The impact of subsidy removal policy on the cultivation pattern of Hamidieh County

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Abstract: The targeted subsidies policy in recent years as one of the most important programs of the government, has affected the agricultural sector. The present study aimed to investigate the impact of this policy on the cultivation pattern of Hamidieh County. Information in this research was acquired through surveying and using random sampling from 196 farmers in this county in the farming year 2013-2014. The Policy Analysis Matrix was applied to achieve the research objectives. The results show that through the targeted subsidies policy and changes in input prices, some crops, such as wheat went out from the optimum cultivation pattern and are replaced with other products such as hay and rice. This affair shows the necessity of more paying attention from planners and policy makers to the changes resulting from the removal of subsidies on cultivation patterns in different regions and its impact on other variables. Therefore, it is suggested that before any policy making, the results of policy actions be considered through simulation.

Key words: Targeted subsidies; Cultivation pattern; Hamidieh County; Policy analysis matrix

1. Introduction

The country's agricultural sector is among sectors which always have been under state protection and this support generally is in the form of price, inputs or services. Input subsidies and production factors have primary and secondary effects. Increased production costs and the need for liquidity are the first impact of agricultural subsidy removal. The increase in price leads to a decline in the competitiveness of domestic goods compared to imported ones. In the absence of appropriate tariff system, undoubtedly, domestic production will be damaged and imports will be increased. In such circumstances, to maintain production status, it is necessary to make incentives for farmers to reduce costs and increase productivity. In addition, replacement and removal of some agricultural crops in different regions with crops which create more value-added must be considered. Replacement of the products with economy will create a new atmosphere in the country which needs strong and complex managerial activities. Subsidies allocated to agriculture, according to Budget Act of 2010 amounted to 8550 million Rials and were allocated to chemical fertilizers, seeds, seedlings, tractor, combine, optimizing the use of pesticides and fertilizers, provision of managed funds for the development of agricultural activities, development of health services for nomadic and rural livestock,

animal feed and rural animal breeding etc. (Karimi and Zahedi Keivan, 2010).

Implementing the targeted subsidies project in agriculture as a prerequisite is essential. This necessity has been derived from the lack of rational consumption of agricultural inputs such as fertilizers, pesticides, seed and manpower. This leads to inappropriate use of soil and water resources and environmental pollution and unsustainable development in the country. Therefore, it is essential to peruse the targeted subsidies policy in the agricultural sector to provide the appropriate mechanisms to modify processes in the country. Based on current experience, in other countries, subsidies are not used as a one-dimensional axis and are applied as a supportive basket for agriculture. Namely, the policy makers combine some methods and define a supportive basket according to the type of products or conditions (Salami and Saraiee, 2008).

Removal of governmental support in the form of the subsidies paid to farmers and producers in this sector can affect the composition of incomes and expenses. In a way that can affect the selection of cultivation model by farmers of the region. This issue has been taken into consideration in some studies such as Pakravan et al in 2011, Rashid Ghalam and Khalilian In 2011, Rahmani et al in 2010. This study, as a case study in Hamidieh County, looks for investigating whether the removal of this supports affects the region's cultivation pattern or not.

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2. Research methods

The present study in terms of research orientation is a functional study, given that looks for investigating the impact of the removal of government subsidies on the cultivation pattern in Hamidieh Region and also with respect to that information related to this study are collected in the period 2013-2014, this is a cross-sectional study. Data collection, the level of monitoring and control of variables and the generalizability, all are in the type of survey. In this study due to the use of quantitative variables and great deal of data and because of the time constraints, the surveying and sampling strategy was used.

The process of conducting research, is in a way that given that the goal of the present study, namely investigating the effect of subsidies removal on the cultivation pattern of the study area, according to the theoretical discussions which were presented in the second chapter, in order to develop a cultivation model without government intervention, it is decided that instead of using the gross profit per hectare in planning model, the social profit (calculating profit without government interventions) be used. Considering this profit as coefficients of the objective function in formulating the optimal cultivation patter, can reflect the response of farmer who faced with the real prices of products and inputs utilized in the process of crop production in the region. Thus, the comparison of three existing cropping patterns, the optimal cropping pattern with the goal of profit maximization and the optimal cropping pattern with the aim of maximizing social benefits can represent the behavior of agricultural producers in the region in the face of different policies. Therefore, in this research, in order to calculate the social benefit, the APM policy analysis matrix was used. This matrix used the following indicators:

1. The cost of internal resources: this index measures the proportion of internal resources costs and the difference between revenues and costs of tradable inputs, based on shadow prices. DRC index is obtained as following:

$$DRC = \frac{\sum b_{ok} p_k^s}{\left(p_o^s - \sum \alpha_{oj} p_j^s\right)} \qquad (1)$$

In the above equation

P_o^s: Shadow price of output o; P_j^s shadow prices of tradable input j; P_K^S shadow price of the non-tradable input K; α_{oj} the j-th input required to produce one unit of output o; b_{ok} the value of input required to produce k-th input to produce one unit of output o (Saei, 2011).

2. Social Net profitability: this result is the result of subtracting shadow expenses from shadow income and shows that by shadow prices whether profitability exists or not? According to equation, if NSP=0, the manufacturing activity is at breakeven, and if 0 <NSP, the manufacturing activity has comparative advantage and if 0> NSP, the manufacturing activity don't have comparative advantage (Emad Zadeh et al. 2010).

$$NSP = (E - F - G)Y \qquad (2)$$

In the above equation, Y is yield in area unit, G non-traded inputs' to the shadow price, E revenues to the shadow price, and F is the traded inputs to shadow price.

3. The proportion of cost and social benefits: this index is the product of the division of shadow costs on shadow incomes. Activities are profitable that help to economic growth. SCB cannot be lower than zero, the SCB criterion can be shown as following: (Saei, 2011).

$$SCB = \frac{\left(\sum b_{ok} p_k^s + \alpha_{oi} P_j^s\right)}{P_o^s} \qquad (3)$$

However, as mentioned, in this study the social profitability index was used to develop cultivation pattern, regardless of state support. In order to calculate this indicator, it is necessary to calculate the shadow prices of outputs and inputs and exchange rates (Salimi Far and Miraiee Khalil Abadi, 2002). In this study, all beneficiaries of the agricultural sector in the Hamidieh Region in farming season 2012-2013, were considered as population and using random sampling, 196 people were selected as the sample size.

3. Research results

As mentioned, the main objective of the present study is to investigate the effect of the removal of subsidies on cultivation pattern in Hamidieh County. Therefore, three cultivation patterns were compared to each other. The first pattern is the current pattern in the study area which the information is extracted from the Agricultural Jihad Organization. The second pattern includes the optimum cultivation pattern in the current situation (considering subsidies).

Necessary information was obtained through questionnaire, by 196 farmers in the county. In the third step, the desired pattern was calculated given removal of government assistance (subsidy) using shadow prices and applying the Policy Analysis Matrix.

4. The current pattern in the region

In Table 1, the current cultivation pattern of the region and the current cultivated area are being investigated.

Now cultivated area is about 50 thousand hectares that the dominant culture in the region includes wheat, barley, corn, rice, tomato and cucumber. Now wheat is considered as the main crop in Hamidieh County. Based on income and costs, the optimal cropping pattern is as Table 2.

Table 1: the current cultivation pattern of the region

Crop	cultivated area
Irrigated wheat	23000
Dry wheat	5000
Barley	2000
Dry barely	500
Rice	5000
Hay	3200
Corn	4000
Tomato	1800
Cucumber	1200

Source: research findings

Table 2: The optimal cultivation pattern based on the maximization of gross income

Crop	cultivated area	Upper limit of change	Lower limit of change
Irrigated wheat	16700	1250000	9760320
Dry wheat	2000	656000	3100810
Barley	2000	925000	654000
Dry barely	500	3100000	2419021
Rice	7430	4100000	3520821
Hay	8320	4723512	4170983
Corn	5500	1673000	1256900
Tomato	3000	4620987	4120000
Cucumber	1550	7850000	6320000

Source: research findings

As seen in the table above, the major changes in the current cultivated area is related to a significant reduction in the cultivated area of wheat and alternative crops such as rice, hay, corn and tomatoes in place of it. This indicates that allocation of more than 23 thousand hectares area of Hamidieh County to wheat, purely is due to reasons such as household food security and government support for this product and in terms of profitability, other Products can be replaced by this crop.

It should also be noted that in this research, the cultivated area of wheat and dry barley was assumed Zero due to maximizing profit and only in the present study, that's why this assumption that rain-fed arable lands cannot be cultured in water farming type, they have been considered as a limitation in the model. Shadow price survey shows that land, water and machinery are main inputs limiting farming in the study area. For land, the shadow price of around 4.1 million Rials has been obtained that is slightly higher than the current price of the land rent price. For water input, the shadow price of 123 Tomans was obtained which is much higher than the prices paid by farmers. The high shadow price of this input compared to the price paid by farmers reflects the scarcity of this input in the study area.

Due to the existence of surplus labor in the agricultural sector, the Zero shadow price is natural. This issue highlights the region's unemployment in agriculture. For machines, also the shadow price of 78 million Rials has been obtained. This suggests the lack of this input in the study area. Shortages of this input, particularly during the harvest in the region, cause a competition between farmers to rent it and thus, increase in the

price of this input in the study area. Therefore, the positive shadow price of this input seems logical. But finally, it can be stated that based on the above pattern, a total income of 856975400000 Rials has been acquired in the farming year.

5. Cultivation pattern based on social benefits

As mentioned in the methodology, to develop cultivation pattern with regard to subsidies removal, the Policy Analysis Matrix is used in this study. This model is extracted based on shadow prices of inputs.

Table 3: The optimal Cultivation pattern based on the maximization of social benefits

Crop	cultivated area	Upper limit of change	Lower limit of change
wheat	11300	1130000	825430
Irrigated wheat	2000	656000	3100810
Dry wheat	0	1432900	----
Barley	500	565400	------
Dry barely	9030	3789000	2965030
Rice	10120	4290000	3589000
Hay	4500	1356400	986530
Corn	3500	3897000	3498000
Tomato	5200	6439000	5980000

Source: research findings

As seen in the table above, again, the reduction in the cultivated area of wheat compared to the previous model is the main difference between the optimized patterns. In this model, compared to the current model, the cultivation has grown to 50% and compared with the optimal cultivation pattern, has been reduced by about 35%. This issue shows the lack of profitability of this product in terms of trade liberalization and lack of governmental support for this product in dealing with other crops. Also, compared to the previous model, removal of barley from the cultivation pattern is significant as well, and rain-fed barley is kept constant only at the current cultivated area.

This issue is also true for dry-fed wheat that the main reason for this, is due to the lack of use of land for irrigated crops. In comparing the two models it is specified that the rice cultivated area increased from 7430 to 9030 which shows a growth of 21 percent. This demonstrates the competitive ability of this product with other entered products in the model by leveraging real prices. It is observed in this pattern that the hay cultivated area increased from 8320 to 10,120 which shows a growth of 21 percent. In the case of corn cultivated area, unlike the two previous crops, a reduction of 1,000 ha in cultivation is observed.

This means that with regard to actual prices rather than market prices, through government intervention, the competitiveness of this crop decreases and this crop gives its place in the cultivation pattern to crops such as rice and hay. The reduction in the cultivated area is also visible for crops such as tomato. This means that the cultivated area of this crop has been reduced to about 500 ha

compared to the previous pattern. But other remarkable thing is a considerable declining of cucumber cultivated area compared to the profit maximizer pattern. In general, comparing the two models, the increase in the cultivated area of hay and rice is remarkable compared with other products.

In this model, also based on the shadow prices of inputs like the pattern of maximizing profits, land, water and machinery are three limiting factors in the region. In this model, the shadow price of land equals to 1987000 Rials that compared to the profit maximizer model, shows 39 percent profit. Given the increased cultivated area of crops and more scarcity of the land input among examined inputs, this increase in the shadow price of land, can be expected. In the case of water input, the positive shadow price reflects the scarcity of this input in the production process in Hamidieh County. It has also been observed about this input that the shadow price of 1230 Rials increase to 1850 Rials per cubic meter.

This input like the input of land, given the increased cultivated area of this pattern compared to the previous pattern and especially increase in the cultivated area of water consuming crops such as hay and rice instead of wheat and barley, this shadow price increase will be natural and consistent with expectations. The incidence of zero shadow price for the labor input in this model also suggests the existence of surplus labor in agriculture sector if maximizing social benefits model be selected instead of the current cropping pattern in the region. This implies the existence of remarkable surplus labor in the region, so that even the increase in the cultivated area can't absorb the workforce of the region. The revenue of the maximum social benefit equals to 1172774000000 Rials which compared to the previous model, the model of maximizing gross profit, shows an increase of 36 percent.

6. Discussion and suggestions

This study aimed to identify the impact of subsidy removal and reduce policy on the cultivation pattern of Hamidieh County. Similar to studies such as Pakravan and colleagues in 2011, Jafari in 2009, Rahmani et al., 2009, Kapach and colleagues in 2010, Mohanty et al. 2002 and Zhang et al 2002, by calculating prices in competitive conditions and eliminating distortions of government intervention, this study also through the PAM matrix, investigated the effect of subsidies removal on the cultivation pattern of the region.

The results show that the current cultivation pattern of the region is different to the cropping pattern with the objective of profit maximization. A result that the studies Pakravan and colleagues in 2011, Rashid Ghalam and Khalilian in 2011, also noted it. But the remarkable thing in this research is alternative crops such as hay and rice instead of wheat in the cultivation pattern based on the maximization of social welfare in the region. In other words, the results show that considering the relative merits of products, rather than the current gross income, as a decision criterion, creates major changes in optimal cultivation pattern of the region.

In studies Rahmani et al. 2010, Sagheb in 2005, Pakravan and colleagues in 2011, Nilabja 2004, Makosholo and Jooste 2006, these changes have been approved. The results also considered the shortcoming of water resources in the study area, as the major constraint of agriculture sector to develop the cultivated lands in the region.

Confirming the effectiveness of the removal of government support for the region's cultivation pattern is among the most important results of this research. As the results showed, by changing in input prices, some products go out from the optimal cropping pattern and other products such as hay and rice are replaced. This issue necessitates planners and policy makers to pay more attention to changes resulting from the removal of subsidies on cultivation patterns in different regions and its impact on other variables. Therefore, it is suggested that before any policy making, by applying simulation, the results of policy be considered.

Shadow prices of various models show that like most of the country, the water input is one of the most limiting factors of production in agricultural development in the region. The results show a significant difference between the prices paid by farmers and the real value of water. Therefore, it is suggested that planners and policy makers by implementing policies tailored to local circumstances, reduce this difference in order to optimize the consumption of this scarce input.

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