Springer Science+Business Media Dordrecht, Retrieved February 07, 2016, From: https://www.researchgate.net/publication/30 1986698_The_Theory_Behind_the_Sustainable_Livelihood_Approach.

24. Morshedi, L. 2015. Designing a Pattern for Using Organic Agriculture to Improve Food Security from the Viewpoint of Experts and Farmers of Fars Province. PhD. Dissertation, Islamic Azad University, Science and Research Branch of Tehran.

25. Nahusnay, A. and Tessfaye, T. 2015. Roles of Rural Women in Livelihood and Ssustainable Food Security in Ethiopia: A Case Study from Delanta Dawunt District, North Wollo Zone. *Int. J. Food Sci. Nutr.,* **4(3):** 343-355.

26. Nourozi, M and Hayati. D. 2017. Sustainability of Livelihoods among Farmers Community in Kermanshah Province, Iran: A Comparison of Farmers'Attitude Based on Their Characteristics. *J. Agr. Sci. Tech.*, **19:** 1099-1113.

27. Olufayo, M. O. 2012. *The Gender Roles of Women in Aquaculture and Food Security in Nigeria.* Retrieved February 03, 2016, From: https://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/35118/olufayo%20iifet%20paper.pdf?sequence=5.

28. Oluwatayo, I. B. 2015. Gender Considerations in Decision Making in Rural Nigeria: Implications on Households' Food Security in Ekiti State. Retrieved February 03, 2016, From: http://erd.eui.eu/media/oluwatayo.pdf.

29. Omidi Najafabadi, M. 2014. A Gender Sensitive Analysis Towards Organic Agriculture: A Structural Equation Modeling Approach. *J. Agric. Environ. Ethics*. **27(2):** 225-240. Retrieved February 05, 2016, From: http://link.springer.com/article/10.1007%2Fs10806-013-9461-z

30. Payandeh Najafabadi, A. T., Omidi Najafabadi, M. and Farid-Rohani, M. R. 2013. Factors Contributing to Academic Achievement: A Bayesian Structure Equation Modelling Study. *Int. J. Math. Edu. Sci. Technol.,* **44(4):** 490-500.

31. Phonepraseuth, V. 2012. From Resettlement to Sustainable Livelihood Development: The Potential of Resettlement and Livelihood Resettlement Arrangement to Achieve LivelihoodS. A Case Study of Resettled Communities on the Makai Plateau Name then 2 Hydropower Project in Lao PDR. A Thesis Presented in Partial Fulfilment of the Requirements for the Degree of Master of Philosophy in Development Studies at Massey University, Palmerstone North, New

Zealand. Retrieved July 19, 2016, From: http://mro.massey.ac.nz/bitstream/handle/10 179/3594/02_whole.pdf?sequence=1

32. Pyagay, A., Zhekeyeva, K., Aktailakova, G., Iskakova, M. and Tulegenova, Z. 2018. Ensuring Food Security of Developing Economy: Issues and Perspectives. *J. Agr. Sci. Tech.,* **20:** 1085-1097.

33. Rostami, F., Desert, M., Maleki, T., Sassanian, F. and Shahmoradi, M. 2014. Traumatic Challenges and Problems of Girls in Rural Communities (Case Study: Mahesht County, Kermanshah County), *J. Women Politics Policy*, **12(4):** 489-506.

34. Rostami, F., Shahmoradi, M. and Bagheei, S. 2015. Factors Affecting on Rural Households Food Security (Case Study: Karnachy in Kermanshah County). *Iran. J. Agric. Econ. Dev. Res.*, **45(4):** 725-737.

35. Sharaunga, S., Mudhara, M. and Bogale, A. 2015. The Impact of Women's Empowerment in Agriculture on Household Vulnerability to Food Insecurity in the Kwazulu-Natal Province. *Forum. Dev. Stud.*, **42(2):** 195-223. Retrieved February 08, 2016, From: http://dx.doi.org/10.1080/08039410.2014.99 7792.

36. Sholeye, O. O., Jeminusi, O. A., Orenuga, A. and Ogundipe, O. 2014. Household Food Security among Pregnant Women in Ogun–East Senatorial Zone: A Rural–Urban Comparison. *J. Public Health Epidemiol.*, **6(4):** 185-164.

37. Singh, M., Maharjan, K. L. and Dangol, D. R. 2012. Food Security through Organic Agriculture: A Global and National Perspective. *J. Int. Dev.*, **18(4):** 3-10.

38. Singh, T P. 2015. Women's Economic Empowerment: A Sustainable Path to Food Security. *IJELLH*, **3(1):** 325-339.

39. Smith, P. 2013. Delivering Food Security without Increasing Pressure on Land. *Glob. Food Sec.*, **2:** 18-23.

40. Sraboni, E., Malapit, H. J., Quisumbing, A. R. and Ahmed, A. U. 2014. Women's Empowerment in Agriculture: What Role for Food Security in Bangladesh? *World Dev.,* **61:** 11-52.

41. Studdert, L. J., Frongillo, E. A. and Valoist, P. 2001. Household Food Insecurity Was Prevalent in Java during Indonesia's Economic Crisis. *J. Nutr.*, **131(70):** 2685-2691.

42. Tibesigwa, B., Visser, M., Hunter, L., Colllinson, M. and Twine, W. 2015. Gender Differences in Climate Change Risk, Food Security and Adaption: A Study of Rural Households' Reliance on Agriculture and Natural Resources to Sustain Livelihoods. Retrieved February 03, 2016, From: http://www.afdb.org/en/aec-2015/papers/paper/gender-differences-in-climate-change-risk-food-security-and-adaptation-a-study-of-rural-households-reliance-on-agriculture-and-natural-resources-to-sustain-livelihoods-4714/.

43. USAID. 2014. *Gender Analysis*. August 10, 2016, From: http://www.care.org/sites/default/files/docu ments/ENSURE%20Gender%20Analysis%2 0Zimbabwe.pdf.

44. WFP. 2009. *Comprehensive Food Security and Vulnerability Analysis Guidelines.* Retrieved February 03, 2016, From: http://documents.wfp.org/stellent/groups/pu blic/documents/manual_guide_proce.

45. Word Bank. 2009. *Gender in Agriculture Sourcebook, Agriculture and Rural Development.* Retrieved February 03, 2016, From: http://siteresources.worldbank.org/INTGEN AGRLIVSOUBOOK/Resources/CompleteB ook.pdf.

تحلیل جنسیتی وضعیت امنیت غذایی خانوارهای روستایی بر اساس چارچوب معیشت پایدار در شهرستان کرمانشاه

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چکیده

این پژوهش با هدف تحلیل جنسیتی منابع مختلف تولیدی و معیشتی مؤثر بر وضعیت امنیت غذایی خانوارهای روستاهای شهرستان کرمانشاه بر اساس چارچوب معیشت پایدار، انجام گرفت. با توجه به نقش کلیدی زنان در امنیت غذایی، تفاوت دسترسی و کنترل زنان و مردان بر منابع و وجود نابرابری‌های جنسیتی به عنوان یکی از مهم‌ترین اصول مطالعات روستایی، انجام این تحقیق ضروری به نظر می‌رسد. روش تحقیق مورد استفاده در این پژوهش از نظر هدف کاربردی، از لحاظ نحوه جمع‌آوری داده‌ها از نوع غیر آزمایشی و بر حسب روش علّی- تطبیقی است. جامعه آماری خانوارهای بهره‌بردار بخش کشاورزی روستاهای شهرستان کرمانشاه شامل ۲۵۶۷۱ خانوار می‌باشند که از بین آنان تعداد ۷۵۰ نفر (شامل۳۷۵ خانوار، ۳۷۵ زن و ۳۷۵ مرد) به عنوان حجم نمونه با روش نمونه‌گیری طبقه‌ای با انتساب متناسب انتخاب شدند. ابزار تحقیق پرسشنامه بود که روایی آن با استفاده از نظرات متخصصان و پایایی آن از طریق ضریب تتای ترتیبی (۰/۸۳۸- ۰/۷۱۴) مورد تأیید قرار گرفت. در آمار استنباطی به منظور تحلیل جنسیتی مدل‌یابی معادلات ساختاری با استفاده از رویکرد بیزی میمیک مورد استفاده قرار گرفت. سپس مدل ساختاری میمیک که اساس مقایسه دو گروه است، ارائه شد. نتایج تحقیق حاکی از آن است که مردان در خانوارهای مورد مطالعه نسبت به زنان از امنیت غذایی بیشتری به ترتیب در سه بعد موجود بودن مواد غذایی، دسترسی به مواد غذایی و پایداری برخوردارند. مردان نسبت به زنان از سرمایه‌های مالی، سرمایه‌های اجتماعی ، سرمایه‌های طبیعی، تحت تأثیر بافت آسیب‌پذیری و از ساختارها و فرآیندهای تحول‌زای بیشتری برخوردارند؛ و زنان نسبت به مردان از سرمایه‌های انسانی، سرمایه‌های فیزیکی و از راهبردهای معیشت بیشتری بهره می‌گیرند. این نتایج می‌تواند در تصمیم‌گیری‌های مربوط به تداوم یا توقف برنامه‌های مربوط به دستیابی به امنیت غذایی و توسعه پایدار، نقش بسزایی داشته باشد.