



THE COMPARATIVE ADVANTAGE, COMPETITIVENESS AND ADDED VALUE OF POTATO CROP OF BAGHDAD PROVINCE FOR YEAR 2018

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Abstract

Potato crop is one of the important vegetable crops, which has an important nutritional role for most people in the world, especially in developing countries. This crop has also entered into commercial transactions and has become a comparative and competitive advantage for many countries that have adopted the methods of production and productivity efficiency to achieve the highest added values and foreign currencies in favor of their economies. For these reasons the research has been carried out based on two methodologies: one of them the methodology of policy analysis matrix (PAM) and value chain analysis (VCA) to study some economic indicators in relation to comparative advantage, competitiveness and added value, and to study some of the value chains of the potato crop and to identify the most important factors and challenges facing the production of this crop. The results of the research show that Iraq does not have a comparative advantage and competitiveness at the regional and external level, based on the result of the cost of domestic resource cost (DRC), which reached greater than one 3.5 per donum and ton. While this sector characterized by competitiveness locally, achieving modest private profits for each of the donums and tons amounted to 1063732, 193405.8 IQD each, respectively, supported by the Private Cost Ratio (PCR) cost factor, which was less than one value reached 0.41, While the result of social profits were negative values (-5,91277, -107504.9) IQD for each of the matrix of donums and tons, respectively. The added value achieved for each donum and ton amounted to 1293050, 234009 IQD each, respectively. Through monitoring the value chain for this crop has become apparent many problems and constraints, including the high prices of inputs, and the problems related to the marketing of this crop and the multiplicity of channels marketing, The results of the study showed that 43.75% of spent dinar on purchasing 1 kg of potato goes to the marketing intermediaries of the crop, by 33.3% and 10.5% for both retailers and wholesale respectively. Thus, their marketing margins, including profits, amounted to 69 IQD.kg⁻¹, 266 IQD.kg⁻¹ for both wholesale and retail traders respectively, as well as problems related to non-protection of the crop, dumping of imported crops and problems related to the non-optimal use of resources and modern methods in production. The research included a number of recommendations, among which are the most important: the need to expand the cultivation of this crop and not rely on imports, and the need to follow agricultural scientific policies that follow the balanced policy of support and protection, as well as planning and proper organization to increase the productivity of available resources and activate scientific research and development and transfer of modern technologies and activate the role of extension and agricultural training in potato production sector.

Keywords : Matrix, Added Value, Value Chain, Marketing cycle, wholesaler.

Introduction

Potato crop is one of the important vegetable crops grown in more than 100 countries in temperate, subtropical and tropical climates. The developing countries are the largest producer of potatoes and the largest importer. The cultivation of this crop is successful in different soils except for saline and alkaline soils. The best soil to grow is the loamy and sandy soil containing organic materials, good drainage and ventilation, pH 6.4 - 5.2, is the ideal soil for potato cultivation, and get the best tubers at 18 - 20 °C and maturity period ranging from 90 - 120 days, and grown in fall and spring seasons. The potato crop is the fourth largest food crop in terms of nutritional importance in the world after wheat, maize and rice. It is one of the main ingredients in many meals, different food industries, a good source of energy, food carbohydrates and some vitamins (C, B1, B3 and B6) and minerals such as calcium, phosphorus and magnesium, as well as contain some of the antioxidants that help in the prevention of diseases related to aging and contains fibers which beneficial to health (Ali Haj Hamoda, 2010).

The potato crop has also entered into many trade exchanges between countries. Many of these countries have a comparative advantage and competitiveness in their production efficiency, achieving the highest added values and providing foreign currencies for their national economies, as well as self-sufficiency of this crop. Because of the privileges in Iraq of human and financial potential, water resources and favorable weather conditions for the growth of this crop in

both spring and autumn, and increase its productivity at the domestic level and achieve self-sufficiency. However, the lack of exploitation of these possibilities available efficiently with their interference with some of the troubled agricultural policies, led to a decline in the cultivation of this crop in Iraq, and became Iraqi domestic markets easy market for various agricultural products imported from foreign countries and some neighboring countries and in large quantities, This is causing imbalance in the structure of economic policy in general and agricultural policy in particular. The aim of the study is to study some indicators to measure the comparative advantage, competitiveness and added value of potato crop through the interplay between two methods of quantitative and descriptive analysis within the two analysis methods: analysis of the policy analysis matrix and analysis of the value chain of the potato crop to determine the efficiency of domestic production, In addition to diagnosing some of the problems encountered in the potato value chain workshops. Especially the trends of the advanced countries exert pressure on developing countries to prevent the import quotas and raise support in all forms of agricultural commodities and work decisions of (free) global trade and the privatization of the agricultural sector and the market of free competition, which has significant impacts on the agricultural sector. The cultivation of the potato crop is facing many problems and constraints, which have led to a decline in the level of production and productivity, so many farmers have left this crop. as domestic production has not been able to meet the growing demand despite the available resources and natural

resources suitable for the growth of the crop, Iraqi markets have become an easy market for various agricultural commodities, including the potato crop, which the state imports large quantities of it, which leads to the exit of foreign currency outside the state markets, Compete and compete with domestic production at peak production. While the importance of research is linked with the food and economic crops importance in trade transactions between countries, as Iraq imports the potato seeds about 75 thousand tons per year (Ali and Farhan, 2015), the study of (Al-Bahadli, 2017) showed that Iraq's imports the all kinds of potatoes including the planting tubers amounted to 128.8 thousand tons in 2014 the amount of estimated import value 23,223.3 thousand dollars, which has a negative impact on the balance of payments from foreign currencies, as well as the importance of two methods of analysis to identify some important indicators on the feasibility of profitability of the crop and the efficiency of using available resources to achieve added value and knowledge of some agricultural followed policies. The research assumed as under the influence of the opening up of world trade and the free movement of goods between countries, the lack of protection of agricultural production in Iraq and the fierce competition for production and the reduction of its costs as one of the terms and conditions of global competition as well as the use of traditional potato cultivation techniques in Iraq, the research assumes that domestic production cannot compete with production At the very least, that under these circumstances, Iraq does not have a comparative advantage in producing the potato crop, as well as achieving a low added value per ton of potato crop as a result of higher production costs. The aim of the research is to achieving some of aims its there's: estimating comparative and competitive advantage coefficients using the policy analysis matrix. Study the efficiency of domestic production compared to Arab and global production based on the values of coefficients of comparative advantage. Also Identify some episodes of the potato crop chain and the most important problems and obstacles that face them. In addition to calculating value added and profits realized for some value chain workshops. As well as studying some indicators of the intervention of the government agricultural policy and the impact on the food sector, especially the potato crop. Finally obtain some recommendations and proposals to solve some of the problems facing the potato crop for the purpose of benefiting from it by some farmers and decision makers.

Materials and Methods

In order to meet the requirements of scientific research a field questionnaire was designed for the potato crop farmers. The required data for a representative sample of the potato crop for Baghdad governorate was obtained through a personal interview in the crop-intensive areas and provinces. Which is an important and fundamental requirement of the two methods of Policy Analysis Matrix (PAM) and Value Chain Analysis (VCA). Which have been adopted by a number of researchers at the local and global level. These methodologies help governments and entrepreneurs to identify productivity and to measure the extent of inconsistency between policy intervention objectives and the means of implementing that policy.

(Monk and Pearson 1989) published their first research using the Policy Analysis Matrix (PAM) in 1989, while (Picazo and Estuch, 2008) used the policy Analysis Matrix to

study the profitability of the rice crop in Spain. (Bojnec, 2003) examined the comparative advantage of beef production using the domestic resource cost factor (DRC), that one of the indicators of the policy analysis matrix. While (Mohanty, 2003) used a policy analysis matrix to determine the state policy intervention in the cotton crop. Also (Al-Falluji 2012) used the Policy Analysis Matrix to investigate the impact of state intervention on the fisheries sector in Iraq.

The concept of comparative advantage means the analysis and calculation of the real (economic) costs of any production with the reference of international prices. If the system achieves a positive profit at market prices (domestic prices). If a positive profit is achieved by social prices, it means that this system has a comparative advantage and is economically efficient and has a capacity for global competitiveness (Atea, 2006). The methodology of the policy analysis matrix is based on two types of accounts for the commodity system. The first defines the profitability account and represents the difference between revenue and costs. The second is the measurement of divergences. It gives indicators of government policy intervention and market failure and the impact on the commodity system. The policy analysis matrix is designed based on the profit equation (Profit = Revenue - cost) (Monke and Pearson, 1989). The policy analysis matrix is based on the Technical Coefficient table, which includes both (tradable input) and (non tradable input) because it is difficult to transfer from one country to another. Thus, a matrix structure Policy analysis of three rows and four columns as shown in Table (1).

Table 1 : Structure of policy analysis matrix

Profits	Costs		Revenue	
	Domestic Resources	Tradable Input		
D	C	B	A	Private Price
H	G	F	E	Social Price
L	K	J	I	Divergences

Reference: Monke and Pearson, 1989

The first row represents the return and the cost of tradable inputs, domestic resources and profits (A, B, C and D) respectively, calculated at local market prices, while the second row represents the return and the cost of tradable inputs, domestic resources and social profits (E, F, G, H) Respectively calculated by social prices (shadow prices). The third row represents the differences between the first and second rows and represents the impact of government intervention policy and market failure on the commodity system. From this table, some comparative advantage indicators are calculated based on some criteria, including the domestic resource cost (DRC). Which is calculated according to the following formula $DRC = G / E - F$: (Mohanty and other, 2003). The policy analysis matrix also includes another indicator that measures competitiveness, it is private cost ratio indicator. If this ratio is less than the one, this means that the commodity system has the ability to compete. If it is greater than the one, the commodity system is not competitive and achieves Loss is calculated according to the following formula $PCR = C / AB$ (Picazo, 2008). The Policy Analysis Matrix methodology also includes several other relevant indicators and will be listed as per the research requirements. While the methodology of value chain analysis is based on some basic concepts and the mathematical framework used for this methodology is based on the

following mathematical formula: Value added = Revenue - Variable cost. Value chain analysis is one of the systems through which production inputs are converted into outputs that pass through several stages of transformation prior to their arrival to the end consumer. These are the stages of initial processing of the production inputs, the stage of production and marketing, and at each stage or activity of these activities a value is added to the product. (Porter, 1985; Hempel, 2010) gave a concept of the value chain as linking all series of circles of the production circle, the manufacturing circle and the marketing circle together, and analyzing and studying each episode individually and its relationship to the previous and subsequent circles before reaching the final consumer. (Emana, 2011) explain in its study of the value chain of the potato crop, it consists of basic circles, which include the supply chain of Wholesalers, Brokers, Retailers, and finally consumers. While (Trienekens, 2011) was found in its study of the concept of the value chain and it consists of two dimensions: the first is the vertical representing the flow of agricultural products from the product circle to the end consumer circle, and the second represents the horizontal dimension includes the relationships between the active factors in the same link circle of the value chain. He also pointed out that there are factors and variables that lead to the success of the value chain in case of availability and vice versa, such as: availability of efficient human resources, good infrastructure, finance, knowledge and technology, proximity and distance from markets, laws and systems of institutions and legislations and efficiency etc. There is also another term and concept related to the methodology of the value chain, which is competitiveness. (Al-Khudaeri, 2004) defines it as the capacity of an activity or a productive sector to find different situations through which it can excel in the fields of (Production, processing, manufacturing, marketing, etc) from other activities or sectors operating in the same field and through the achievement of high value added and achieve continuous success in the markets. (Zayed, 2006) explained that the most important factors leading to the success of the competition are: the advantage of obtaining the lowest cost of any reduction of production costs without affecting the quality of the product and desirable qualities of the consumer, as well as the advantage of obtaining the competitiveness of discrimination, the ability of the productive sector or enterprise to provide a product of good quality and different recipes for products or goods produced or produced by other competitors located in the same markets from the point of view of the consumer. Finally, the concept of value added is the returns generated by the productive entity within a certain period of time. It is one of the criteria and indicators that measure the contribution of the project in addition to the agricultural income. The net and total value added generated by the agricultural project can be calculated (Al- Isawy, 2005). Value added can also be defined as the difference between total (overall) revenues and the costs of production inputs involved in the production process, calculated at the macroeconomic level based on what the economic sector adds to national income (Karipk, 1990). also defined by (Al-IZZY, 1989) as the added value contributed by the productive project to enhance the national product. It is one of the indicators and criteria used in the planning programs in the distribution of resources on various projects to achieve social benefits. While (Al-dhahiri, 1991) defined the total added value as the value generated by the use of

production inputs (variable costs) in the production process to their original value. The methodology of value chain analysis is one of the very few studies at the level of applied economic studies in Iraq, which used by (Alfalluji) in his study of the sector of fish and grain sector (wheat) and published a number of researches, including: (Al-falluji, 2016), (Al-falluji, 2016) and (Al-falluji, 2018). He studied the various production workshops starting from the production circle and then the marketing circle to the final consumer circle. The value added of the circles was found, and then the diagnosis of some problems and obstacles in the different circles and finding suitable solutions and recommendations.

Results and Discussion

Based on my two methods of analysis are aimed at diagnosing some important indicators for the production and marketing cycles of potato crop through the diagnosis of quantitative obstacles, problems and indicators from studying each of the following:

Production cycle

Potato crop like other agricultural crops in Iraq, there are many problems facing its production, Many studies have shown that the productivity of this crop is low as the average productivity of the donum for the period 2000-2013 has reached 3799.5 kg.donum⁻¹ (Al-farraji, Ahmad, 2015). The average of the period 2007-2014 was 3821 kg.donum. Iraq ranked 14th in the Arab world (Agricultural Statistics Yearbook, 2013). This decline in productivity is due to the interaction of many factors and problems facing the production of this crop, from the initial processing of production inputs to the production process and the final marketing process. The cultivation of the potato crop depends on the seeds (tubers) that are imported from abroad at very high prices. The price of one ton may reach 1750 thousand IQD from the different resources and from different sources, some of which may be of poor quality varieties and low productivity to be cultivated in the spring season. Thus, part of the production of this season is stored to be cultivated in the fall season, which does not produce high production levels due to recycling, poor storage and stimulation of production of the stored spring season. Which is sold all its production in the markets on the one hand and on the other side there is weakness and shortness in the aspects of fertilizers and control materials processing by the state and the high prices in the black markets, which ranged between 750 thousand IQD.ton⁻¹ for (DAP) fertilizers and 500-700 thousand IQD.ton⁻¹ for Urea fertilizer, While prices of pesticides ranged between 20-50 thousand IQD.L⁻¹. In addition to the presence of factors leading to the decline in production and productivity, such as high salinity and non-follow the scientific methods in irrigation. and the absence of drainage systems as well as the disappearance and non-maintenance of drainage systems, and the weakness of modern technology use, whether in irrigation or crop cultivation and harvest and limited the cultivation of the crop on the old traditional means, as well as the lack of skill component of many farmers not to keep pace with rapid developments in production processes. Also most of crop cultivation was limited to the old traditional means, as well as the lack of skill in many farmers because they did not keep up with the rapid developments in production processes. other factors that led to the decrease in production and the

low competitiveness of the potato crop and the decrease in the added value achieved by it is the high cost of mechanical work for the preparation of the soil for agriculture, which is the process of tillage and softening and furrows making which amounted to 20 thousand IQD.hour⁻¹. In addition, most farmers use irrigation by machines, which leads to additional costs of electricity, fuel and oil costs for diesel pumps as well as repair and maintenance fees for these pumps. Other factors influencing production, productivity and added value are the lack of agriculture on the dates specified for the potato crop. Many farmers delay or provide the date of agriculture and this has an impact on the production and productivity of the crop and many farmers exceed the recommended quantities for the plant density per donums, as the cultivation of quantities exceeding 750 kg.donum⁻¹, while the quantities recommended by the competent authorities range from 450 to 600 kg.donum⁻¹ of potato tubers of the appropriate size 50-55 gm.tuber⁻¹. as well as the addition of fertilizer and the dates of addition and quantity of its impact on production and productivity, as many farmers use amounts of fertilizer more than the recommended quantities technically exceeds the fertilizer (DAP) 200 kg.donum⁻¹ and 150 kg.donum⁻¹ of urea fertilizers. While the recommended technical quantities of (DAP) fertilizers ranged between 60-65 kg.donum⁻¹ and urea fertilizer 80-85 kg.donum⁻¹** (Saleh and Salman, 2013). Also from the main problems facing the agricultural sector in general and the potato production sector in particular are the competition of agricultural commodities imported from vegetables and fruits in general and the potato crop in particular from neighboring countries at low prices equal to or less than the prices of the local product so Iraq has become an easy market for most imported agricultural commodities and is part of the dumping policies of the neighboring countries against Iraq, which led to the reluctance of domestic farmers to grow most of the agricultural crops, including the potato crop. Moreover, the institutional, administrative, legislative and agricultural policies that govern the agricultural sector are not clear in their management of this important economic sector and have not been effective in their performance and effectiveness in the development of this sector, which has negatively affected most of the agricultural sectors including the potato crop production sector.

Marketing cycle

The market can be defined as the location where supply forces interact with demand forces. As a result of this interaction, the price of the commodity, which is defined as the exchange value or what the buyer pays to the seller for the commodity, service or benefit that obtains, The buyer may be the final consumer or be one of the intermediaries who deal with the product or with each other (Al-khateeb, 2000). Thus, it can be said that competitive prices lead to several functions, including: directing and organizing productive decisions, consumption decisions and marketing decisions (Al-Kenebit, 1995). Most of the markets consist of marketing channels. (Alkhateeb, 2000) defines it as the number of organizations or persons cooperating with each other, which have the responsibility to make available the product or service to the final consumer. The channel of marketing or distribution consists of several levels, and each member within the distribution channel performs some functions associated with the transfer of the product from the

producer to the consumer which represent level in the distribution channel of the commodity, based on there are several levels representing intermediaries, each of which performs a function on the commodity as follows :

- 1- Producer to the consumer directly.
2. The producer then to the retailer and finally to the consumer.
- 3- The producer then to the wholesaler and then to the retailer and finally reaches the consumer.
- 4 - The producer and then to the wholesaler and then another agent and then retailer and then to the consumer.

Through the above mentioned the channels (1 and 2) are the shortest distribution channels with the lowest marketing margin, while the channels (3 and 4) have multiple levels, thus increasing the excess marketing margins which do not add benefit to the consumer, which is detrimental to both producers and consumers. Marketing costs can be defined as all expenses covering marketing jobs and services. The marketing margin is defined as the difference between the price of the commodity at each stage of the marketing process and its new price at an additional marketing stage (Al-dabbagh, 2014). The marketing operations of the potato crop begin after the maturity of the crop which ranging 90-120 days.

Many farmers harvest the crop by traditional methods (manual) by rental of workers or through the family work and the wages of their work from 15 to 20 thousand dinars.worker⁻¹ then sorting the appropriate sizes of tubers and cleaning and then packaged. after the exclusion of tubers or unwanted or cut as a result of harvesting operations and then packaged in nylon bags, ranging in weights from 25-30 kg.bag⁻¹ thus the cost of purchasing these empty bags, which are enough to fill one ton ranging from 7-10 thousand dinars.ton⁻¹. Then the farmer transfers the potato crop from the farms to the wholesale markets by pickup trucks (1-2 tons) and a fee ranging from 20-30 thousand IQD.ton⁻¹ according to the distance between the farm and the marketing center as well as the transport process is subject to many difficulties, including bad roads which are not good and not paved and security points, etc. Then the yield is marketed to the wholesale market, which is specialized offices for the sale of agricultural crops, including the potato crop, and the sale is the method of direct selling through the interaction of the forces of supply and demand, although these markets are not governed by the protection of the local product from the entry of most agricultural crops of vegetables and fruits Imported from neighboring countries at low prices lower than the prices of the domestic product, Then the market is marketed to wholesale markets, which are specialized offices for the sale of agricultural crops, including potato crop. In these markets, the sales are directly through the interaction of supply and demand forces. It is worth mentioning that these markets are not governed by the protection of the local product from the entry of agricultural crops of vegetables and fruits imported from neighboring countries at prices lower than the prices of the local product, The dumping of domestic wholesale markets with imported agricultural products and crops has led to the inability of domestic farmers to compete these imported crops, with the cessation of government subsidies and the high costs of producing potato crop locally, which was reflected in decrease of yield quantities, in

addition, the rise in local production prices is due to the insufficient and high costs of production inputs. as well as the lack of interest in agricultural marketing or the existence of effective control, which regulates the flow of agricultural products from the producer to the consumer through the marketing routes known from wholesalers and then retailers to the end consumer but what is happening as mentioned above is dumping the Iraqi markets with various agricultural products imported, leading to lower prices of domestic agricultural commodities in the peak of season of local production compared to the cost of production.

Moreover, most farmers do not have experience in the process of packing the crop well in terms of packing, sorting and grading of the crop, so there is always a lack of confidence between the agricultural producers on the one hand and the wholesaler and retailer on the other. The sale is from the wholesaler to the retailer or the consumer according to the agreement on the price of the crop in kilograms and through the auction and when selling in the wholesale offices are deducted commission from 10-12% of the value of the sale. In addition, 500-750 IQD are deducted for each piece sold by the buyer (the retailer) according to the type of crop paid by the retailer. In other offices, a commission of 10% and 1000 dinars is deducted for each sold item.

Field (Farm) Wholesale and Retail Price

The price of the farm is the price of the crop, including the marketing margins borne by the farmer (the cost of transferring the packaging and bags) between the farm and the wholesale market. The net price received by the farmer is the selling price after subtracting the marketing margins borne by the farmer.

The average price of the field for the study year was 450 thousand IQD. ton⁻¹, while the commission of the wholesalers' office was 12% of the value of the sale, plus the

loading fees for each sold piece (potato bag weighing 25-30 kg) 750 IQD. The desired weight is 25 kg. The retailer pays the buyer (buyer) and can be noted here that the desired weight in the purchase is 25 kg per bag. The average sold quantities to the wholesaler's office per month were estimated at 360000 kg and the average selling price is 450 IQD.kg⁻¹. Thus, the value of the sales per month is 162000000 IQD, with a commission of 12% and loading for each piece sold to the retailer, the number of each ton 40 pieces or a bag sold and thus the number of pieces to the amount of 360 tons ranging to 14400 bag weight of 25 kg and the load of the bag 750 IQD. bag⁻¹. The total value of the sales commission and the loading fee of the piece or bag obtained by the wholesale office shall be equal to (1944000000 + 108000000 IQD = 302400000). The average value of sales of one kilogram of potatoes obtained by the wholesaler from the retailer is equal to (302400000 IQD.360000 kg⁻¹ = 84 IQD.kg⁻¹), while the average price of selling potatoes to the retailer for the study year ranged from 750-850 IQD.kg⁻¹ and an average of 800 IQD.kg⁻¹ and may sometimes reach 1000 IQD.kg⁻¹ in some areas and cities where the supply of potatoes is low at the end of the season of local production, the average amount of sales to the retailer during day is estimated 450 kg of potatoes. Thus, the average monthly sales are equal to (13500 kg.month⁻¹). The following table shows the cost items of both the wholesaler cycle and the retailer cycle and the cost of one kilogram of these costs. The results of table (3) show that the share of one kilogram of these costs is 12 IQD, and 67.6 IQD.kg⁻¹ of both wholesale and retail respectively. Thus, the marketing margins, including the profits of the wholesaler and the retailer, amounted to 96 IQD.kg⁻¹ and 266 IQD.kg⁻¹ respectively. the profits of the wholesale and retail merchants amounted to 84 IQD.kg⁻¹, 189.4 IQD.kg⁻¹ respectively. To find out the average prices of the farm, the wholesaler and the retailer it is possible to observe the data in Table (4).

Table 3 : The marketing cost items of the wholesale and retail traders of the potato crop at 1000 IQD per month.

Items Marketing cycle	Temporary labor fees	Electricity and fuel costs	Transfer costs and other expenses	Office rent	Permanent labor fees	Maintenance Fees and Extinction	Total	Coast of one kg of potato per IQD
Wholesale trader	1800	150	200	750	1500	16	4416	12
Retail trader	-	75	337.5	100	400	-	912.5	67.6

Reference: According to the results of the field questionnaire.

Table 4 : Average prices of potato crop from farm to final consumer per IQD.

Items Crop	product Price after deducting the cost of marketing	Producer price	Wholesale price	Retail price
Potato	420	450	534	800

Reference: According to the results of the field questionnaire.

Through these prices can be extracted absolute margins and the share of each of the workers from the final spent consumer IQD to purchase 1 kg of potatoes as shown in the following table:-

Table 5 : Free margin and the share of both employees of the spent consumer dinar to buy a kg of potato.

Items Crop	Free margin			Employees share			
	The difference between producer and wholesale price	The difference between retail and wholesale price	The difference between producer and retail price	Share of farmer	Share of wholesaler	Share of retail trader	share of intermediaries
Potato	84	266	350	56.25	10.5	33.25	43.75

Reference: According to the prices average of the table (4)

The share of each worker was derived from the following mathematical formulas:

1. Farmer share = Producer price / retail price*100.
2. Wholesale share = wholesale price - farmer price / retail price*100.
3. Retail share = retail price - wholesale price / retail price*100.

from the above table, it is clear that what constitutes the share of intermediaries is 43.75% of the consumer dinar which was spent to buy 1 kg of potato crop, which is a large proportion have an impact on what the product achieves as well as its impact on the end consumer. The percentages in Table (5) show that 33.25% of the consumer dinar goes to the retailers, and 10.5% goes to the wholesalers. This has an effect on both the profits and the added value achieved by the producers of the potato crop. As well as its impact on the final consumer and then the final consumer demand, which is the main engine of the supply process of the potato crop and then the competitiveness of the crop locally because it is linked to the process of increasing demand associated with decrease of production and marketing costs.

Estimating the results of the Policy analysis Matrix

Table (6) shows the technical treatments for the production of the potato crop, which included all the tradable inputs (B), which included both of seeds (tubers), DAP and Urea fertilizer, weeds pesticides, growth stimulants, disease control and insect control pesticides as shown in the average quantities per donum in Table (6). The domestic resources also included land, permanent work, temporary work as well as mechanical work, and transport, loading and unloading fees, Packing bags coats and capital interest. These data were obtained through samples representing the research area of Baghdad governorate by designing a questionnaire prepared for this purpose which is an important priority in this type of study for the methodology of the policy analysis matrix. The cost of the human resource (Family work and wage workers) was calculated and mechanic work (tillage, softening of soil, furrows making, pesticides and stimulants spraying) based on the number of working hours per donum from the start of preparation of the soil until the crop harvest. While the cost of the remaining inputs from the tradable resources and the domestic resources and quantities were calculated according to the results of the field questionnaire which prepared for the study area of Baghdad governorate as shown in Table (6).

Table 6 : Technical treatments of potato crop production in Iraq - Baghdad governorate for 2017.

Inputs	Production factors	Mean of quantity per donum
Traded inputs (B)	First : seeds (tubers). Second: chemical fertilizers which include 1- DAP fertilizer 2- Urea fertilizer 3- Gramoxone (paraquat) pesticide. 4- Agricultural tonic (high potassium and phosphorus). 5- Control of diseases, insects, fungal and insecticide (Dithane). 6- Fuel	750 kg.donum ⁻¹ 150 kg.donum ⁻¹ 80 kg.donum ⁻¹ 1 L. donum ⁻¹ 600 ml. donum ⁻¹ 600 ml. donum ⁻¹ 30 L.donum ⁻¹
Domestic resources (C)	First : land Second: labour that include 1- permanent labour 2- wage work Third: mechanical work. Fourth: loading and unloading fees, Packing bags coats..etc Fifth: capital interest Sixth: Exhaustion and maintenance	1 donum 60 hour.donum ⁻¹ Per season 177 hour.donum.season ⁻¹ 4 hour.donum ⁻¹ 165000 IQD.donum ⁻¹ 6000 IQD.donum ⁻¹
Donum productivity mean		5500 kg.donum ⁻¹

Reference: Calculated by the researcher according to the results of the field questionnaire.

First row calculation of the Policy analysis Matrix

The first row of the policy analysis matrix was calculated for each of the tradable inputs and domestic resources and product depending on prices of these resources in the domestic market (private prices). The prices of the rest of the resources of fertilizers, pesticides, seeds, control materials, rent of land and fuel were calculated based on their prices in domestic markets and as produced by the questionnaire and as shown in Table (7) as the wages were calculated based on of one-hour wages for human labor as well as mechanical work prevailing in the domestic markets.

Second row calculation of the Policy analysis Matrix

To calculate the variables of the second row, the world prices of the tradable production inputs (tubers, fertilizers

(DAP, Urea), pesticides, control materials, plant growth stimulants, fuel) must be adjusted from the foreign currency to the domestic currency to know the social prices using the standard conversion factor, and the official exchange rates for the study period 2017-2018, which the exchange rate was approximately 1124. IQD/\$. The border prices have also been used, which give approximate values of social prices. and after making detailed calculations in order to obtain social prices of the tradable inputs and the return, as shown in table (8), while the social prices of domestic resources were calculated based on private prices due to the difficulty of trading domestic resources (land, labor, capital, water, etc.) as shown in table (8).

Table 7 : First row calculation the policy analysis matrix using domestic prices (IQD) of donum and ton.

Inputs	Production factors	Unit price of Production factors	Production factor coast IQD.donum ⁻¹	Production factor coast IQD.ton ⁻¹
(B) Tradable inputs	First : seeds (tubers).	550 IQD.kg ⁻¹	420750	76500
	Second: chemical fertilizers which include:	765 IQD.kg ⁻¹	79500	14454.5
	1-DAP fertilizer	650 IQD.kg ⁻¹	40000	7272.7
	2-Urea fertilizer	500 IQD.kg ⁻¹ *80kg.donum	12000	2181.8
	3- Gramoxone (paraquat) pesticide.	12000 IQD.kg ⁻¹ 1L.donum ⁻¹	7200	1309.1
	4-Agricultural tonic (high potassium and phosphorus).	12000 IQD.L ⁻¹ 600ml.donum ⁻¹	9000	1636.4
	5-Control of diseases, insects, fungal and insecticide (Dithane).	15000 IQD.L ⁻¹ 600ml.donum ⁻¹		4090.9
	6-Fuel	750 IQD.L ⁻¹ 30L.donum ⁻¹	22500	
Total cost of traded inputs at private prices			590950	107445.5
(C) Domestic resources	First : land	12000 IQD.donum ⁻¹ *0.5 year		
	Second: labour that include:	2000 IQD.hour ⁻¹ *		
	1- permanent labour	60hour.donum ⁻¹	60000	10909.1
	2- wage work			
	Third:mechanical work.	2000 IQD.hour ⁻¹ *		
	Fourth: loading and unloading fees, Packing bags coats. etc	177hour.donum ⁻¹	120000	21818.2
	Fifth: capital interest	18000 IQD.hour ⁻¹ * 4 hour.donum ⁻¹	354000	64363.6
Sixth: Exhaustion and maintenance		72000	13090.9	
		165000	30000	
		165000 IQD.donum ⁻¹	43318	7876
		1082950 IQD/capital dinar*0.008*0.5 year	6000	1090.9
		6000 IQD.donum ⁻¹ *1		
C= Total cost of domestic inputs at private prices			820318	149148.7
C+B = total of private coasts			1411268	256594.2
Returns A= 5500 kg average of donum productivity*450 IQD as wholesale price.			2475000	450000
D= privatel profitability			1063732	193405.8

Reference: Depending on the questionnaire and domestic market prices.

Table 8 : Cost of production and return factors (project budget) calculated at social prices in IQD.dunum⁻¹ and ton.

Inputs	Production factor	Unit price of Production factors (IQD)	Production factor coast IQD.donum ⁻¹	Production factor coast IQD.ton ⁻¹
F) (Tradable inputs	First : seeds (tubers).	1605 IQD.kg ⁻¹ * 800kg.donum ⁻¹	1284000	233454.5
	Second: chemical fertilizers which include:	439.797 IQD.kg ⁻¹ *150kg.donum ⁻¹	65970 IQD	11994.5
	1-DAP fertilizer	288.5 IQD.kg ⁻¹ *110kg.donum ⁻¹	31735 IQD	5770
	2-Urea fertilizer	5\$*1124.9*1L		
	3- Gramoxone (paraquat) pesticide.	5\$*1124.9 IQD= 5624.5 IQD.L-1/100ml=	3374.4 IQD	613.5
	4-Agricultural tonic (high potassium and phosphorus).	5.624*600ml=		
	5-Control of diseases, insects, fungal and insecticide (Dithane).	6\$*1124.9IQD= 6749.4/1000ml=	4049.6 IQD	736.3
	6-Fuel	700 IQD/L* 30 L/donum ⁻¹	21000 IQD	3818.2
F= Total cost of tradable inputs at social prices			1410129	256387.1
G)(Domestic resources	First : land	12000 IQD.donum ⁻¹ *0.5 year	60000	10909.1
	Second: labour that include:	2000 IQD.hour ⁻¹ * 60hour.donum ⁻¹		
	1- permanent labour		120000	21818.2
	2- wage work	2000 IQD.hour ⁻¹ * 177hour.donum ⁻¹	354000	64363.6
	Third:mechanical work.		72000	13090.9
	Fourth: loading and unloading fees, Packing bags coats..etc	18000 IQD.hour ⁻¹ * 4 hour.donum ⁻¹	165000	30000
	Fifth: capital interest		54148	9845.1
Sixth: Exhaustion and maintenance		165000 IQD.donum ⁻¹	6000	1090.9
		1082950 IQD/capital dinar*0.008*0.5 year		
		6000 IQD.donum ⁻¹ *1		
G= Total cost of domestic resources at social prices			831148	151117.8
F+ G = Total social costs			2241277	407504.9
Social return E = 5500 dunum average productivity * 300 IQD Selling price of wholesale			1650000	300000
H= D= social profitability			591277-	107504.9-

Inputs	Production factor	Unit price of Production factors (IQD)	Production factor coast IQD.donum ⁻¹	Production factor coast IQD.ton ⁻¹
Tradable inputs (F)	First : seeds (tubers).		1284000	233454.5
	Second: chemical fertilizers which include:	1605 IQD.kg ⁻¹ * 800kg.donum ⁻¹	65970 IQD	11994.5
	1-DAP fertilizer	439.797 IQD.kg ⁻¹ *150kg.donum ⁻¹	31735 IQD	5770
	2-Urea fertilizer	288.5 IQD.kg ⁻¹		
	3- Gramoxone (paraquat) pesticide.	5\$*1124.9*1L *110kg.donum ⁻¹		
	4-Agricultural tonic (high potassium and phosphorus).	5\$*1124.9 IQD= 5624.5 IQD.L-1/100ml=	3374.4 IQD	613.5
	5-Control of diseases, insects, fungal and insecticide (Dithane).	5.624*600ml= 6\$*1124.9IQD= 6749.4/1000ml=	4049.6 IQD 21000 IQD	736.3 3818.2
6-Fuel	700 IQD/L* 30 L/donum ⁻¹	IQD.donum ⁻¹		
F= Total cost of tradable inputs at social prices			1410129	256387.1
Domestic resources (G)	First : land	12000 IQD.donum ⁻¹ *0.5 year	60000	10909.1
	Second: labour that include:	2000 IQD.hour ⁻¹ *	120000	21818.2
	1- permanent labour	60hour.donum ⁻¹	354000	64363.6
	2- wage work		72000	13090.9
	Third:mechanical work.	2000 IQD.hour ⁻¹ *	165000	30000
	Fourth: loading and unloading fees, Packing bags coats..etc	177hour.donum ⁻¹	54148	9845.1
Fifth: capital interest	18000 IQD.hour ⁻¹ * 4 hour.donum ⁻¹	6000	1090.9	
Sixth: Exhaustion and maintenance	165000 IQD.donum ⁻¹ 1082950 IQD/capital dinar*0.008*0.5 year 6000 IQD.donum ⁻¹ *1			
G= Total cost of domestic resources at social prices			831148	151117.8
F+ G = Total social costs			2241277	407504.9
Social return E = 5500 dunum average productivity * 300 IQD			1650000	300000
Selling price of wholesale				
H= D= social profitability			591277-	107504.9-

Reference: Depending on the questionnaire and domestic market prices.

Through indicators obtained through Tables (7 , 8) we can see the efficiency of domestic resources, as well as knowledge of comparative advantage, competitiveness and some other indicators related to the research subject, through the indicators of the structure of the policy analysis matrix whose variables were obtained from the calculation of the first and second rows of the technical treatments of the tradable inputs and the domestic resources of each of the dunums and tons as shown in Tables (9, 10).

Table 9 : Results of the structure of the agricultural policy analysis matrix, calculated in IQD. dunum⁻¹.

Profits	Costs		Revenue	
	Domestic Resources	Tradable Input		
D 1063732	820318 C	B 590950	A 2475000	Private Price
H - 591277	G 831148	F 1410129	E 1650000	Social Price
L 1655009	K-10830	J-819179	I 825000	Divergences

Reference: By the researcher depending on the results of Tables (7 , 8).

Table 10 : Results of the structure of the agricultural policy analysis matrix calculated in IQD.ton⁻¹.

Profits	Costs		Revenue	
	Domestic Resources	Tradable Input		
D 193405.8	149148.7 C	B 10744.5	A 450000	Private Price
H - 107504.9	G 151117.8	F 256387.1	E 300000	Social Price
L 300910.7	K - 1969.1	J - 148941.6	I 150000	Divergences

Reference: By the researcher depending on the results of Tables (7 , 8). the last column.

By analyzing the results of Tables (9 , 10), some of the following indicators can be obtained:

1. Financial profitability: $D = A - (B + C) = 1063732$ IQD it measures the private profitability and is calculated from the difference between total returns (A) and production costs of both (B + C) and financial profitability showed a positive value reached 1063732 IQD.donum⁻¹. The financial profitability per ton amounted to 193405.8 IQD.ton⁻¹, indicating the domestic competitiveness of potato crop in the light of current agricultural policies and based on domestic market prices.
2. Social profitability: $H = E - (F - G) = -591277$ The social profitability is calculated as the difference between the total revenue (E) and the total production costs (F + G), which calculated based on social prices. The social profitability has shown negative value for both the donum and produced ton matrix and priced at social prices as shown in Table (9 , 10) indicating that the potato crop in Iraq does not have a comparative advantage in the light of the cost of alternative opportunities. This means that there is inefficient use of domestic resources.
3. The third row of the policy analysis matrix includes the differences between the returns, costs and profits evaluated at domestic prices as shown in the first row of the matrix and between the returns, costs and profits in the second row of the matrix evaluated at social prices. These values in the third row refer to market distortions and the overall impact of the policies followed in the country (tax policies, support policies, etc.). (I) shows the difference between private and

social income (A-E) it has a positive value reached (8255000) IQD.donum⁻¹. This means that the private price is higher than the social price, In other words the producer gets higher prices than if the social prices. while (J) represents the difference between the value of tradable production inputs at domestic (private) prices and social prices. The value of (J) has a negative sign, which means that the value of inputs at domestic prices (B) is lower than social prices (F). This indicates that there is support for production inputs by the state. Thus, producers buy these resources at prices lower than world prices and the state treasury pays the difference. Similarly, the value of (K) has a negative sign, which means that the cost of domestic resources at private prices is lower than that of social prices. This indicates that there is financial aid for these resources and that there is a conversion of (K) value of the country's economy to support the potato crop sector. As for the value of (L), which represents the overall effect of all policies on input and output prices, it has a positive value of 165,5009 IQD.donum⁻¹. These policies are in the interests of the potato producers, meaning that there are financial transfers from the country's economy to the potato production sector. Some other indicators can be derived from the structure of the policy analysis matrix in Tables (9 , 10) by using some mathematical formulas in which some indicators of comparative advantage, competitiveness, added value and protection treatments can be identified. As shown in Table 11.

Table 11 : Protection treatments, comparative advantage, competitive and added value.

Treatments	Mathematical Formula	Indicator
Nominal protection coefficient for output	$NPCO = A/E$	1.5
Nominal protection coefficient for Inputs	$NPCI = B/F$	0.41
Profitability coefficient	$PC = D/H$	1.8-
Private cost ratio	$PCR = C/A-B$	0.41
Domestic Resource cost coefficient	$DRC = G/E-F$	3.5 per donum 3.5 per ton
Added Value	$AV = \text{Revenue} - \text{variables costs}$ $2475000 - 1181950 = 1293050$ $AV = 450000 - 215990.9 = 234009$	$AV = 1293050 D/dounm$ $AV = 234009 IQD.ton^{-1}$

Reference: By the researcher based on the data of table (9 , 10) of the results of the structure of the policy analysis matrix.

Table (11) indicates that these parameters can be interpreted based on the value and indication of the treatments. if it was greater than the one or smaller than the one or equal to it or any other indication according to the nature of the data under study. on this basis, the coefficient of nominal protection of outputs with a positive value greater than one reached (1.5) which means that producers receive prices for their products higher than the social prices, which indicates that there is protection for producers, while this value represents negative protection for the consumer of this commodity and they have to pay prices higher under this policy followed by the state. While the coefficient of nominal protection of inputs with a positive value less than one amounted to 0.41, which means that the prices of tradable production inputs at domestic prices less than their social prices, which indicates the existence of support for these inputs by the state. while the coefficient of social profitability

with a negative signal exceeded (-1.8) and the explanation of this coefficient from two aspects: This coefficient is greater than one or smaller or equal to one, but it also comes with a negative sign if one of the values of both the private profits (D) and the social profits (H) is negative and on this basis is interpreted. In this case, when the sign of social profitability is negative, this means that the potato production sector benefits from this policy to achieve private profits at the expense of social profits and the potato production sector does not achieve savings from foreign currencies. The ratio of private costs with a positive value less than one was (0.41) this means that the cost of domestic resources (C) is less than the added value of this crop production. This means that investment in potato production projects generates private profits for domestic investors, which means that the commodity system is competitive locally. While the domestic resource cost (DRC) has a positive value greater than the one

reached (3.5) for each of the donum and ton matrix in tables (9 , 10). This means that the cost of domestic resources (land, labor and capital) at social prices exceeds the added value (AV = EF) achieved at social prices. This indicates that there is inefficiency in the use of domestic resources. The potato production in Iraq does not have comparative advantage and competitiveness at the regional or global level, that the production of this commodity does not provide foreign currencies for the balance of trade, and this is confirmed by the large quantities of imported potatoes from neighboring countries and prices are competitive for domestic production, if not less than it. Unless there are policies based on good planning for improve the efficient use of local resources available in the country. While the added value achieved at domestic level at local prices for each of donum and ton which reached 1293050 IQD and 23,4009 IQD respectively, which are low values when compared to the period from the beginning of planting until harvest after 5 months. The research achieved some or number conclusion its there's : Investment in potato cultivation projects generates private financial profits for the local product, based on private profitability compared to social profits, which showed a negative sign. And Potato production projects are subsidized by the state and have a competitive advantage at the local economy level based on the (PCR) costs. Also The investment in potato crop projects does not provide foreign currencies for balance of trade. Iraq does not have a comparative advantage at the regional or foreign level, based on the domestic resource cost factor (DRC). As well as There is a subsidy for the tradable inputs based on the value of the nominal protection coefficient of the tradable inputs. And According to the questionnaire data, there is a problem related to flooding the Iraqi market with the various agricultural commodities imported, including the potato crop with subsidized prices, reaching the Iraqi markets from the neighboring countries at competitive prices less than the prices of the domestic product and even less than the cost of producing the potato crop locally. this has led some farmers to refrain from growing potato crop. In addition to potato crop achieves added value per donum or ton but this value is low and this is due to the misuse of some resources such as land, labor and capital, as well as some production requirements, if not used within the specifications and quantities recommended technically, such as chemical fertilizers and high labor wages, which reflected the increase in the cost of production. As well as the multiplication of cycles and levels of marketing of potatoes from the producer cycle to the end consumer, leading to the addition of marketing margins which have a dual impact on both the producer and the consumer and then affect the added value product and consumer demand. Finally the agricultural sector, including the potato production sector, is not supported by modern technologies and innovations in production and balanced protection, as well as unclear agricultural, institutional, administrative and legislative policy in this regard. Also the research achieved to some of recommends as to its there's : expanding the cultivation of the potato crop as it generates profits especially for domestic producers and has a competitive ability at the local economy level to increase production and reduce reliance on imports from neighboring countries. And it is necessary to the continued attention and support by the state to the local producer to increase the efficiency of the resources use and local potential through the proper planning and use of

modern technologies to raise the efficiency of local resources. As well as the agricultural policies should be adopted to deal with cases of flooding the Iraqi market with various agricultural commodities, including potato crops, in order to encourage the local producer to grow the potato crop and to reduce farmers' reluctance to grow it. Finally reduction of production costs through efficient management in use of production inputs in accordance with the recommended quantities, as well as reducing the cost of leased work and reducing the marketing margins by reducing the marketing cycles that do not add any added value to the commodity.

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