Impact of Agricultural support policies on Smallholders' resilience to Food insecurity: Evidence from Iran

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Abstract

One of the essential goals of societies, primarily developing countries, is to eradicate poverty and achieve sustainable development. As vulnerable individuals in various communities increasingly face various economic, environmental, and political challenges, governments and policymakers' pre-crisis management to increase the productivity of different economic sectors, such as the agricultural sector, is considered inevitable. The efficiency of the farm sector is not only crucial for ensuring food security in the country, but it will also affect the livelihoods, incomes, and resilience of rural smallholders. Given the above, the purpose of this study is to investigate the impact of agricultural support policies on the resilience of rural farmers in the Fariman region. In this regard, The Resilience Index Measurement and Analysis (RIMA) introduced by the FAO has been used to determine the resilience of rural farmers. Additionally, the distribution of subsidized fertilizers to farmers as a common agricultural support policy in the country has been chosen. The impact of this agricultural support policy on the resilience of rural farmers has been estimated using the propensity score matching method in this study. The study area is the Hossein Abad Rekhneh Gol village, located in Fariman County, and the data were collected through documentation and the use of questionnaires. The study results indicate that households eligible to receive subsidized fertilizers have higher resilience on average compared to households that are not eligible. Based on the research findings for the study area, due to government budget and supply constraints, subsidized fertilizer should be prioritized for smallholder farmers in rural areas rather than large-scale operations. Furthermore, the number of agricultural wells available for rent to rural farmers should be significantly expanded.

Keywords: Agricultural support policies, Rural farmers, Resilience, Propensity Score Matching, Food insecurity.

1. Introduction

Achieving food security and combating poverty and hunger have become central to the agricultural policies of various countries, especially in developing and underdeveloped societies. This can be supported by various statistics that have been published to validate the statement above. In 2024, about 700 million people—or 8.5 percent of the global population—live in extreme poverty on less than \$2.15 a day. Around 3.5 billion people live on less than \$6.85 a day, the poverty line more relevant for middle-income countries, which are home to three-quarters of the world's population. Also, 1.2 billion people around the world face life-changing risks from climate-related hazards, such as floods, heat waves, droughts, or cyclones (Christoph Lakner, Maria Eugenia Genoni, Henry Stemmler, Nishant Yonzan, 2024). In two major global programs, the Millennium Development Goals (MDGs) and the Sustainable Development Goals (SDGs), one of the most critical sustainable development goals is the eradication or reduction of global poverty and hunger. Accordingly, medium-term and short-term programs have been outlined in different communities to achieve these overarching goals (Sustainable Development Goals, 2019). Among the various economic sectors, the agricultural sector, due to its ability to produce and supply food, increase employment through the expansion of upstream and downstream industries, and increase foreign exchange earnings through the expansion of non-oil exports, plays an essential and decisive role in establishing food security. It can also facilitate economic development, especially in underdeveloped and developing countries. Therefore, the development of the agricultural sector has been considered as one of the most effective tools for reducing the poverty of the communities above in recent decades(Alam et al., 2023).

Iran, as a developing country, is no exception to the above rule and requires the development of the agricultural sector to stimulate sustainable and comprehensive economic growth. The negative impact of climate change on agricultural production, intensified inflationary trends, high food prices, increasing food waste, increasing need for food imports, and, more significantly, ongoing international sanctions make it difficult to access affordable food and pose challenges to Iran's food security (Ghalibaf et al., 2022). Therefore, Increasing the productivity of the agricultural sector, in addition to ensuring the country's food security, can significantly affect the livelihood and employment status of the rural population of Iran. The small-scale and peasant production system is the most prevalent mode of production, accounting for more than 85% of agricultural production units in the country (Mojaveran et al., 2019).

Given the points mentioned above about the importance of the agricultural sector and the significant role of rural smallholders in this sector, attention to the employment and livelihood status of these households is considered a fundamental element in achieving development. On the other hand, since rural residents are more exposed to economic, environmental, and social vulnerabilities compared to urban dwellers due to the lack of various welfare facilities, the adoption and implementation of appropriate policymaking in the agricultural sector and rural areas can be helpful and effective in responding to the phenomenon of migration and reducing the rural population growth rate as a tool to increase the productivity of agricultural products and increase employment in rural areas (Moradian et al., 2023).

In general, the support policies in Iran's agricultural sector can be introduced in three general frameworks. The first group includes tax exemptions, legal privileges, tariff barriers, and preferential rates for bank credits. The second group includes explicit and implicit subsidies for the production and consumption of agricultural commodities, including input subsidies and price support measures. Finally, the third group can be introduced as public services and infrastructure in the agricultural sector, which includes budget payments for the development of agricultural infrastructure, research and extension, and other civil activities in the agricultural sector (Mojtahed & Esfahani, 1989).

Granting production subsidies and guaranteed prices of strategic agricultural products are among the most common types of direct support for agricultural producers in Iran. The objective of the government and policymakers in adopting and implementing the policies mentioned above is not only to increase the productivity of the farm sector but also to increase the income of farmers and improve their livelihood status, especially rural smallholders. Regarding the improvement of the livelihood status of rural smallholders, one can refer to ensuring their food security and income stability, as agricultural producers are constantly faced with technical, economic, and environmental challenges due to the nature of farming production. Therefore, identifying and implementing measures that will increase the resilience of rural smallholders is of great importance.

The concept of resilience is considered as the capacity of a system, family, or individual to resist various shocks and risks, which has been on the agenda of all countries as a new concept of development in the 2030 Sustainable Development Agenda (d'Errico et al., 2021; FAO, 2018).

Without urgent action to reduce various shocks and risks, alongside measures to enhance the resiliency of individuals, it may take decades to eradicate extreme poverty and over a century to eliminate poverty as defined for nearly half of the global population (Haile Aboye et al., 2024; Maria Gabriela Farfan Betran, 2024). In Iran, a significant portion of agricultural producers consists of rural smallholders, highlighting the importance of their resilience to food insecurity. Therefore, it is crucial to consider measures and policies that strengthen the resilience of rural farmers against different shocks.

Upon reviewing the existing literature, a significant gap becomes apparent. While many studies have focused on the impact of agricultural support policies on food insecurity, few have explored their effects on farmers' resilience to food insecurity.

Table 1 refers to some of the mentioned studies.

Number	**Surveyed study**	**Location**	**Policy measures / Programs (in Agriculture)**	**Mean result**
1	(Hunt et al., 2011)	Australian villages	Agricultural extension; extension program in the Tasmanian sheep industry as a supporting case study	Improving the capacity-building and resilience in rural industries and communities
2	(Schouten et al., 2012)	Netherlands	Rural development policies; Impact of Modulation from a Resilience Perspective	Increasing an average score of 79/156 on the criteria for developing resilience.
3	(Azwardi et al., 2016)	Indonesia	Agricultural policy (non-energy subsidy)	The subsidy is affected by the price of rice.
4	(Ambelu et al., 2017)	Southern Ethiopia	The intervention measures on the livestock and	Improving the resilience of rural communities.

			infrastructure of resilience dimensions	
5	(Walls et al., 2018)	low- and middle-income countries	The impact of agricultural input subsidies on food and nutrition security	Improving household cash income, change household behavior and food consumption. Changes in non-food consumption.
6	(Huang et al., 2018)	China	Agricultural Land use policy; (WMRH) withdrawal mechanism for rural homesteads.	Implementation of a WMRH is found to be optimal for enhancing rural resilience.
7	(d'Errico et al., 2020)	Lesotho	Cash transfer projects; Child Grant Program.	Positive and significant short-term impact on less resilient households.
8	(Buitenhuis et al., 2020)	Netherlands	Common agricultural policies (CAP)	Strongly support the robustness of the resilience of farming system.
9	(Anantha et al., 2021)	South Asia	Management practices on sustainable crop production	Improving climate resilience in smallholder farming systems
10	(Maia et al., 2021)	Brazil	Climate resilience program; a set of climate-smart production practices and locally-adapted technologies.	Improving the production practices, land management, and the quality of life of the farmers.
11	(Mokgomo et al., 2022)	South Africa	Impact of Government Agricultural Support on Agricultural Income, Production and Food Security	Significant in reducing food insecurity, improving agricultural production and income of the beneficiary small-scale farmers.
12	(Baffour-Ata et al., 2023)	Ghana, Bono east Region,	Climate smart agriculture (CSA) program.	Positive and significant effect on the resilience of smallholder farmers.
13	(Ali et al., 2023)	Ethiopia	Climate smart agriculture (CSA) program.	Increasing smallholder farmers' resilience
14	(Temesgen Gelata et al., 2024)	Ethiopia	Dairy contract farming adoption	Increasing households' resilience to food insecurity by 18%

While review of studies on the effects of agricultural policies on various factors (including farmers' welfare, food security, and production productivity) generally indicate that appropriate policies can improve the overall agrarian system, research assessing the impact of support policies, such as subsidized fertilizer distribution, on the resilience of farming households to food insecurity is lacking. Given the existing gap among the studies conducted, especially in Iran, this research intends to examine the effect of a common support policy in the Iranian agricultural sector on the resilience of rural smallholders against food insecurity. It is believed that the proper implementation and adoption of each type of support policy in this sector not only provides the means to achieve the overarching goals, such as achieving sustainable food security but also leads to an improvement in the livelihood status and resilience of farmers.

2. Materials and Methods

2.1. Study area and Data

Fariman County, with an area of 3,356 square kilometers, is located 75 kilometers from the center of Khorasan Razavi Province. The county has two districts, four cities, five townships, and 148 inhabited villages. The total population of Fariman County is 99,001, of which 85,966 live in cities and 40,035 (44.40%) live in villages (Iran Statistics Center, 2015).

Among the counties in Khorasan Razavi province, Fariman County is considered as an important agricultural production hub due to its extensive irrigated and rain-fed farmlands and high capacity for agricultural, horticultural, and livestock production.

Considering the significance of agricultural production in Fariman County, studying and examining the resilience capacity of farmers in this region and the impact of agricultural support policies on their resilience are of undeniable importance.

With the objective of studying the impact of agricultural support policies on the resilience of rural farmers, the following criteria have been considered for selecting the target village in Qalandarabad district:

- The study village should have a sufficient number of farm households for whom agriculture is the main source of income for the household head.
- The agriculture of the households under study should include both rain-fed and irrigated farming.
- The farmers should reside in the same village.

According to the opinions of experts from the orgnization of Agriculture Jihad in Fariman County and the Agricultural Support Services Organization in Qalandarabad, the village of Hosein Abad Rekhneh Gol has been selected for the study due to the level of rural employment in the agricultural sector and the availability of diverse water resources (wells and qanats).

The resilience of the statistical population in facing food insecurity was estimated using the results of a previous study (Moradian et al., 2023)conducted in Hossein Abad Rekhneh Gol village. The households of rural farmers who were part of the study (Moradian et al., 2023) were surveyed about their receipt of agricultural support subsidies. The impact of farming subsidies on the resilience index against food insecurity was then calculated using the methods detailed in section 3 of this article. The statistical sample group comprised 149 farm households, selected through a random sampling method from a total of 214 farmers in the village.

The methodology employed in this research comprises two main parts. The first part estimates the resilience index of rural smallholders against food insecurity, and the second part examines the effect of the implemented support policies on this index.

3.2. Estimating the Resilience Index of Rural Smallholders against Food Insecurity

In this study, the resilience index of rural smallholders was estimated using the RIMA (Resilience Index Measurement Analysis), which was introduced by the FAO in 2008 and expanded in 2016. The RIMA resilience index consists of four pillars, namely access to public services, assets, social safety nets, and adaptive capacity. Each of these pillars is composed of a number of unobservable variables. To examine the resilience index (RIMA) against food insecurity, various food insecurity indicators can be utilized, including the Food Consumption Scale (FCI) and the Household Hunger Scale (HHS).

Finally, after separately calculating the resilience index's pillars and the food insecurity indicators, the RIMA Resilience Index is obtained using methods such as structural equation models (MIMIC[1]). The RIMA resilience index can range from zero to one hundred, with lower values meaning less resilience to food insecurity and vice versa.

3.3. Estimating the Impact of Agricultural Support Policies on the Resilience of Rural Farmers

In general, the policies of purchasing agricultural products at guaranteed prices and providing subsidies for agrarian inputs are considered the most significant agricultural support policies implemented in various regions, including the area under investigation in this study. The guaranteed price policy, primarily applicable to wheat, involves the government announcing the purchase rate for wheat for the upcoming agricultural year, allowing farmers to supply their produce to the government.

The policy of granting agricultural input subsidies, a recent initiative, is a comprehensive support system for farmers. It includes granting credit and financial facilities, distributing agrarian inputs, and other facilities. Notably, among these, the allocation of subsidized fertilizers plays a crucial role. These fertilizers, distributed based on farmers' share of agricultural water ownership, directly enhance their productivity and income. Other required inputs are obtained by farmers in the free market.

Considering that some of the farmers under study, due to the low quantity or quality of their harvested wheat or other factors, do not want to benefit from the wheat guaranteed price policy and sell their product freely, and also the difference in yields makes it challenging to examine the effect of the guaranteed price policy on the resilience of farmers, in the present study, the impact of the subsidized fertilizer distribution policy on the resilience of rural farmers evaluation. As mentioned, the main objective of this study is to examine the effects of subsidized fertilizer distribution on the RIMA resilience index, which is called the Resilience Capacity Index (RCI) of rural households. In this regard, the Matching Method is considered an effective tool for evaluating

[1] . Multiple Indexes and Multiple Causes.

the effect of a specific treatment (for example, an agricultural policy) on a group of people in society. In empirical research, matching is defined as pairing and comparing treatment group units with control group units based on observable characteristics (Independent variables). This method was first used by Rosenbaum and Rubin (Rosenbaum & Rubin, 1985) and has since been extensively used in the field of market policy evaluation (Filsaraee., 2015).

The matching method can be used in all situations where an individual with a specific treatment or a group of individuals with a particular treatment is compared to a group of individuals without that treatment. There have been many studies conducted abroad on the evaluation of policies using the matching approach, including the studies by Dehejia and Haba (1966), List and colleagues (2003), Mendelsohn (2006), Profiling and Weis (2008), and Chadder and Quinn (2012) and Penn (2014), (Pishbahar Esmaeel, 2017).Therefore, the resilience of a sample group that has benefited from the fertilizer subsidies policy can be compared to other sample groups.

Any microeconomic evaluation study should overcome the issue of selection bias. This issue arises from the fact that the objective is to compare the outcomes of participation in a program or non-participation. Both outcomes cannot be observed for an individual at the same time. Additionally, considering the average outcome of non-participation as an appropriate approximation is not valid since, in general, participating and non-participating groups may differ even in the absence of treatment, a phenomenon known as selection bias. The Propensity Score Matching (PSM) approach is a possible method to address this issue.

Conventionally, the effects of treatment in econometric models are estimated through virtual endogenous regressors, which allow individuals and groups to be classified into two different groups called treatment and control groups. One of the common econometric approaches is the Heckman two-step Tobit model, which, in the first step, includes the estimation of probabilistic models such as Probit and Logit. The propensity score matching method does not require identification restriction and estimates the effects of treatment by simulating a random experiment in a non-parametric method. This means that it matches observations in the treatment group with observations in the group that did not receive treatment(Iravani S, Kakhki Daneshvar M, 2019).

To estimate the propensity score, the probability of participation in the treatment must first be calculated for all samples using the observed variables as explanatory variables. Then, individuals in the control sample are selected as matched samples for each individual in the treatment sample. Logit or Probit models are used to calculate the probability of participation in the treatment. In this study, the treatment is the use of agricultural support policies (subsidised fertilizer), and the independent variables include the pillars of the resilience RIMA index such as access to public services (ABS), assets (AST), social safety nets (SSN), and adaptive capacity (AC). The experimental model is as follows:

$$Y = \alpha + ABS_i X_i + AST_i X_i + SSN_i X_i + AC_i X_i \tag{1}$$

The Average Treatment Effect on the Treated (ATT) is considered the parameter of interest in the PSM analysis. In this study, ATT is the average effect of agricultural support policies (subsidies fertilizer) on the resilience of the rural households under study. ATT is calculated using the matching of observations in the treatment group and the control group that are close in terms of propensity scores, as follows:

$$\mathrm{ATT}\ (x) = E(Y_{1i}|T_i = 1) - E(Y_{0i}|T_i = 1) \qquad (2)$$

Descriptively, the PSM estimate is simply a difference in means between the treatment group and the control group, where the means are weighted averages using the weights of the distribution of propensity scores to participate(Pishbahar Esmaeel, 2017).

In the research literature, various methods of propensity score matching are used to match two treatment and control groups with similar propensity scores to calculate ATT. Given that the choice of matching estimator depends heavily on the characteristics of the data under consideration and the structure of the study, the Radius estimator is used in this study.

4. Results

As explained, the PSM approach was used to examine the effect of agricultural support policy on the resilience of rural farmers in the village of Hossein Abad Rekhneh Gol. In this approach, the dependent variable is the Resilience Capacity Index (RCI), and the independent variables include access to public services (ABS), assets (AST), social security networks (SSN), and adaptive capacity (AC). The data used in this section were extracted from the results of the study conducted by (Moradian et al., 2023). Based on the mentioned results, out of the 149 households examined, 33 households (22%) are highly resilient, 82 households (55%) are resilient, 26 households (18%) are relatively resilient, and finally, eight households (5%) are vulnerable to food insecurity.

Also, farmers who received subsidized fertilizers during the agricultural year are considered the treatment group, and farmers who did not receive subsidized fertilizers are in the control group. Table 2 shows the number and share of the treatment and control groups.

Table 2- The number and share of rural households in the treatment and control groups

Control Group *(Farmers who did not receive subsidized fertilizer)*	***Treatment Group*** *(Farmers who received subsidized fertilizer)*	***Description***
76	73	*Number (household)*
51%	49%	*Share of total (percentage)*

Source: Research findings

Table 3 shows the results of comparing the means of the two treatment and control groups for the independent variables of the model before matching.

Table 3- Comparison of the average resilience pillars in two control and treatment groups

Pvalue	***T***	***Standard Deviation***		***Mean***		***Independent Variables***
		Treatment Group	Control Group	Treatment Group	Control Group	
0.00	4.66	0.14	0.56	0.36	-0.35	*Access to Basic Service (ABS)*
0.00	-11.17	0.81	0.65	0.68	-0.66	*Assets (AST)*

0.38	0.86	1	1	0.17	0.17	*Social Safety Nets (SSN)*
0.00	-0.5	0.96	0.86	0.4	-0.39	*Adaptive Capacity (AC)*

Source: Research findings

As can be seen from the table, before matching, the social safety net variable does not statistically differ between the control and treatment groups. However, there is a statistically significant difference between the control and treatment groups in terms of the variables of access to public services, assets, and adaptation capacity. These differences indicate that there is sample selection bias, and therefore, matching of households from the two groups is necessary before examining and evaluating the effect of the subsidized fertilizer distribution on household resilience capacity.

The first step in the propensity score matching process is to use the Logit or Probit method. In this study, these calculations were performed using the Probit model based on the default settings of the Stata software. Although there is no need to interpret the Probit model's results at this stage, they are shown in Table 4.

Table 4 - Propensity Score Matching calculations - The Probit model results

P-value	***T***	***Coefficients***	***Variables***
0.03	2.10	0.39	*Access to Basic Service (ABS)*
0.00	6.05	1.49	*Assets (AST)*
0.26	-1.11	-0.14	*Social Safety Nets (SSN)*
0.14	1.47	0.24	*Adaptive Capacity (AC)*
0.97	0.03	0.005	*Intercept*
Log likelihood: 50.42	LR Chi2: 105.66		*Prob 0.00*

Source: Research finding

Table 5 explains the estimated propensity score. Once the propensity score has been calculated for each observation, it is necessary to ensure that there is an overlap in the propensity score range between the control and treatment groups. This range is called the region of common support and is used to determine the optimal number of blocks.

Table 5- Descriptive statistics of the estimated Propensity Score Matching

Mean	***Smallest***	***Percentiles***	***Thresholds***
0.686	0.134	0.137	*1%*
	0.137	0.167	*5%*
Std. Dev	0.145	0.197	*10%*
0.289	0.145	0.473	*25%*
	(Largest)	0.758	*50%*
Variance.	0.999	0.932	*75%*

0.082	0.999	0.990	*90%*
	0.999	0.999	*95%*
Observations 103	1	0.999	*99%*

Source: Research findings

Based on the table above, the common support region is in the range (of 0.134 to 1), and the optimal number of blocks determined is five. This number of blocks ensures that the mean propensity score is the same for the treatment and control groups in each block.

Table 6 shows the results of the test of the propensity score's balancing property. Based on Table 6, which indicates the number of treatments and controls in each block, the balance of the blocks has been achieved.

Table 6- The balance test of the estimated propensity score

Sum	***Receiving and not receiving subsidized fertilizer***		***Propensity score blocks***
	1	**0**	
12	3	9	*0.134*
9	5	4	*0.2*
12	5	7	*0.4*
23	16	7	*0.6*
47	44	3	*0.8*
103	73	30	*Sum*

Source: Research findings

Table 7 shows the effect of the subsidized fertilizer distribution support policy on the resilience index of rural farmers in Hossein Abad Rekhneh Gol village. This table shows the results of using the propensity scores obtained from the Probit model and matching the propensity scores using the radius method. The radius method was chosen from among the other available algorithms for calculating the ATT (Average Treatment Effect on the Treated).

Table 7- The effect of the support policy of subsidized fertilizer distribution on the RCI of rural farmers

Standard Deviation	***t***	***Numbers of Control Group***	***Numbers of Treatment***	***Average Treatment effect on the Treated***	***Treatment***	***Dependent Variable***
1.55	4.08	73	30	6.33	Receiving subsidized fertilizer	*Resilience Capacity Index*

Source: Research findings

As can be seen from the table, the t-statistic between the control and treatment groups is significant. This means that the distribution of subsidized fertilizers, as an agricultural support policy, has a significant effect on the resilience index of rural farmers in Hossein Abad Rakhneh Gol village. The mean resilience of the treatment group (the group that received subsidized fertilizers) is higher in the face of food insecurity than the control group (the group that did not receive subsidized fertilizers).

5. Conclusion and Discussion

In general, unpredictable crises in the political, economic, and environmental fields are considered to be significant factors in food insecurity in developing countries. Iran, as a developing country, has always been and continues to face various shocks, such as climate change, drought, and political and economic sanctions. These challenges and problems have had a significant impact on different economic sectors, especially agriculture and industry, in recent years. The increase in the volume of imports and the price of various items, including livestock inputs, to supply and produce agricultural products in recent years is a testament to this claim.

Since resilience is considered the capacity for absorption, adaptation, and transition of an individual or household in the face of shock(Béné et al., 2012), increasing resilience requires long-term measures that cannot be achieved without the support of policymakers. These measures include a wide range of actions, including the creation and improvement of infrastructure and agriculture, especially in rural areas.

Taking into account the above, the purpose of this study is to examine the effect of the subsidized fertilizer distribution support policy on the resilience of rural farmers in Hossein Abad Rakhneh Gol village. In this regard, the propensity score matching approach has been used. Based on the results obtained from the mentioned method, it was found that the average resilience of households that received subsidized fertilizers is higher than the group of households that did not benefit from this policy. The findings reveal a significant positive effect of subsidized fertilizer on household resilience to food insecurity, with participating households demonstrating. This suggests that subsidized fertilizer programs can contribute to enhanced food security, potentially by increasing crop yields, improving household income, and diversifying food production.

Furthermore, the analysis of the resilience index by (Moradian et al., 2023) indicates among the variables that create the asset pillar in the resilience index, the wheat yield variable plays a significant role. Therefore, factors that lead to an increase in the yield of agricultural products can also increase their resilience in the face of food insecurity. One of the factors that have a significant impact on improving the yield of agricultural products, including wheat, is the use of chemical fertilizers (including nitrogen, phosphorus, and potassium). In the crop year (2022-2023) in which the data was collected, these fertilizers were the only subsidized input distributed by the government to farmers. Due to the price difference between subsidized fertilizers and the market, many of the farmers studied who were unable to receive this subsidy due to lack of agricultural water were unable to buy it in the market in cash, too. This can have a significant impact on reducing the yield of their products and consequently affect their resilience.

In general, given that the majority of agricultural producers are rural smallholders and the livelihood of rural residents and farmers has been affected by various economic and environmental shocks in recent years, the lack of government support in the form of appropriate and effective policies to improve the resilience of farmers has further provided the ground for rural migration to cities. It will lead to an increase in poverty and marginalization.

Creating an understanding and awareness of rural farmers' resilience and identifying the factors and policies that affect their resilience will lead to directing the policy path in the form of improving the weaknesses of different regions and will result in significant savings in budget and time. These two factors are among the important and limiting factors in various policy-making.

Finally, based on the study results, it is recommended that:

- The number of available agricultural rental wells for rural farmers should be increased. Additionally, extending the contract duration with rural farmers could lead to an increase in the productivity of agricultural production in rural areas.

- Necessary changes in the resolution related to fertilizer distribution laws should be made in a way that small rural landowners (including rain-fed farmers? and irrigated farmers?) receive subsidized fertilizers based on the area under cultivation in each agricultural year. In the allocation of subsidized fertilizers, which are limited by quantity and budget constraints from the government, rural farmers should be prioritized over large landowners.

6. Limitations

Policies supporting agricultural producers in Iran mainly involve providing subsidies for production inputs and purchasing essential products, particularly wheat, at guaranteed prices by the government. Considering the approach taken in this study regarding the impact of agricultural support policies on the resilience of rural farmers, it may not be possible to assess the effectiveness of the policy of purchasing agricultural products at guaranteed prices in improving the livelihoods and resilience of rural farmers due to differences in eligible conditions.

Since no study has been done on the impact of the policy of purchasing agricultural products at guaranteed prices on the resilience of farmers in Iran, this could be an area of interest for researchers in the future.

7. Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

8. Author Contributions

ShZ: Writing- review & editing, Writing – original draft, Software, Resources, Data collection, Methodology, Analysis. MD: Review & editing, Conceptualization, Supervision. MDK: Review & editing, Conceptualization, Validation, Supervision. MSS: Review & editing, Conceptualization, Supervision.

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11. Extended Abstract

One of the essential goals of societies, primarily developing and underdeveloped countries, is to eradicate poverty and achieve sustainable development. As vulnerable individuals in various communities increasingly face various economic, environmental, and political challenges, governments and policymakers' pre-crisis management to increase the productivity of different economic sectors, such as the agricultural sector, is considered inevitable. The efficiency of the farm sector is not only crucial for ensuring food security in the country, but it will also affect the livelihoods, incomes, and resilience of rural smallholders. Given the above, the purpose of this study is to investigate the impact of agricultural support policies on the resilience of rural farmers in the Fariman region. In this regard, The Resilience Index Measurement and Analysis (RIMA) introduced by the FAO has been used to determine the resilience of rural farmers.

Additionally, the distribution of subsidized fertilizers to farmers as a common agricultural support policy in the country has been chosen. The impact of this agricultural support policy on the resilience of rural farmers has been estimated using the propensity score matching method in this study. The study area is the Hossein Abad Rekhneh Gol village, located in Fariman County, and the data were collected through documentation and questionnaires. The study results indicate that households eligible to receive subsidized fertilizers have higher resilience on average compared to households that are not eligible. One of the factors that have a significant impact on improving the yield of agricultural products, including wheat, is the use of chemical fertilizers (including nitrogen, phosphorus, and potassium). In the crop year in which the data was collected, these fertilizers were the only subsidized input distributed by the government to farmers. Due to the price difference between subsidized fertilizers and the market, many of the farmers studied who

were unable to receive this subsidy due to lack of agricultural water were unable to buy it in the market in cash, too. This can have a significant impact on reducing the yield of their products and consequently affect their resilience. So for the study area, it is recommended that rural smallholders be prioritized in the allocation of subsidized fertilizers, which is constrained by quantity and budget limitations imposed by the government, compared to large-scale farmers. Additionally, the number of agricultural wells available for rent to rural farmers should be increased as much as possible.

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چکیده

یکی از اهداف اساسی جوامع، به‌ویژه کشورهای در حال توسعه، ریشه‌کن کردن فقر و دستیابی به توسعه پایدار است. با توجه به اینکه افراد آسیب‌پذیر در جوامع مختلف با چالش‌های اقتصادی، محیطی و سیاسی روبه‌رو هستند، مدیریت پیش از بحران توسط دولت‌ها و سیاست‌گذاران برای افزایش بهره‌وری بخش‌های مختلف اقتصادی، از جمله بخش کشاورزی، امری اجتناب‌ناپذیر تلقی می‌شود. کارآیی بخش کشاورزی نه تنها برای تأمین امنیت غذایی کشور حیاتی است، بلکه بر معیشت، درآمد و تاب‌آوری کشاورزان خرده‌مالک روستایی نیز تأثیر می‌گذارد. با توجه به موارد فوق، هدف این مطالعه بررسی تأثیر سیاست‌های حمایتی کشاورزی بر تاب‌آوری کشاورزان روستایی در منطقه فریمان است. در این راستا، از شاخص سنجش و تحلیل تاب‌آوری (RIMA) که توسط سازمان غذا و کشاورزی (FAO) معرفی شده است، برای تعیین تاب‌آوری کشاورزان روستایی استفاده شده است .علاوه بر این، توزیع کودهای یارانه‌ای به کشاورزان به عنوان یک سیاست حمایتی رایج در کشور انتخاب شده است. تأثیر این سیاست حمایتی بر تاب‌آوری کشاورزان روستایی با استفاده از روش تطبیق نمره گرایش در این مطالعه برآورد شده است. منطقه مطالعه، روستای حسین‌آباد رخنه‌گل در شهرستان فریمان است و داده‌ها از طریق اسناد و پرسش‌نامه جمع‌آوری شده‌اند. نتایج مطالعه نشان می‌دهد که خانوارهای واجد شرایط دریافت کودهای یارانه‌ای، به‌طور متوسط از تاب‌آوری بالاتری نسبت به خانوارهای غیر واجد شرایط برخوردارند. بر اساس یافته‌های پژوهش برای منطقه مطالعه، با توجه به محدودیت‌های بودجه‌ای و عرضه دولتی، کود یارانه‌ای باید در اولویت کشاورزان خرده‌مالک روستایی قرار گیرد، نه عملیات‌های کشاورزی در مقیاس بزرگ. علاوه بر این، تعداد چاه‌های کشاورزی قابل اجاره برای کشاورزان روستایی باید به میزان قابل توجهی افزایش یابد.

واژه‌های کلیدی :سیاست‌های حمایتی کشاورزی، کشاورزان روستایی، تاب‌آوری، روش تطبیق نمره گرایش، ناامنی غذایی.