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Analysis of Iran's Potato Market until 2021

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Abstract

This research aimed to evaluate the exchange rate volatility on financial leverage and profitability of companies listed in the Tehran stock exchange. Therefore, a model was estimated to examine the research objectives using annual data of companies listed in the Tehran stock product in 2015-2020 through panel data Potato is considered the third most critical crop in Iran after wheat and rice. In the last three decades, the area under cultivation of potatoes and production in Iran mainly depended on climatic conditions and various policies. For this reason, the production process has been accompanied by fluctuations. This research has employed an analytical-correlational method that examines the status of potatoes from different aspects, production, consumption, export, price, cultivation status, export target countries, guaranteed price trends, and the relationships between variables. Information from the Ministry of Agriculture- jihad, organizations, and statistical and customs centers reports have been used for data analysis. According to the results, the price fluctuation of this product in 2020 is less than the consumer price index.
Moreover, the amount of exports has increased as much as 83% compared to previous years. In 2020, potato production was1148 thousand, and in 2021, 1105 thousand tons of net surplus production is predicted. The study of variable relationships shows a positive and significant relationship between the market price of potatoes and the guaranteed price with the amount of production, producer price index, and the guaranteed price of potatoes. Still, no relationship was observed between the price relationship and exports.

Keywords: Consumption, Export, Market, Potato, Production

Introduction

One of the fundamental human problems in today's world is the provision of food needs, so that food security is one of the most important goals at the top of government programs. The management of the agricultural sector must be such that it can meet many of the needs of society to achieve food security and adopt favorable policies, which have sufficient resources. On the other hand, agricultural production itself requires two groups of production factors. The first group is the physical factors of production such as land, seeds, water, labor, etc., which are necessary conditions for production in terms of quantity and quality. The second group is non-physical factors of production, and they can be referred to the proper management of inputs, which is considered a sufficient condition for production. The second group is non-physical factors of production, and they can be referred to the proper management of inputs, which is considered a sufficient condition for

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production. The physical and non-physical factors are necessary to produce desirable and optimal agriculture (Daneshi, 2020). Agricultural management studies the optimal use of resources in the agricultural sector using its efficient methods and tools and answers one of the fundamental questions of economics about how much input should be used by determining the optimal amount of use of institutions (khorrami, 2012).

Agriculture is one of the most important economic sectors of the country, and its role is undeniable in economic, political, and international development and stability. Therefore, agricultural development is the most critical priority in the national development programs of developing countries (arani and *et al.*, 2018).

Potato with the scientific name of Solanum tuberosum is an annual plant of Solanaceae that is cultivated for its underground tuber. Tomatoes, eggplants, and peppers belong to the same family. The Indians were the first people who cultivated potatoes in South America in Peru about 4,000 years ago. There are more than a thousand varieties of potatoes around the world. The first name was potato was BATATA, that the Spaniards changed it to potato in the 16th century. Edible potatoes are actually tuber-like parts of the underground stem of the potato plant. The two roles of the potato tuber are the plant's food storage and the origin of the next generation of potatoes. Potato is a tuber crop that plays an essential role in feeding the people of the world. Potato tubers are high in carbohydrates and are of great interest because of their high yield per hectare. The height of the potato plant is low; it has white flowers and a yellow flag that grows in cold and humid climates. The protrusions on the potato are covered with buds called potato eyes. Common varieties of potatoes usually do not produce seeds. The potato propagation method is done by planting a piece of it with at least one potato eye. Some people mistakenly call these pieces' potato seeds. The importance and role of potatoes as a crop sought to increase the population, and potatoes were considered as a high-yield crop under the conditions of that time. In general, potato breeding changes have taken place during the last 200 years that have caused the adaptation of this plant to different regions with specific lengths of days, so that it has been cultivated in areas with high latitudes. Potato is first imported to Iran by Fath Ali Shah, which is cultivated today in most places, especially in Azerbaijan, Ardabil, Isfahan, Hamedan, Zanjan, Tehran.

According to the statistics of Agriculture-jahad ministry in 2020, Iran is ranked 13th in the world producers with the production of more than 5500000 tons of potatoes in more than 149000 hectares. The average yield of potatoes in the 2019-2020 crop year was 37.1 tons. Hamedan province with 44.6 and Kermanshah with 43.6 tons per hectare have the first and second ranks of potato yield in the country, respectively. The Northern provinces (Gilan, Mazandaran, and Golestan) have the lowest yield with 15 tons per hectare (Ministry of Jihad for Agriculture, 2020).

The export of potatoes in 2020 was equal to 950 thousand tons, increasing about 83% compared to 2019. In the last three decades, the level of cultivation and production of potatoes has fluctuated in Iran. A total of 20-

25% waste of this product is one of its production problems in the country. The central potato-producing provinces are Hamedan, Ardabil, Isfahan, Kurdistan, and East Azerbaijan (Ministry of Jihad for Agriculture, 2020).

Daneshi (2020) studied potatoes in Iran and showed that the amount of cultivated area and, consequently, the amount of potato production in the last three decades in Iran mainly depends on the climatic conditions that are less manageable. For this reason, the production process has been accompanied by fluctuations. A total of 20-25% waste of this product is one of its production problems in the country. The central potato-producing provinces are Hamedan, Ardabil, Isfahan, Kurdistan, and East Azerbaijan, where the production in these provinces is entirely under irrigated cultivation and depends on less manageable weather conditions. Moreover, solutions were provided to manage the current situation by examining the production status, the area under cultivation, and potato yield in the area and climate of the country, and significant production areas of this product.

For this reason, the production process has been accompanied by 20-25% product fluctuations, which is one of its production problems in the Iran In this report, a perspective can be provided for better planning and management of this product by reviewing and analyzing the production situation and forecasting the amount of production in the current year, consumption, price, export, production management, and potato cultivation. Therefore, in the end, the issues are summarized, and suggestions and solutions are presented.

Materials and Methods

This research has employed an analytical-correlational method that examines the status of potatoes from different aspects, production, consumption, export, price, cultivation status, export target countries, guaranteed price trends, and the relationships between variables. Information from the Ministry of Jihad for Agriculture, organizations, and reports from statistical and customs centers has been used for data analysis.

Data analysis

Production

Review of the annual production process

According to the Minister of Agriculture forecast, figure 1 shows the annual trend of potato production, which is 5337 thousand tons in 2021. About 20,000 tons is from the area of rain-fed farms, which is projected to decrease by about 4% compared to 2020. This decrease in production is the lack of willingness of farmers to cultivate due to unfavorable market conditions and low prices of potatoes in 2020 and the occurrence of drought this year.

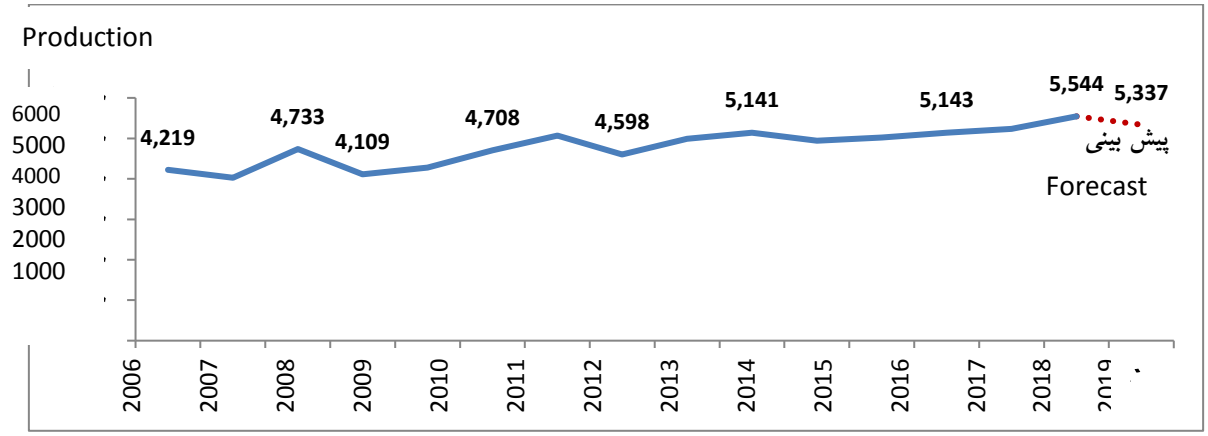

Figure 1. Annual potato production trend during the years 2006-2020 and forecast in 2021- thousand tons
Resource: Ministry of Jihad Agriculture

Forecasting the production in different seasons of 2021

The production forecast in different seasons of 2021 is shown in Figure 2. First, the average production of the last several years in different seasons was calculated, and the production was calculated from the percentage of production in each season to calculate production in different seasons. The results show that the amount of production (harvest) is about 10% of the annual production with 518 thousand tons in spring, 171 thousand tons in the form of continuous production plan in winter, 945 thousand tons, i.e., 3% of annual production in summer, 3690 thousand tons, i.e., 69% of the annual production in fall.

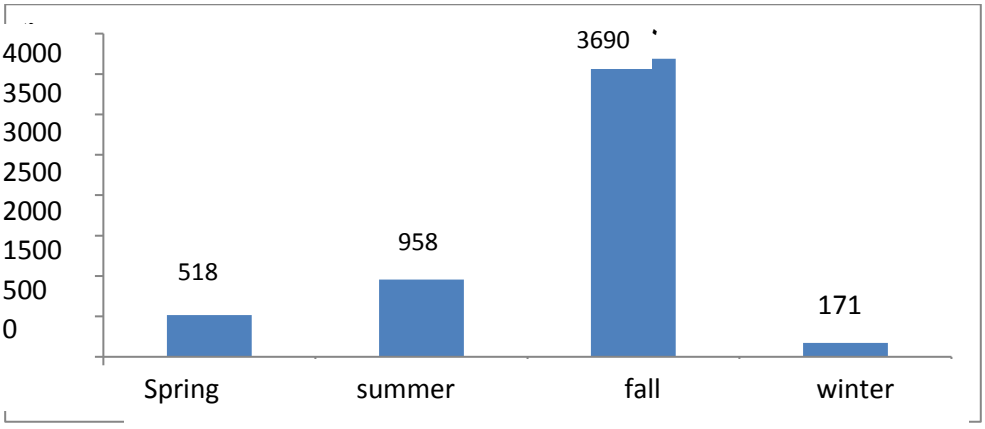

Figure 2. Forecast of seasonal production of potatoes in the seasons of 2021
Source: Findings

Ranking the area under cultivation and production of the provinces

Figure 3 shows the mean percentage of area under cultivation in 2016-2020 and the three provinces of Hamedan, Ardabil, and Isfahan, accounting for about 39% of the arable land. The southern provinces of Kerman, Kurdistan, Lorestan, Zanjan, East Azarbaijan, Fars, and Kermanshah accounted for about 37% of the cultivated area, and in total, the nine mentioned provinces have 76% of the cultivated area of the country. Therefore, the implementation of communication programs in these nine provinces can be a priority.

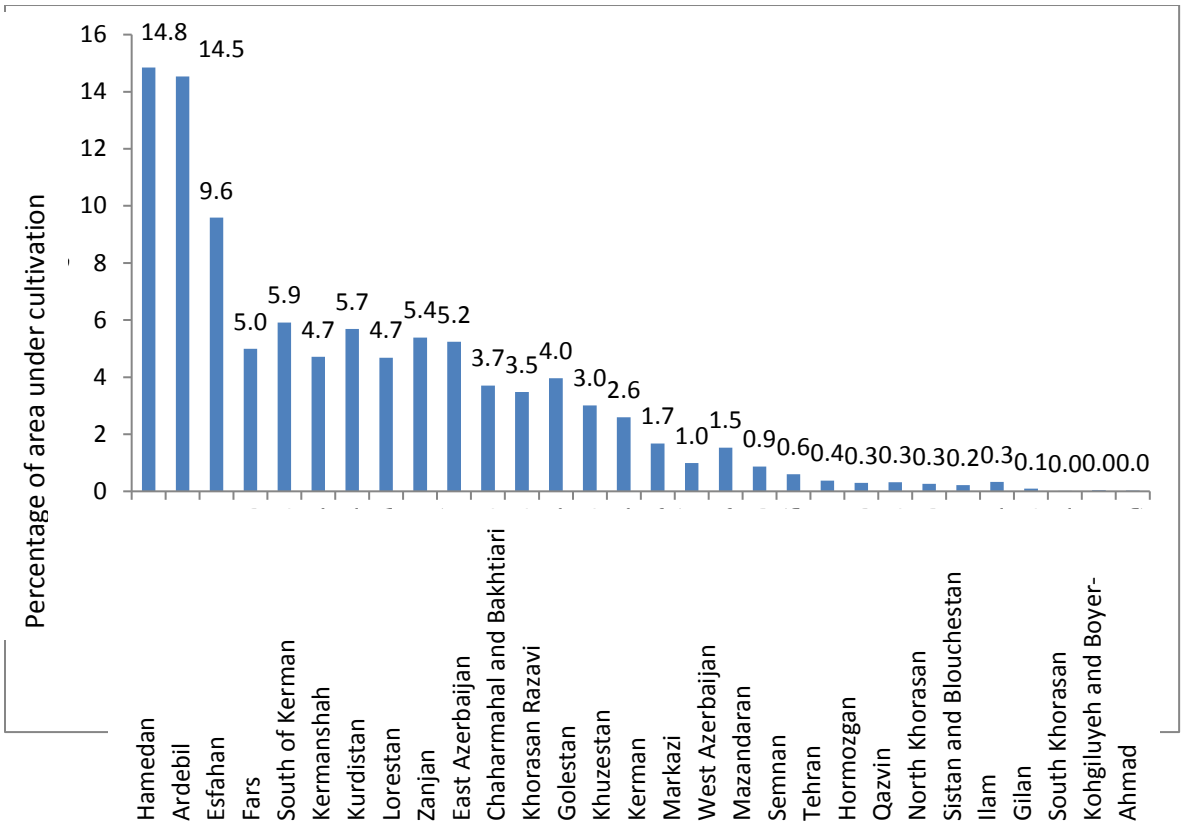

Figure 3. Percentage of the mean area under cultivation in the years 2016-2020
Source: Statistics Center of Iran

Figure 4 shows the average percentage of production in 2016-2020, and the three provinces of Hamadan, Ardabil, and Isfahan have about 42% of the cultivated area. Then, provinces, Kurdistan, Zanjan, Lorestan, East Azerbaijan, Fars, and Kermanshah and the southern region of Kerman account for about 40% of drawer production, and in total, 10 provinces have 82% of the country's production.

Therefore, implementing communication programs and investment incentives, including constructing storage warehouses in these 10 provinces, can be a priority.

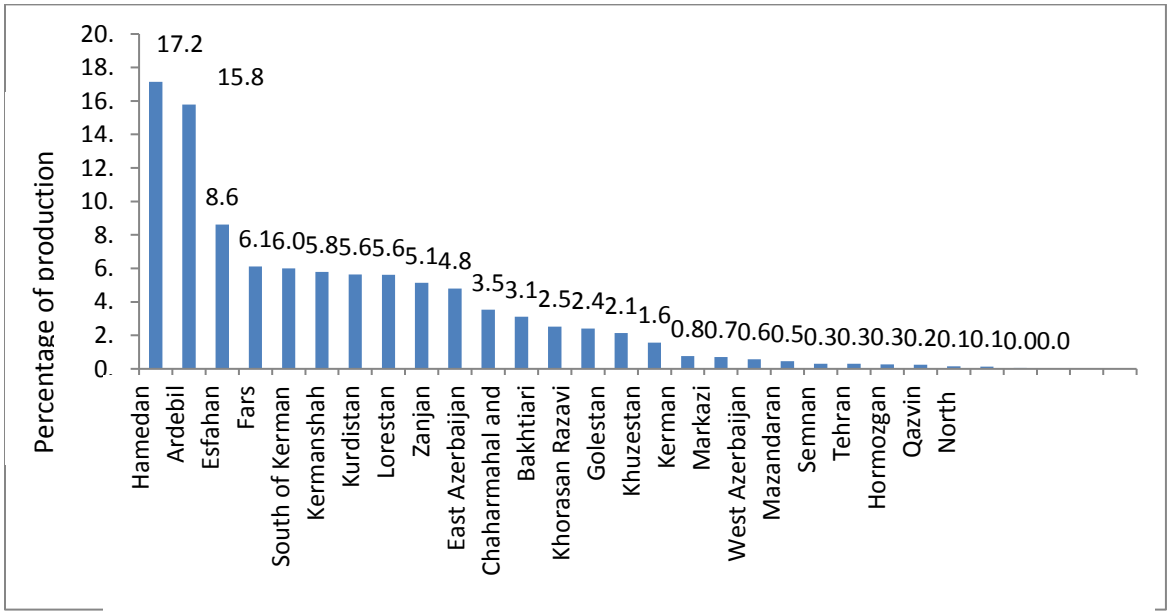

Figure 4. Mean production percentage in 2016-2020
Source: Statistics Center of Iran

Number of Farmers

According to the Statistics Center, the number of potato farmers has declined by 43% between 2003 and 2018.

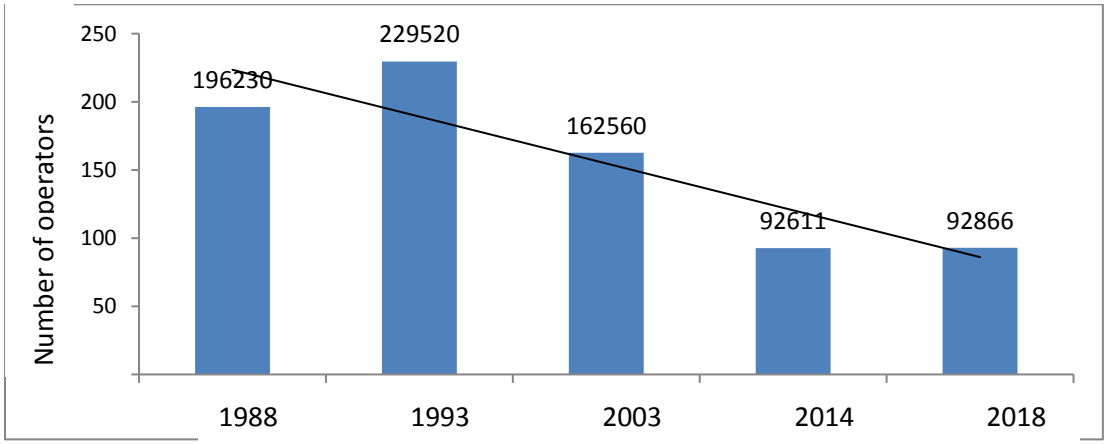

Figure 5. Number of operators in different years
Source: Statistics Center of Iran

The need for consumption is estimated at 3782 thousand tons considering per capita consumption of 45 kg and the population statistics in 2021 (84038 thousand people) (Table 1). The production forecast is 5337 thousand tons, so this year 1555 thousand tons of production over demand is forecast without considering the need for seeds. If 3 tons for each hectare of grain is considered as much as 450 thousand tons of seed will be consumed given 150 thousand hectares of cultivated area. Therefore, the net amount of surplus production in 2021 is predicted to be 1105 thousand tons.

Table 1. Net surplus of production and consumption

Description	Per capita consumption (Kg)	Consumption rate (thousand tons) in the current year	Production forecast for this year (thousand tons)	Production in 2020 (thousand tons)	Net production surplus (thousand tons)
According to the estimation of the Statistics Center of Iran, the population in 2020 and 2021 are considered 84038 and 84971 thousand people.	45	3781.71	5337	5544	1105

Resource: Findings

The total consumption of potatoes in the year is 3781 thousand tons, assuming that the consumption is fixed in each season is 958 thousand tons. According to the production statistics from 2016 to 2020 in different seasons and considering the stability of the current year production pattern and the amount of production and assuming the stability of the current year production pattern, the amount of production in spring, summer, fall, and winter are 518, 945, 3690 and 171 thousand tons (Figure 6), the amount of production in fall is 3.5 times the seasonal need, which will address the shortage of other seasons and seed consumption. If the outbreak of corona continues and the activity is limited in restaurants and hotels, as well as the closure of schools and universities, the production surplus in the whole of 2021 is estimated at 1105 thousand tons. Planning to use surplus production in the conversion and export industries can prevent price reductions and waste.

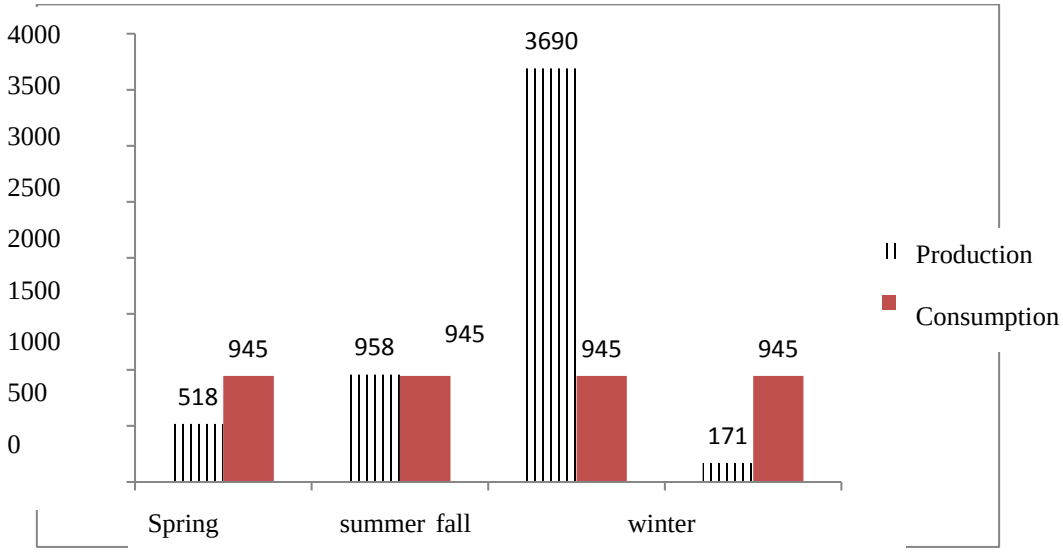

Figure 6. Prediction of seasonal potato production and consumption in 2021 seasons
Resource: Findings

The price of potatoes

The price comparison for different months shows that the consumer prices of potatoes in 2019 and 2020 in October, which coincides with the highest harvest, have the lowest price, and in April and March, which have the lowest yield, have the highest price. Therefore, further supply has reduced prices, and the price fluctuates and amounts less in the second six months than in the first six months.

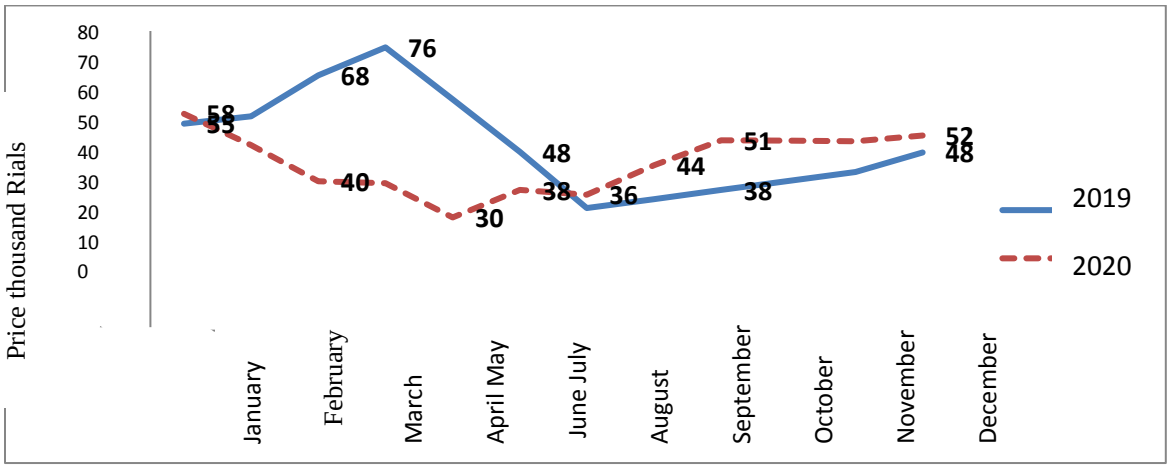

Figure 7. National Average Monthly Retail Price of Potatoes during 2020-2014
Resource: Consumers and Producers Protection Organization

Agricultural Marketing and Commercialization Journal
6(2), 89-110, 2022, ISSN Print: 2676640X, ISSN online: 2676-7570

Reviewing the price at three levels of the farm, wholesale, and retail for two types of stored potatoes and fresh potatoes shows that the most price fluctuations are in retail, and stored potatoes have fluctuated more in price than fresh potatoes.

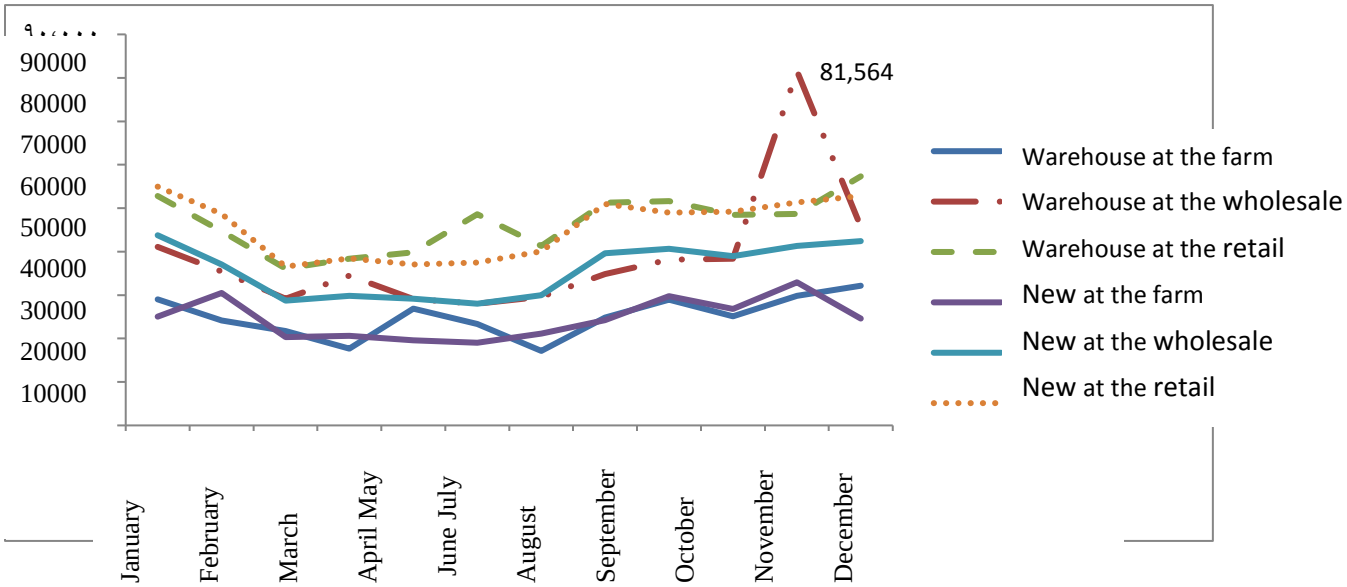

Figure 8. Review of the monthly trend in different sales levels in 2020
Unit: Rials. Resource: Ministry of Jihad Agriculture

Comparison of potato price with the consumer price index

The trend of the potato price index with the total consumer index, as well as the food and beverage index in different months of 2020, shows that the potato price has fluctuated more than the entire consumer index, as well as the food and beverage index. Moreover, the price has decreased in other months compared to April, and the food and beverage index has increased more than the total consumer price index. The price trend of potatoes shows that the price index in August was 48% lower than in April, and in March, the price of potatoes was 10% lower than the price in April.

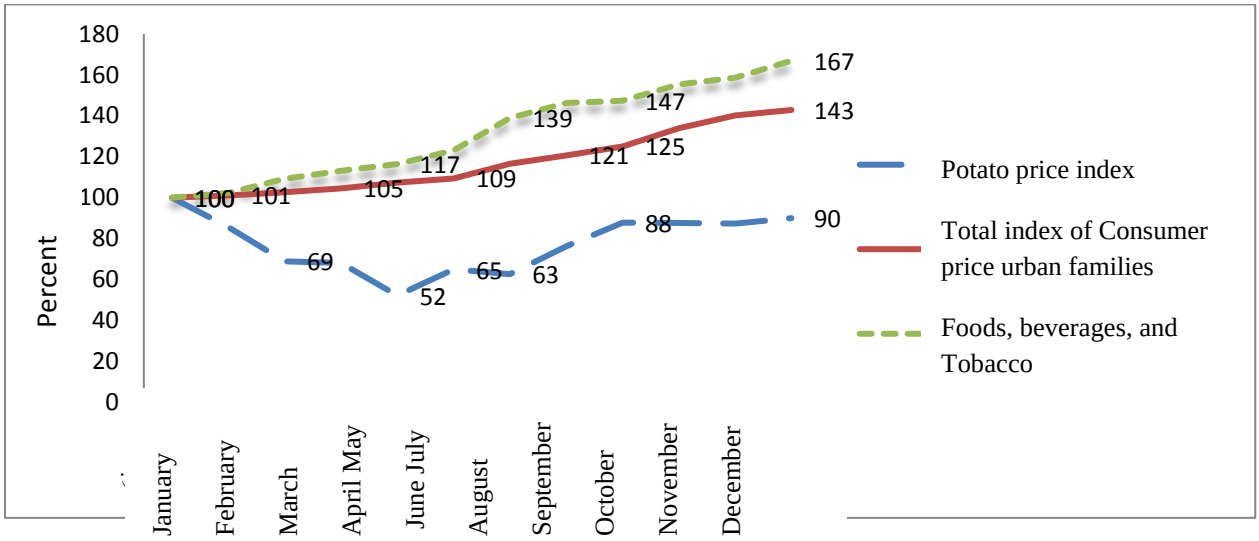

Figure 9. Comparison of potato price with CPI index

Resource: Consumers and Producers Protection Organization and Statistics Center of Iran

Evaluating the A review of retail prices shows that the price increase has been minimal (0.5-0.8%) in the week ending May 15, 2020, and this year.

Export

Annual export trend

Figure 10 and Table 2 show an 83% increase in the export rate in 1999 compared to 1998. The comparison of 2019 with 2018 shows a 12% decrease in exports.

The results show that the export trend is not consistent with the change in production. Despite an 83 percent increase in exports in 2020 compared to the previous year (production grew by about 4 percent during this period), the average consumer price in 2020 decreased by 9% compared to last year. Therefore, organizations active producing, storing, and processing of potatoes in production and export are suggested to prepare and present appropriate planning.

Table 2. Exports in different years

Commodity	2015	2016	2017	2018	2019	2020
Fresh and chilled potatoes	678.8	647.7	530	550.2	518	950
Other	17.2	35.9	20.6	33..8	0.04	000
Total	696	683.6	550.6	584	518	950

Resource: *Unit: one thousand tons*

Agricultural Marketing and Commercialization Journal
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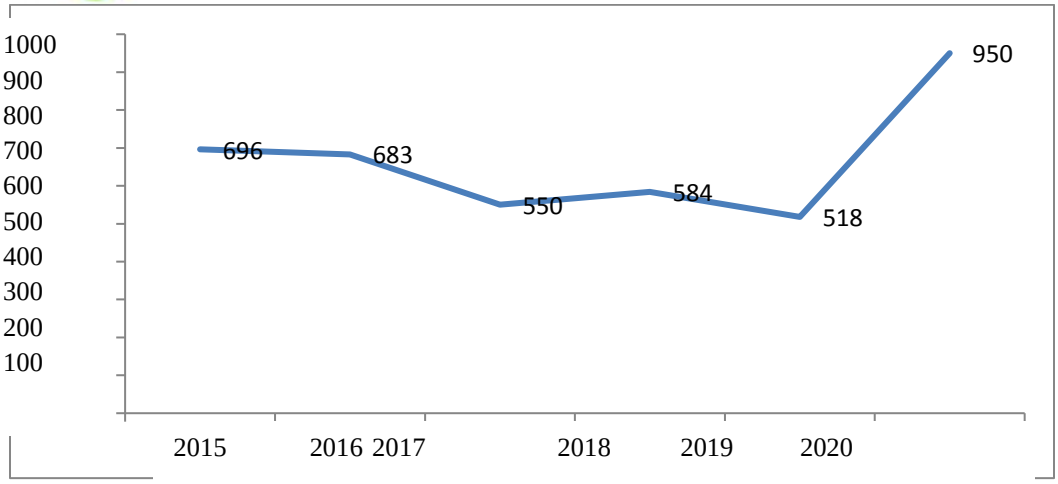

Figure 10. Potato exports during the years 2020-2015
Resource: General Directorate of Customs

Target countries for potato exports

Evaluating the target countries for exports shows that in 2020, potatoes exported to 21 countries. The largest volume of exports (41%) was to Afghanistan, followed by Iraq (24%), the Republic of Azerbaijan (13%), Uzbekistan (8%), and Pakistan (6%).

Examining the mean exports in 2019-2015 shows that the highest value of exports was to Iraq (50%) and Turkmenistan (25%). Therefore, Iraq and Turkmenistan markets are among the target markets for the export of potatoes, which was lost in 2020. On the other hand, countries like Pakistan, Georgia, and Kazakhstan have been targeted.

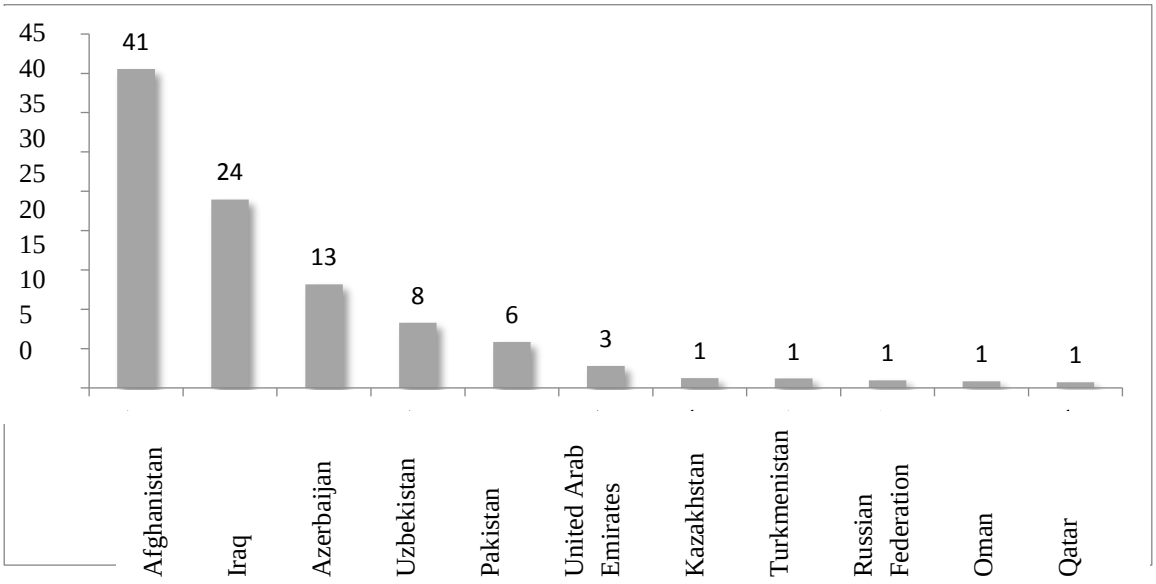

Figure 11. Exports for different countries in 2020

Table 3. Value and percentage of the value of potato exports for different countries in 2020

Country	Export value in 2020 (thousand dollars)	Percentage of exports
Afghanistan	22.4	40.54
Iraq	10484.2	23.95
Azerbaijan	51397.1	13.17
Uzbekistan	3526.3	8.27
Pakistan	58.2	5.85
United Arab Emirates	6.7	2.78
Kazakhstan	4.0	1.24
Turkmenistan	7410.5	1.18
Russian Federation	5.0	0.97
Oman	1499.2	0.83
Diameter	16696.9	0.70
Kuwait	32.8	0.32
Georgia	30358.6	0.07
Ukraine	1049.2	0.05
Sri Lanka	1229.8	0.03
Armenia	4.4	0.02
Malaysia	1578.1	0.01
Bahrain	891.6	0.01
Portugal	403.4	0.00
Kyrgyzstan	94.4	0.00
Belarus	14.4	0.00
Total	126767.1	۱۰۰

Resource: General Directorate of Customs

Agricultural Marketing and Commercialization Journal
6(2), 89-110, 2022, ISSN Print: 2676640X, ISSN online: 2676-7570

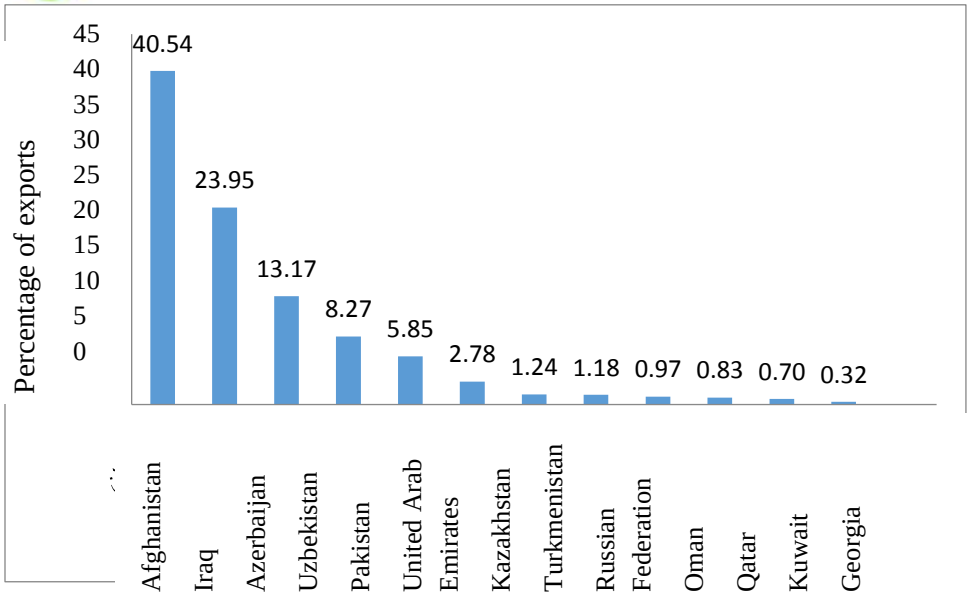

Figure 12. Mean percentage of the value of potato exports for different countries in the years 2015-2019
Resource: trade map

Table 4. Mean value and percentage of the value of potato exports for different countries in 2015-2015

Country	Mean value of exports in 2015-2019 (thousand dollars)	Percentage of exports
Iraq	84292	50.18
Turkmenistan	42264.6	25.16
Azerbaijan	19011	11.32
Afghanistan	13879.8	8.26
United Arab Emirates	2261.8	1.35
Turkey	1489.8	0.89
Kuwait	1056	0.63
Kyrgyzstan	767.2	0.46
Pakistan	736.6	0.44
Russia	718.4	0.43
Syria	489.8	0.29
Georgia	326.8	0.19
Diameter	292	0.17
Oman	193.8	0.12
Uzbekistan	85	0.05
Armenia	43	0.03
Tajikistan	36.8	0.02
Bahrain	11.6	0.01
Somalia	3.6	0.00

Ukraine	3.2	0.00
South Korea	2.2	0.00
Tunisia	1	0.00
Total	167967.2	100

Resource: trade map

Evaluating the percentage of exports in different months shows that the highest amount of exports in 2020 occurred in March, December, January, and February, respectively, and therefore most exports were made in the second six months. Therefore, more exports should be made during the peak harvest months, which occur in September, October, November, and December, to help reduce production surplus in these months.

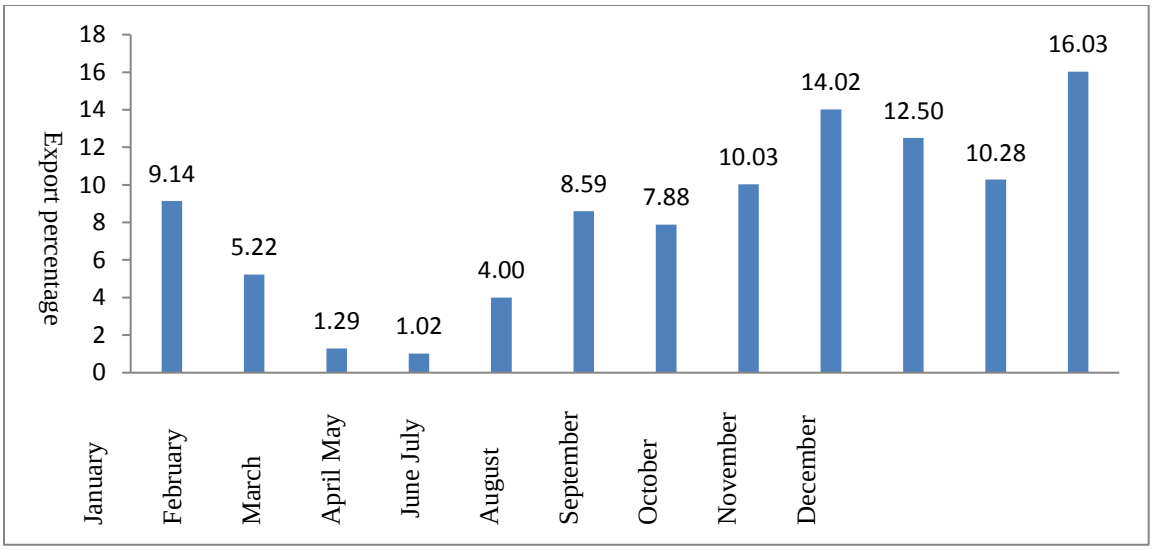

Figure 13. Percentage of exports in different months in 2020
Resource: General Customs Administration (2021)

Production management and the area under cultivation by potato

The amount of notified cultivated area is announced annually by the Ministry of Jihad Agriculture, which differs from the area under executive cultivation. This section examines the extent of this discrepancy.
Given the area under notified cultivation between the two years, the cultivation in 2020 decreased by 89 hectares compared to 2019, increasing about 0.01% cultivation in 2019. Evaluating the level of executive cultivation shows that 7296 hectares had an increase in cultivation, which is about 5% of the area under cultivation in 2019. Although in 2020, the area under notified cultivation has been reduced by 89 hectares compared to 2019, farmers did not react to this notification in

2020 and increased 5,585 hectares under notified cultivation (4%). The study of data shows that in the 2018-2019 crop year, farmers had cultivated less than the notified area of 1800 hectares, which is about 2% of the area under notified cultivation in 2019.

Table 5. Status of notified and executive potato production in 2019 and 2020 - Unit: hectare

Crop year	notified	executive	Executive and notified disputes	Percentage change in execution versus notification
2019-2020	143880	149465	5585	+4
2018-2019	143969	142169	-1800	-2
The difference between 2020 and 2019	-89	+7296		
Percentage changes from 2020 to 2019 (percentage)	-0.01	+5		

Resource: Deputy of Agriculture

Guaranteed purchase amount of potatoes

The information of the purchases in the Rural Cooperative Organization shows that no purchases have been made by the Rural Cooperatives in the last two years.

Table 6. Guaranteed purchase amount (Rials)

Description	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Spring potatoes	18779	.	.	25834	.	.
Fall potatoes	5572	184	.	.	.	.
Total	24351	184	.	25834	.	.

Resource: Rural Cooperative

The review of the guaranteed purchase price trend is completely upward, and the price rate from 2020 to 2019 has increased by 14%.

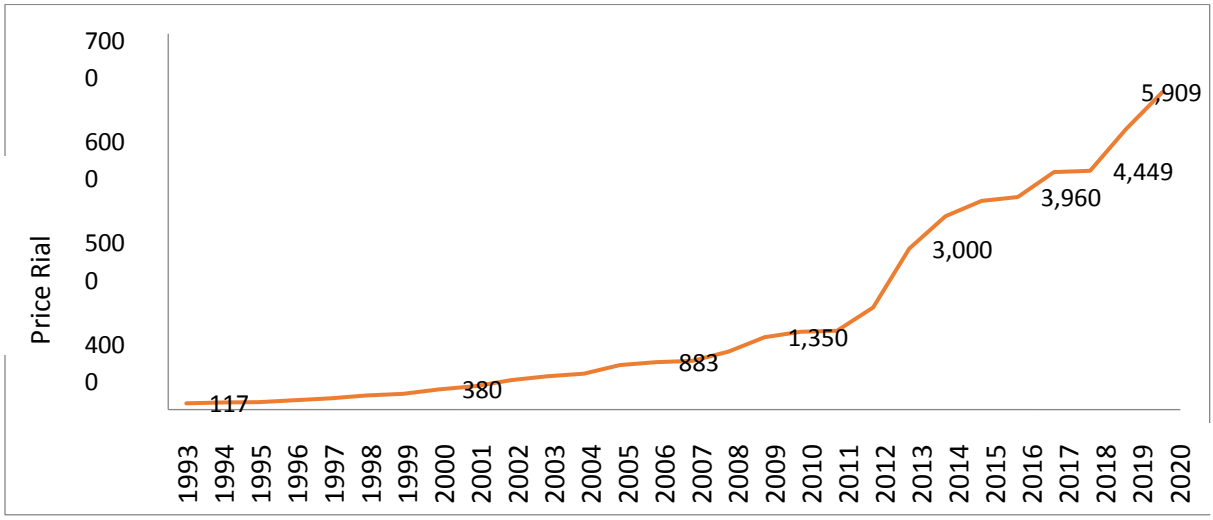

Figure 14. Guaranteed price trend in 2006-2020
Resource: Statistics Center of Iran

Investigation through the inferential statistical methods

Investigating the relationship between price and production

The time-series relationships of potato price with annual production amount show that price has a positive and significant effect on production in estimating the effect of price on price cultivation, which is significant with a coefficient of 0.025 at the level of probability 0.05 and the amount of production will increase with increasing price.

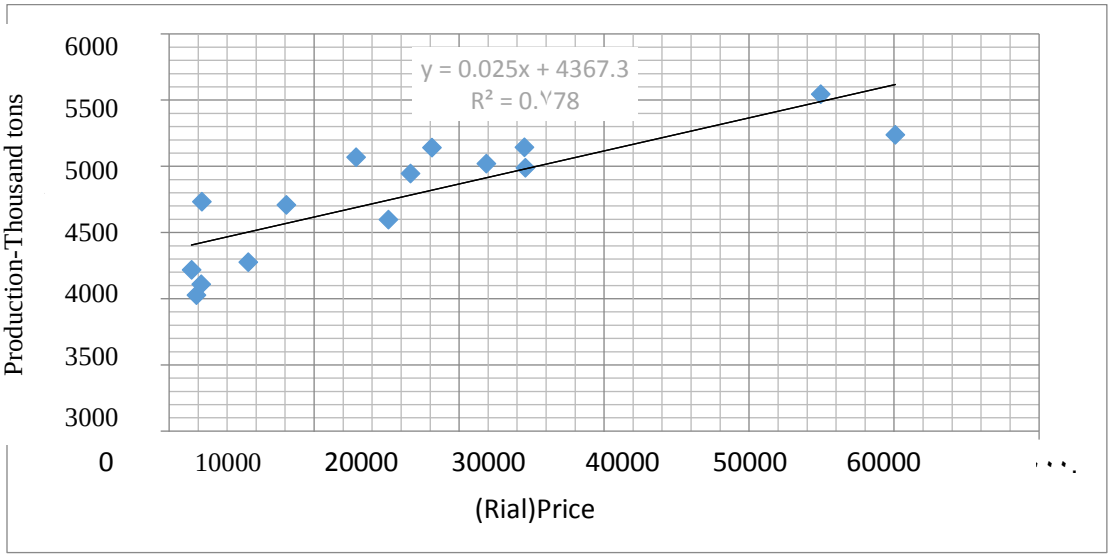

Figure 15. Investigating the relationship between price and production

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6(2), 89-110, 2022, ISSN Print: 2676640X, ISSN online: 2676-7570

Investigating the relationship between price and exports

Time series relationships show no significant relationship between price variable and export volume, and the coefficient of price variable is not significant at the 0.05% probability level. Exports can be increased by reducing the price due to the lack of domestic demand, and factors other than price can affect it.

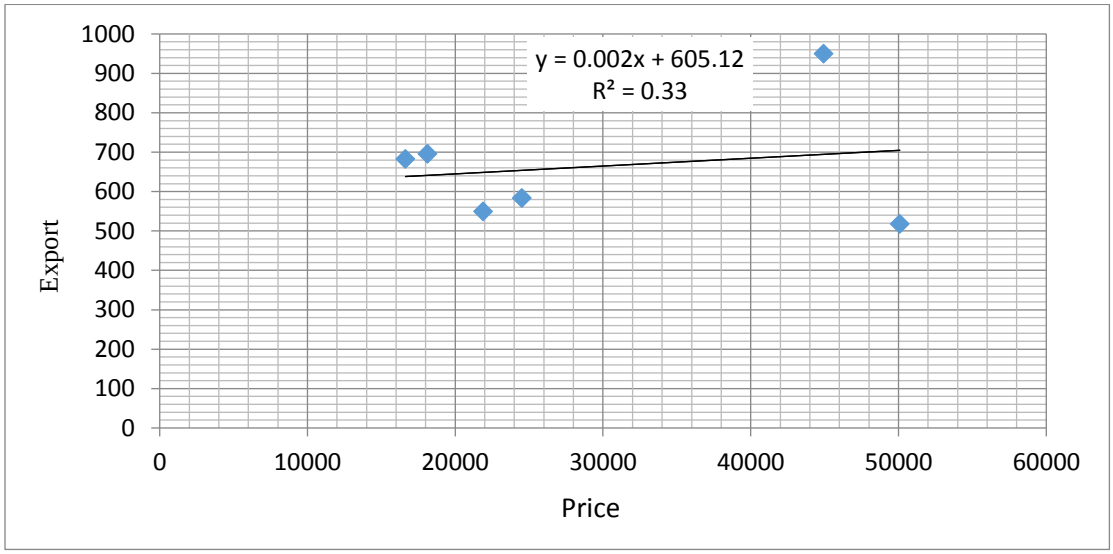

Figure 16. Price-Export Relationship

The relationship between the producer price index and guaranteed price of potatoes

The time-series relationships of the producer price index (PPI) with guaranteed price show that the producer price index has a positive and significant effect on the guaranteed price of potato with an impact factor of 10 at a probability level of 0.05%, and the guaranteed price increases by increasing the price.

The relationship between production and guaranteed price

The time-series relationships of guaranteed price with production volume show that guaranteed price has a positive and significant effect on production with a coefficient of 0.204 at a probability level of 0.05%, and the guaranteed price increases by increasing the price. Therefore, the increase in the guaranteed price is one of the reasons for the rise in production, and farmers can be led to cultivating other essential products of the country by rationalizing the guaranteed price.

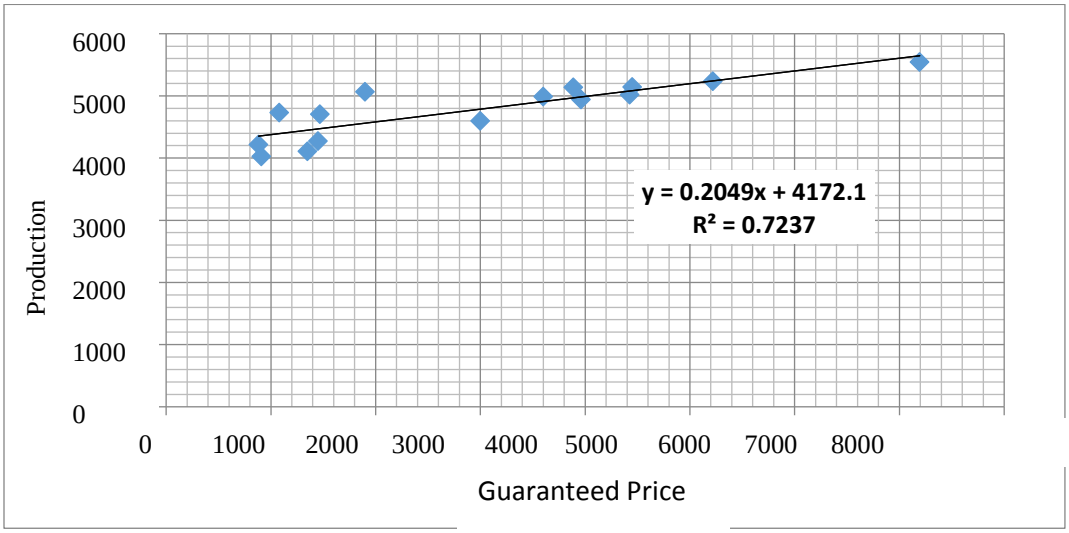

Figure 17. Relationship between production and guaranteed price

Discussion and conclusions

According to data from the Jihad Agricultural Organization, the following can be deduced from the central provinces producing potatoes in the current season and production forecast for the next 10 months:

1. According to the notified plan of the current crop year, it is estimated that the amount of potato production, provided the weather conditions are stable, is about 5337 thousand tons in all seasons. Considering the per capita consumption of 45 kg and the population rate this year, the consumption forecast is estimated at 3782 thousand tons. The net amount of production surplus by eliminating seed consumption will be equal to 1105 thousand tons. If there is no problem in the expected production process, the fall in potato prices will not be unexpected.
2. According to the notified plan of the current crop year, it is estimated that the maximum amount of potato production (provided the weather conditions are stable) is about 3690 thousand tons in the fall. Considering the per capita consumption of 45 kg and the population rate this year, the consumption forecast in the fall quarter of this year is estimated at about 1000 tons. Therefore, about 2690 thousand tons of surplus production is needed in the three months of autumn, and the most significant drop in prices will occur in these three months and months close to this season.
3. A detailed review of data shows that wholesale prices, especially in the field of potatoes stored in 2020, have also dropped in price up to 74%. The primary decrease in the potato price is related to the reserved potatoes,

which are mainly in the field and wholesale. The reduction in the price of these potatoes has also affected the price of fresh potatoes. Therefore, exporting over consumption can prevent further price reductions.

4. The difference in price per farm with retail shows that the price difference between farm and retail is almost 3 times, and the profit margin is 2 to 3 times the price per farm. Therefore, setting up marketing cooperatives that can reach the retailer from the farm at a fair price can reduce this profit margin.
5. Comparing the prices of different months shows that the prices of potatoes in 2019 and 2020 in October, which coincides with the highest harvest, have the lowest amount, and in April and March, which are the lowest harvest, have the highest price. In the second six months, the price fluctuates less than in the first six months. Therefore, it is necessary to implement production protection policies in the second six months and consumer protection policies in the first six months.
6. Exports show that in 2020, the highest exports (38%) were to Afghanistan, followed by Iraq (25%), the Republic of Azerbaijan (14%), followed by Uzbekistan (10%) and Pakistan (9%). Generally, the exports were done to 21 countries, but a survey of average exports in 2015-2015 shows that the largest exports were to Iraq (50%) and Turkmenistan (25%). Percentage of exports in different months shows that the highest amount of exports in 2020 occurred in March, December, January, and February, respectively, and therefore most exports were made in the second six months.
7. The trend of potato price index with the total consumer index as well as the food and beverage index in the months of 2020 shows that the price of potatoes has fluctuated more and decreased in price compared to April.

The following policy tools are recommended to improve the production system and the market:

1. Supply control to support the manufacturer:

1.1. Considering that potatoes can be stored, the Rural Cooperative Union is suggested to proceed with the supportive or agreed purchase to support farmers (by storing the product) and supply it in the coming seasons (winter and spring) when facing reduced production.

1.2. Given the above and to support the producer and there is currently no export ban for potatoes, the export conditions should be facilitated by considering the necessary incentives.

1.3. Every year, the government tries to support the producer in the form of price policies such as guaranteed purchase, guaranteed price, supportive purchase, and non-price policies such as tariff restrictions, providing the required liquidity from the banking network, paying subsidies for inputs, and factors of agricultural production, export subsidies, etc. Most pricing policies

will solve the producer problem on a cross-sectional and seasonal basis. The production of vegetables and summer vegetables in Iran mainly follows the pattern of spider webs. This means that one year they face a shortage of production and a price increase, and the next year they face an increase in production and a price decrease. Accordingly, if support is to be provided by the government, it is better to consider the said policy in a production chain and in non-price.

Implement the Option method

An option contract is a market-based solution that interprets the market price of all actions taken to support the agricultural sector. In this method, the buyer has the right to apply or not to apply the transaction. This model helps the government to save costs and manage the level and amount of production. In option contracts, the contract seller undertakes to trade a certain amount of the product at the transaction price of the buyer's request, and the price of the transaction is the price agreed upon at the time of the contract. If option contracts are used for agricultural products, each farmer can be granted a sales option two or three months before the harvest season; it is possible to estimate the area under cultivation, or the farmer's crop o sell its product to the government or any other institution that commits to these securities. The difference between the set price and the actual selling price can be paid by the government as a subsidy. These options can be traded on the secondary market and commodity exchanges, and the feature of this method is to value the government's support for the agricultural sector so that the price of this support is extracted and a large part of the associated labor costs are reduced. Using this method, the challenge in the current agricultural structure, where the sale of the product at a very low price by traders, futures, etc., is solved.

Increasing processing and complementary factories and industries

The processing and complementary industries increase the economic value of these products by performing various works on agricultural products. Excessive use of produced potatoes will prevent the reduction of prices and waste, which the use of small and medium businesses to produce chips and puree can be effective.

Legal tools for observing the cultivation pattern

One of the challenges of the agricultural sector in the provinces is that the cultivation pattern announced by the specialized deputy does not have an executive guarantee, and solving this problem requires legal tools to implement the cultivation pattern correctly.

Development of contract cultivation

The continuous system of production and market plays an essential role in the planning of production, and one of its important tools is the use of conventional agriculture in the value chains of agricultural products. In other words, financial support of all components of the value chain can play an influential role in

regulating the market through financial institutions such as banks, insurance, mutual funds, etc. The most critical non-price protection policy in this sector is the support policy of agricultural research and promotion in value chain strengthening and contract farming.

Expanding the information and communication infrastructure of the agricultural sector with the target markets

It is necessary to create a complete information system consisting of farmers and the area under cultivation of summer crops, unions, cooperatives, organizations, industries, and processing, market sales of products given the importance of the information system in integrating production and market regulation. In other words, the expansion of information and communication infrastructure of the agricultural sector with domestic and foreign markets can also explain the cultivation pattern.

Strengthening and developing the organizations in the agricultural sector

Strengthening and developing the organizations in the agricultural sector to market them and develop contract farming.

Price stabilization fund

Strengthening and developing support and financial funds play an important role in agricultural development.

Agricultural insurance (risk management insurance)

Support through agricultural insurance (risk management insurance) can compensate the damage to the farmer in the event of falling prices or natural disasters.

Export Development

The time and place of export must be considered in the export process. The markets of Iraq and Turkmenistan were among the target markets for potato exports, lost in 2020. On the other hand, countries such as Pakistan, Georgia, and Kazakhstan are among the target countries. Therefore, more exports should be done in the peak harvest months, mostly in September, October, November, and December, to help reduce the production surplus in these months.

Since potatoes are water-based products and the amount of virtual water is estimated at about 440 cubic meters per ton. The country is in a drought, and planning to export this product is not the right decision, and production should be done as needed. Therefore, exports should be done only to regulate the market and are not cost-effective for currency exchange.

2. Applying time restrictions on exports or receipt of export duties commensurate with the time of production:

One of the available solutions to support producers and consumers is to receive or eliminate export duties commensurate with the harvest time.

3. Strengthening chain organizations and marketing cooperatives that can use different capacities in logistics, transportation, maintenance, processing, and market supply in a

coordinated and related management capacity. One of the causes of price fluctuations is brokers and sales intermediaries. Marketing management and the establishment of formal marketing cooperatives can increase the price between production and consumption.

4. Due to the close relationship between production and market, it is necessary to consider regional and provincial planning to produce, consumption, export, and capacity for each region and province separately.
5. Despite the implementation of the continuity plan, most production in the potato crop is in the fall, the storage and export capacities must be managed and managed according to the production and consumption plan and proper location. Moreover, Warehouses should also be designed in accordance with the production of provinces that have the capacity and advantage of potato production to prevent a decline in product quality.
6. A 30% increase in shipping costs in recent weeks has led to an average price increase of
7. 30% per kilogram of potatoes and a decrease in consumption as consumer prices rise. Therefore, this cost can be reduced by paying transportation subsidies to farmers.

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Reference

- Actions of IRICA in line with The Global Slogan of Customs in 2016 & 2021. https://oec.world/en/profile/country/irn
- Consumer and Producer Protection Organization. 2021. Reports.
- Daneshi, N. 2020. Survey of potato production in Iran, International Conference on New Horizons in Agricultural Sciences and Natural Resources and Environment, Tehran.
- General Directorate of Customs. 2020. https://www.irica.gov.ir/web_directory.
- Mehtari Arani, M, Baghbani Arani, A, Maghsoudi Ganjeh, Y, Abdolmanafi, S. 2018. Study and ranking of effective factors on branding of agricultural products in rural cooperatives of Isfahan province (Case study: potato crop). Rural development strategies. 6 (3), 319-332.
- Ministry of Agriculture. 2020 .Iranian Agricultural Statistics. Third volume. Crops. www.maj.ir
- Rural Development Organization. 2021. Reports.
- Ministry of Agriculture. 2021 .Agricultural Statistics of Iran. The first volume of crops. www.maj.ir
- Statistics Center of Iran, Vice President for Strategic Planning and Supervision of Iran. Retrieved from : www.amar.org.ir
- Trade map. 2020. FAO Statistical of Agricultural production. Food and Agriculture www.trademap.com.
- Khorami, Sh. 2012. Investigation of the optimal pattern of input consumption in Ardabil potato production. Master Thesis. Tabriz University