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Original Article

Designing a community-supported agriculture model for increasing food security

Projetando um modelo agrícola apoiado pela comunidade para aumentar a segurança alimentar

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Abstract

The institutionalization of participation is a topic that has been discussed in different ways over the last few decades. There are many diverse aspects of the agricultural sector and rural communities that can be identified and used to bring about a major change in agriculture. Community supported agriculture (CSA) is one of the participatory and sustainable approaches that can be used in this regard. CSA is a relatively new socioeconomic model for producing food materials, increasing food security, improving the quality of food materials and conserving agricultural land, plants and animals. This research aimed to design a CSA model that was operationalized in Markazi province, Iran, with the aim of increasing food security. It was a survey study applied through a questionnaire. The statistical population (N=110) consisted of all active farmers in Ghazel Dareh village who were selected through the census method. The necessary information was collected through a questionnaire (84 of which were completed and returned) and analyzed using SPSS v. 25 and LISREL. The results showed that economic, socio-institutional, policy-making, educational and infrastructural factors significantly influenced the development of CSA. Infrastructural and socio-institutional factors with impact factors of 0.88 and 0.54 had the largest and smallest effect on CSA, respectively. Finally, since all impact factors were positive, we can say that improving each of these factors could improve the development of CSA in the study area.

Keywords: modeling, community supported agriculture, participation, food security, Iran, Markazi province.

Resumo

A institucionalização da participação é um tema que tem sido discutido de diferentes formas durante as últimas décadas. Existem muitos aspectos diversos no setor agrícola e nas comunidades rurais que podem ser identificados e utilizados para causar uma grande mudança na agricultura. A agricultura apoiada pela comunidade (AAC) é uma das abordagens participativas e sustentáveis que pode ser utilizada neste sentido. A AAC é um modelo socioeconômico relativamente novo para a produção de materiais alimentares, aumentando a segurança alimentar, melhorando a qualidade dos materiais alimentares e conservando terras agrícolas, plantas e animais. Esta investigação pretendeu desenhar um modelo de AAC que foi operacionalizado na província de Markazi, no Irã, com o objetivo de aumentar a segurança alimentar. Foi um estudo de levantamento aplicado por meio de questionário. A população estatística (N = 110) consistia em todos os agricultores ativos na aldeia de Ghazel Dareh, selecionados por meio do método de censo. A informação necessária foi recolhida por intermédio de um questionário (foram preenchidos e devolvidos 84 questionários) e analisada através do SPSS versão 25 e LISREL. Os resultados mostraram que os fatores econômicos, socioinstitucionais, educacionais, infraestruturais e de elaboração de políticas influenciaram significativamente o desenvolvimento da AAC. Os fatores infraestruturais e socioinstitucionais com fatores de impacto de 0,88 e 0,54 tiveram o maior e o menor efeito na AAC, respectivamente. Finalmente, uma vez que todos os fatores de impacto foram positivos, podemos dizer que a melhoria de cada um deles poderia melhorar o desenvolvimento da AAC na área de estudo.

Palavras-chave: modelização, agricultura apoiada pela comunidade, participação, segurança alimentar, Irã, província de Markazi.

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1. Introduction

At present, agriculture plays the most important role in food security (Armanda et al., 2019) because population growth and greater need for food have increased the demand for agricultural products (Amirzadeh Moradabadi et al., 2020). This will cause many problems: global warming (Luber and McGeehin, 2008), higher energy requirements (FAO, 2016), lower water quality and quantity (Arunrat and Pumijumnong, 2015), increased urban and industrial waste (Chen et al., 2019), greater extent of soil degradation (FAO, 2016) and, most importantly, lower levels of food security resulting in destruction of cities and the environment. In addition, considering the current environmental conditions, one of the most serious challenges that the world will face is the sustainable supply of and access to food for the global population that will reach 9.7 billion by 2050 (Kennard, 2020), because population growth and loss of environmental capacity for producing food materials have improved the importance of food security compared to previous decades (Amirzadeh Moradabadi et al., 2020). Based on UN estimates, more than 113 million people in 53 countries experienced acute hunger in 2019. The worst food crises in 2018, in order of severity, happened Yemen, the Democratic Republic of the Congo, Afghanistan, Ethiopia, the Syrian Arab Republic, South Sudan, and northern Nigeria. These eight countries account for more than 72 million people, or two-thirds of all those who face acute food insecurity. This report indicates that, despite a slight decrease compared to previous years (2016, 2017 and 2018), more than 100 million people annually have faced acute hunger (FAO, 2019). In Iran, the above-mentioned conditions can be observed at greater intensity: in recent years prices of agricultural products have increased very little compared to other products and services and the high prices of agricultural inputs. Prices of agricultural products have increased very little due to imports of food materials and imposition of government controls on prices of food items. Consequently, farmers' problems have increased, and their financial and economic status has declined day by day. In this context, it seems that the market for Iranian agricultural products and food materials has witnessed a growth in intermediation. Under these conditions, the structure of the activities of the intermediaries for most agricultural products will change from competitive to monopolistic. In Markazi Province, considering its geographical position and close proximity to population centers such as Tehran, Ghazvin and Hamdan, intermediation has grown substantially and hence it is necessary to build a closer relationship between producers and consumers of the agricultural products in this region. CSA is one of the approaches that can be useful in this region, where Ghazel Dareh village is located. This village has an area of about 20,000 ha, 3600 ha of which are agricultural lands. At present, 80 households are engaged in agricultural activities on these lands. Since the irrigated lands are very fertile, wheat yield ranges from 5 to 10 t/ha, whereas its yield in rainfed fields varies from 1 to 3 t/ha. The results of the interviews also suggested that their most problems were related to selling their products as intermediaries play a major role in buying and selling the agricultural products of this village given its proximity to many population centers including Ghazvin, Hamadan, Ghom, and Tehran. These intermediaries buy the potato crop produced in this village at a very negligible price and sell it at prices several-fold higher in the markets of the surrounding cities and Tehran to the consumers. The farmers said that inefficiency of the market distorts the price received by the farmers (which is not higher than the mean production cost) and the price paid by the consumers of potatoes (who always price bubbles) from the actual price. Vulnerability of agricultural and animal products that form the raw materials of the food industries is among the concerns of the managers of the agriculture sector (Malek lou, 2023). One of the solutions that has been suggested for many years by the related specialists and experts is enhancing farmers' participation. The need for local participation and the organization of local residents to cope with the challenges facing their communities is of increasing importance. Of course, organization of local residents to help in shaping development should not be exaggerated. Presentation of a comprehensive assessment of local conditions that represents all sections of the community allows development of more efficient and successful programs. The guidance from local residents makes it possible to base development on the unique conditions and characteristics of the community. This will enable the active local residents to shape the community and its well-being (Brennan and Berardi, 2020). Researchers including Wells and Gradwell (2001) concluded from their studies that CSA could be one of the participatory and sustainable approaches that was likely to yield useful results This approach is cooperation based on mutual commitments between a production unit or farm and a community or group of supporters based on which a direct link is established between the production sectors and the consumers of agricultural and food products. This participation creates a direct link between the farmers and the consumers. Based on a bilateral agreement with the farmers, the citizens pay part or all of production costs (Khoshbakht and najafi, 2010). On their part, the farmers commit themselves to delivering their harvested crop to the citizens on a weekly or monthly basis (or on any other basis) to the citizens (Khoshbakht and Najafi, 2010). This method refers to a viable, small-scale and dynamic agricultural system that provides the rural or urban livelihood and also plays an important and basic role in the economic development of the country. This method seeks to find options and opportunities for improving yield and increasing income of farmers using ecological techniques (Shabanali Fami et al., 2015). Brown and Miller (2015) believe that in an ideal CSA system the consumers expand their relationships with these sectors because of their direct interactions with the farmers and croplands. This in turn increases their awareness and better understanding of the rural community and the problems the local farmers and ecosystems face, and hence they develop a more favorable outlook toward this sector. Cooley and Lass (1998) stated that the most important motivation for participating in CSA projects were environmental concerns and attempts at supporting local

production systems. Shabanali Fami et al. (2015). In their research entitled "Effective Factors on Citizen's Motivation to Participate in Community-Supported Agricultural Plans: A Case Study of Gorgan County, " Tabarsa et al. (2015) reached the conclusion that the level of social capital was the major variable that influenced the motivation of the citizens to participate in CSA. In their research, Perez et al. (2003) asked the participants to state their reasons for participating in CSA projects. The results showed that the top three priorities for the participants in order of importance were purchase of organic produce, purchase of local produce and support of local production and purchase of fresh produce. Brehm and Eisenhauer (2008) concluded in their research that the most important factors for membership in this method from the viewpoint of the participants were that they had access to high quality food materials, developed socially and supported the producers. Wells and Gradwell (2001) conducted a study entitled "Gender and resource management: community supported agriculture as caring-practice" reached the conclusion that the participants had different motivations for membership in this method such as purchasing healthy and nutritious food materials, educating themselves and others, establishing relationships with other producers and members, and adopting conservation activities such as reducing use of chemical fertilizers or not using them at all, conserving soil and managing resources. Thompson and Coskuner-Balli (2007) conducted a study entitled "Enchanting ethical consumerism: the case of community supported agriculture" and concluded that CSA played a vital role in economic security of communities by producing organic products and selling them through local marketing channels (such as agricultural markets or food companies). Also, Improving agricultural water productivity, food security, and sustainable supply of food requires increasing water consumption efficiency, refining management structure, and optimizing water utilization (Teimoori et al., 2019).

Despite the plans of national governments and regional and global organizations to reduce the rate of hunger and malnutrition around the world, unfortunately the number of people involved in the issue of hunger and malnutrition in the world is increasing (von Braun et al., 2021) and in recent years, the COVID-19 crisis has also reduced the economic incomes of families and some national governments by intensifying economic pressures on government incomes as well as rising unemployment, which has directly exacerbated food insecurity (Laborde et al., 2020). Despite the fact that in Iran, due to the existence of a sufficient number of food retailers and wholesalers, there is no problem of timely access to adequate, quality, and nutritious food (Badghan et al., 2020), the WHO reports on food security policies in Iran suggest that Iran's efforts to become a food secure country should be accelerated. Although food insecurity is one of the main concerns of the National Development Programs of the Islamic Republic of Iran and declined number of malnourished people from 5.2% in 2004-2006 to 4.7% in 2017-2019 (GHI, 2021). In the last decade, Iranian officials have emphasized the growth of national production, which has led to an increase in production in both agriculture and food industries, but the consumption of some foods by the Iranian people is still below the required average and reasonable standards and an important challenge in stability of food security in Iran (Roustaee et al., 2021; Sheybani et al., 2018). An important indicator in the stability of food security is the degree of self-sufficiency in strategic agricultural products that Iran continues to meet an important part of its needs through imports. Considering the wide sanctions in Iran, in order to achieve food security and access to healthy and sufficient food, Community-Supported Agriculture can be useful in Iran. Consequently, and given the importance of Community-Supported Agriculture under the current conditions of Iranian Agriculture to achieve food security, the main objective of this research is to design a CSA model. In this research, the initial motivations of the members of the CSA for participation, the relationships between the motivations for joining the CSA and the environmental values and the continuity and satisfaction of the community are studied. In addition, the most important social result obtained from the CSA is social capital that needs to be investigated in this study. Economically, the level of agricultural growth in the community of interest based on implementation of the CSA model is studied, the technical, economic, cultural, and social infrastructures for operationalization of the CSA model in Iran are assessed and the best CSA model is selected.

2. Methodology

This research has a quantitative nature. It is an applied research in terms of its purpose, descriptive-correlational in terms of the method of data collection, and quantitative in terms of the type of data using a questionnaire. The statistical population consisted of all the active farmers in Ghazel Dareh village, Nowbran District, Saveh County, Markazi Province, Iran. The village, which is located in Kuhpayeh Rural District, enjoys modernized agriculture since most of the fertile lands in Glazor Plain belong to it. It's most important crops are potato, rapeseed, wheat, and barley. The statistical population included 110 active farmers who were selected using the census method, and the questionnaires were distributed among them. For this purpose, the questionnaires were distributed among the statistical sample by the research team and after a few days the research team returned to the region and collected the completed questionnaires. After corresponding with them several times and redistributing the questionnaires, 84 questionnaires were completed and returned.

The reliability of the various sections in the questionnaire was determined by calculated Cronbach's alpha and SPSS software. A pre-test was conducted and the Cronbach's alpha values were calculated for different parts of the questionnaire.

Its face and content validity were confirmed by specialists. Finally, the collected information was analyzed using SPSS 22 and structural equation modeling by employing SEM-PLS1. Structural equation modeling is a comprehensive approach for testing hypotheses about the relationships between the observed and latent variables. Acceptability of theoretical models in a specific community

can be tested in this approach by using the correlational and non-experimental data.

3. Results

3.1. Personal characteristics of the respondents

Most of the respondents (83%) were male and the rest (17%) female. The participants in the age group < 30 years were the least frequent (6%) and those in the 41-50 age group the most frequent (54%). Their age range was 19-65 years and the mean age 47 years. More than three-fourths of them were married and the rest (20%) unmarried.

3.2. Structural equation modeling

In this section, a structural model was used to consider the causal effects in the conceptual model of the research and in order to study the significance of each main latent variable and also rate these variables based on their extent of influence in the development of the CSA. The results are listed in the Tables 1 and 2. Table 3 presents the final structural model of interest in this research, shows the standard estimates of the path coefficients and the variances of the latent variables. The results indicate that the variances of the independent and dependent variances were significant in all cases, which in itself is a reason for the validity of the model. In general, the larger the joint variance between a latent variable and an observed variable is the smaller the measurement error will be. As shown in Table 3, all the standard path coefficients had suitable values.

Taking the fit indices in Table 2 into account, the calculated relative value of chi square was 2.557. Relative values of chi square less than 3 are desirable. In addition, the root mean squared error of approximation (RMSEA), which must also be less than 0.08, was 0.060 in the presented model. The values of the root mean square error of approximation (RMSEA) for the fit indices GFI, AGFI, CFI, and NFI, which must also be more than 0.90, were 0.97, 0.95, 0.93, and 0.96, respectively, in the studied model. Consequently, considering the fit indices, we can

Table 1. The research variables.

Variable	Abbreviation symbol	Observed variables	Abbreviation symbol
Agricultural development	AD	Economic factors	EF
		Socio-institutional factors	EDF
		Policy- making factors	PF
		Educational factors	SIF

Table 2. Fit indices of the structural equation model.

Row	Criteria for model evaluation	Abbreviation	Value	Desirable value	Interpretation
1	Chi square to degree of freedom ratio	X^2/df	2.557	<3	Desirable
2	Fit index	GFI	0.97	>0.90	Desirable
3	Modified comparative fit index	AGFI	0.95	>0.90	Desirable
4	Normed fit index	NFI	0.93	>0.90	Desirable
5	Comparative fit index	CFI	0.96	>0.90	Desirable
6	Root mean square error of approximation	RMSEA	0.060	<0.08	Desirable

Table 3. The results obtained from hypothesis testing.

Row	The origin relationships between the independent latent variables	The destination relationships between the independent latent variables (the η variable)	standard coefficient	significance coefficient (t-value)
1	Economic	Development of the CSA	0.65	4.78
2	Socio-institutional		0.54	4.10
3	Policy- making		0.72	5.80
4	Educational		0.80	6.39
5	Infrastructural		0.88	7.44

say that the collected data supported the conceptual model well. In other words, it can be said that the model in the research enjoyed suitable fit.

Since none of the significance coefficients of all the factors influencing agricultural development was in the (-1.96-1.96) range, all five economic, socio-institutional, policy-making, educational, and infrastructural factors significantly influenced agricultural development. In addition, as all coefficients were positive, we can say that increases in any of the factors will enhance development of the CSA. It is noteworthy that "the infrastructural factors" had the most effect and "the socio-institutional factors" the least effect on agricultural development.

4. Discussion and Conclusion

Food security is put on the title page of the agendas of governments as one of the important objectives in today's world. Undoubtedly, the global policy-making is such that, in addition to adopting desirable policies and having sufficient resources, it analyzes and studies all influential factors simultaneously in order to achieve food security. A plan under the title of **empowerment of the farmers** is being implemented and operationalized as the general policy of all countries in order to solve the existing problems and achieve sustainable agricultural development. One of the empowerment programs that has had a successful history in various countries is the CSA development model that is considered an efficient option for coping with malnutrition and hunger as it provides healthy food items. In addition, it has improved citizens' health literacy and promoted consumption of healthy food materials. The results of this research confirmed that the ground can be prepared for agricultural development in Iran by implementing CSA. They also showed that, socially speaking, CSA has influenced food security. To explain this role, it can be said that CSA gathers together the producing and consuming communities and, in addition to socializing people, increases food security and provides a safe environment for the residents by reducing crime and violence rates. The results of the research by Tabarsa et al. (2015) confirm those of the present study as their results suggested that the social capital variable strongly influenced citizens' motivation to participate in CSA. Brehm and Eisenhauer (2008) reached the conclusion that the most important reasons why the farmers joined the CSA were having access to high quality food materials, attaining social development and supporting the producers.

The results demonstrate that, educationally also, CSA increases citizens' empowerment by providing the interested citizens with educational opportunities, upgrades citizens' knowledge and awareness of and sensitivity to nutrition and health and guides the community toward production and consumption of healthy and organic food materials. The results of research by Wells and Gradwell (2001) confirm those of the present study in the educational dimension as they showed that the participants had different motivations for membership in CSA such as their own education and that of others and establishment of relationships with other producers. Consequently, considering the powerful role of the educational factor as the second most influential factor, activities in areas such as "increasing knowledge, awareness and skills of decision makers, managers and experts in the agriculture sector regarding implementation of CSA," "improving the awareness of the consumer community concerning the advantages of CSA," "holding educational-extension courses to increase the farmers' skills in operationalizing CSA," using leading farmers and local trustees to transfer information on the advantages of CSA, and "increasing broadcast of related educational programs on radio and television" can be useful. Among the studied variables in the educational dimension, "use of leading farmers and local trustees to transfer information on the advantages of CSA," had a higher path coefficient. Consequently, it is introduced as the most important educational method. Therefore, it is suggested that use of leading farmers and local trustees for transferring information about the advantages of CSA be on the educational programs.

In the economic dimension also, the results suggested that the CSA project significantly influenced food security. Thompson and Coskuner-Balli (2007) conducted a study entitled "Enchanting ethical consumerism: the case of community supported agriculture" and concluded that CSA played a vital role in economic security of communities by producing organic products and selling them through local marketing channels (such as agricultural markets or food companies). To explain this role, we can say that CSA can provide citizens with fresh food materials and hence decrease their cost of living. It can also stabilize prices of food materials in the market and cope with fluctuations in prices. Consequently, healthier food materials are offered to citizens. Therefore, considering the increasing population growth rate, demand for agricultural products increases. This hypothesis is confirmed in CSA because the costs of transportation and storage decreases substantially due to the participation of the consumers in the process of producing agricultural products. Moreover, the produced products reach the consumers at lower prices due to the reduction in distance, and the consumers can spend the difference on other things such as hygiene, treatment and education. In this regard, considering the major role played by the economic factor in the development of CSA in achieving food security, it is suggested that planners put provision of facilities and governmental help for the development of production infrastructure such as pressurized irrigation systems, land leveling and drainage on their agendas. In addition, special financial assistance to farmers incurring possible losses due to their participation in CSA and provision of facilities at low interest rates for them can be useful as such assistance increases farmers' risk taking and they will participate with greater peace of mind in the approach of CSA to agricultural development.

Considering the existing weaknesses in the study area with regards to starting provincial educational and consultation television networks, it is suggested that fundamental efforts be made and farmers be provided with radio and television programs.

As for the socio-institutional dimension, the farmers think that the conditions are not suitable for them. Consequently, it is suggested that the ground be prepared

for creating CSA-related local organizations and specialized cooperatives by developing the suitable lawful and legal structure and guidelines. Creation of funds such as income stabilization funds and of networks of investors and consumers can prove useful for this purpose.

The policy-making factor also is one of the factors influencing development of CSA for achieving food security. Consequently, it is suggested that the government, when developing general policies, consider offering export incentives and levying import tariffs for the crops produced by farmers participating in the CSA.

References

AMIRZADEH MORADABADI, S., ZIAEE, S., MEHRABI BOSHRABADI, H. and KEIKHA, A., 2020. Effect of agricultural sustainability on food security of rural households in Iran. *Journal of Agricultural Science and Technology*, vol. 22, no. 2, pp. 289-304.

ARMANDA, D.T., GUIN'EE, J.B. and TUKKER, A., 2019. The second green revolution: innovative urban agriculture's contribution to food security and sustainability: a review. *Global Food Security*, vol. 22, pp. 13-24. http://dx.doi.org/10.1016/j.gfs.2019.08.002.

ARUNRAT, N. and PUMIJUMNONG, N., 2015. The preliminary study of climate change impact on rice production and economic in Thailand. *Asian Social Science*, vol. 11, no. 15, pp. 275-294. http://dx.doi.org/10.5539/ass.v11n15p275.

BADGHAN, F., NAMDAR, R. and VALIZADEH, N., 2020. Challenges and opportunities of transgenic agricultural products in Iran: convergence of perspectives using Delphi technique. *Agriculture & Food Security*, vol. 9, no. 1, pp. 1-13. http://dx.doi.org/10.1186/s40066-020-00259-5.

BREHM, J.M. and EISENHAUER, B.W., 2008. Motivations for participating in community-supported agriculture and their relationship with community attachment and social capital. *Journal of Rural Social Sciences*, vol. 23, no. 1, pp. 5.

BRENNAN, M. and BERARDI, M.K., 2020 [viewed 30 Aug 2023]. *Importance of local community action in shaping development* [online]. Available from: https://extension.psu.edu/importance-of-local-community-action-in-shaping-development

BROWN, C. and MILLER, S., 2015. The impacts of market: a review of research on farmers' market and community supported agriculture. *American Journal of Agricultural Economics*, vol. 90, no. 5, pp. 1298-1302. http://dx.doi.org/10.1111/j.1467-8276.2008.01220.x.

CHEN, P.C., YU, M.M., SHIH, J.C., CHANG, C.C. and HSU, S.H., 2019. A reassessment of the Global Food Security Index by using a hierarchical data envelopment analysis approach. *European Journal of Operational Research*, vol. 272, no. 2, pp. 687-698. http://dx.doi.org/10.1016/j.ejor.2018.06.045.

COOLEY, J.P. and LASS, D.A., 1998. Consumer benefits from community supported agriculture membership. *Review of Agricultural Economics*, vol. 20, no. 1, pp. 227-237. http://dx.doi.org/10.2307/1349547.

FOOD AND AGRICULTURE ORGANIZATION – FAO, 2016. *The State of Food and Agriculture 2016, Climate change, agriculture and food security*. Rome: FAO.

FOOD AND AGRICULTURAL ORGANIZATION – FAO, 2019 [viewed 30 Aug 2023]. *2019- Global report on food crises* [online]. Rome: FAO. Available from: https://www.wfp.org/publications/2019-global-report-food-crises

GLOBAL HUNGER INDEX SCORE – GHI, 2021 [viewed 30 Aug 2023]. *Global Hunger Index 2023: Iran* [online]. Available from: https://www.globalhungerindex.org/pdf/en/2021/Iran.pdf

KENNARD, A., 2020. The enemy of my enemy: when firms support climate change regulation. *International Organization*, vol. 74, no. 2, pp. 187-221. http://dx.doi.org/10.1017/S0020818320000107.

KHOSHBAKHT, K. and NAJAFI, F., 2010. The place of biodiversity in organic agriculture. In: *Proceedings of the Organic Agriculture Conference*, 2010, Iran. Iran: Science Academy, pp. 26-38.

LABORDE, D., MARTIN, W., SWINNEN, J. and VOS, R., 2020. COVID-19 risks to global food security. *Science*, vol. 369, no. 6503, pp. 500-502. http://dx.doi.org/10.1126/science.abc4765. PMid:32732407.

LUBER, G. and MCGEEHIN, M., 2008. Climate change and extreme heat events. *American Journal of Preventive Medicine*, vol. 35, no. 5, pp. 429-435. http://dx.doi.org/10.1016/j.amepre.2008.08.021. PMid:18929969.

MALEK LOU, M., 2023. *Designing a model for the development of community agriculture - support from the perspective of the villagers of Ghazeldare village, Central province.* Tehran: Islamic Azad University, Science and Research Branch. PhD thesis.

PEREZ, J., ALLEN, P. and BROWN, M., 2003. *Community supported agriculture on the central coast: the CSA member experience.* California: UC Santa Cruz Research Briefs.

ROUSTAEE, R., EINI ZINAB, H. and MOHAMMADI NASRABADI, F., 2021. Policy proposals to increase milk and dairy consumption in Iran based on a scoping review. *Iranian Journal of Nutrition Sciences and Food Technology*, vol. 16, no. 3, pp. 123-141. In Persian.

SHABANALI FAMI, H., TABARSA, Z., KALANTARI, K. and HATEFI, M., 2015. Effective factors on citizen's motivation to participate in community-supported agricultural plans: a case study of Gorgan county. *Village and Developmente*, vol. 18, no. 2, pp. 19-38.

SHEYBANI, R., HOSSEINI, Z., DAVOODI, S.H., AGHAMOLAEI, T. and GHANBARNEJAD, A., 2018. The effect of peer education intervention on consumption of fruits and vegetables in housewives. *Journal of Preventive Medicine*, vol. 5, no. 2, pp. 19-11.

TABARSA, Z., SHABANALI FEMI, H., KALANTARI, K. and HATFI, M., 2015. Factors affecting the motivation of citizens to participate in community agriculture projects - Pushtiban in a case study of Gorgan city. *Village and Development Quarterly*, vol. 18, no. 2, pp. 19-38.

TEIMOORI, M., MIRDAMADI, S.M. and HOSSEINI, S.J., 2019. Modeling of climate change effects on groundwater resources: the application of dynamic systems approach. *International Journal of Agricultural Management and Development*, vol. 9, no. 2, pp. 107-118.

THOMPSON, S.J. and COSKUNER-BALLI, G., 2007. Enchanting ethical consumerism: the case of community supported agriculture. *Journal of Consumer Culture*, vol. 7, no. 3, pp. 275-303. https://doi.org/10.1177/1469540507081631.

VON BRAUN, J., CHICHAIBELU, B.B., TORERO CULLEN, M., LABORDE, D. and SMALLER C., 2021. *Ending Hunger by 2030: policy actions and costs*. USA: Food Systems Summit Brief.

WELLS, B.L. and GRADWELL, S., 2001. Gender and resource management: community supported agriculture as caring-practice. *Agriculture and Human Values*, vol. 18, no. 1, pp. 107-119. http://dx.doi.org/10.1023/A:1007686617087.