EFFECTS OF VARIETY PRODUCTIVITY ON THE PROFITABILITY AND COMPARATIVE ADVANTAGE FOR IRAQI WHEAT PRODUCTION IN THE YEAR 2017

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Abstract

In spite of nutrition & economic importance for wheat, in addition to its importance in international trade balance. Iraq still unable to achieve food security and self-sufficiency. Because of reduction of production efficiency for production resources. This research is to declare the importance of Governmental price policy and its effects on efficiency of using available resources depending on policy analysis matrix. Results showed that production and marketing system for hybrid Items will benefit Governmental price policy to achieve good profits. These hybrid Items has a comparative advantage on international level. Sousing these Items will reduce the rate of subsidy and save foreign currency for payment balance

Keywords: Policy analysis matrix, Profitability, Comparative advantage, Technical Coefficients Social prices, Transfers (Divergences).

Introduction

Wheat being the staple food, cash crop and major source of nourishment of the people in the word Iraq, ranks first in acreage and production amend all food crops (Abdur-Rehman, 2011). It occupies 50 percent of the total area in the country under food grain crops (Mohammed, 2015). The main reason of the law wheat yield in Iraq is the use of low yielding varieties, as well as poor crop management especially in rain fed areas and lack of sufficient irrigation water (Tahir, 2017). To integrate into global economy, there is an urgent need to improve the crop productivity and efficiency in marketing and trade to maintain competitive by making judicious use of available resources and following an appropriate combination of government policies and market forces (Mohmood, 2017). Applied economists used a variety of to techniques to measure competitiveness and policy effects, but the policy analysis matrix (PAM) stays the most famous in several studies because it relates the parameters of comparative advantage and policy effects, and also use to determine international competitiveness (Monke *et al*., 1989; Mudhi, 2014) primary data was collected from the research area in irrigation farms on cost wheat production by using a suitable questionnaire, secondary data on input and output prices, information on agricultural and macroeconomic policies and on the relevant variables were collected from deferent resources such as Iraqi central Bank, world bank data, ministry of trade and similar studies. Competitiveness and policy analysis of wheat is of major importance to know whether the current sent of Agricultural policies are consistent with existing pattern of competitiveness and strengthen that pattern in future (Abdur-Rehman, 2011; Mahmood, 2018).

Material and Methods

Studying the profitability and comparative advantage is very important for agricultural crops, especially wheat. That is because such study shed a light on some vital indices that determine effects of Governmental price policy and determine many of important indicators that policy makers depend on to achieve agricultural policy goals. Aswellas knowing the effect of variety (item) on profitability and comparative advantage. The current research depends on both quantitative and descriptive analysis by displaying the policy analysis matrix (PAM).

Results and Discussion

Estimating technical coefficients of wheat production in iraq (irrigating areas)

Table 1 : Technical Coefficients for wheat production in Iraq for the year 2017

Inputs	Production	Quantity/ Donum
1. Tradable inputs	1. Seeds 2. Fertilizer:- - Phosphate Fertilizer - Nitrogen Fertilizer 3. Pesticides 4. Fuel	45 kgs/ Donum 40 kgs/ Donum 60 kgs/ Donum 1.5 liters/ Donum 50 liters/ Donum
2. Domestic resources	1. Land 2. Labour includes:- - Land arrangement - Irrigation - Taking care crops - Fertilizing & Pesticiding 3. Machinery:- - Land digging & Smoothing - Harvesting - Gathering harvesting waste - Working capital	1. Donum ÷ 2 (one season) 6 hours/ Donum 45 hours/ Donum 10 hours/ Donum 5 hours/ Donum 3 hours/ Donum 1 hours/ Donum 1 hours/ Donum 160,000, ID./ Donum
Average yield	850 kgs/ Donum for local variety 1640 kgs/ Donum for hybrid variety	

Source: Calculated based on the questionnaire data.

Estimating policy analysis matrix for the researched wheat verities

1. Calculate the first Raw (private prices): Table (2) show the steps of calculating the first row for "PAM" which represents production costs for tradable inputs (B) and the cost of domestic resources (c) and Revenue (A) Calculated in private prices. (Local market prices).

Table 2 : Production costs & revenue (farm balance) in private prices

Inputs	Production factors	Price Per unit	Cost I.D/ Donum
1. Tradable inputs (B)	1. Seeds:-		
	Hybrid Seeds	1500 ID/ kg	45*1500= 67.500
	Local Seeds	900 ID/ kg	45*900= 40.500
	2. Fertilizer:-		
	- Phosphate Fertilizer	850 ID/ kg	850*40= 34000
	- Nitrogen Fertilizer	450 ID/ kg	450*60= 27000
	3. Pesticides	16000 ID/ Litre	1.5*16000= 24000
	4. Fuel	700 ID/ Litre	700*50= 35000
Total (B)		for hybrid variety ↔ 187500	
		for local variety ↔ 160500	
2. Domestic resources (C)	1. Land rent:-	100.000 ID/Dunom	$1*\dfrac{100}{2} = 50000$
	2. Capital:-	160.000 ID/Dunom	
			$1*160.000= 160.000$
	3. Lab our:-		
	- Land arrangement	2500 ID/ hour	
	- Irrigation	2500 ID/ hour	6*2500= 15000
	- Fertilizing	2500 ID/ hour	45*2500= 112.500
	- Pesticiding	2500 ID/ hour	10*2500= 25000
	4. Machinery:-		5*2500= 12500
	- Land arrangement	20000 ID/ hour	
	- Harvesting	25000 ID/ hour	3*20000= 60000
	- Gathering harvesting waste	5000 ID/ hour	1*25000= 25000
	- Packaging & Marking Cost	45000 ID/ ton	1*5000= 5000
			49200 for hybrid variety
			25500 for local variety
Total (C)		250500 for local variety	
		374200 for hybrid variety	

3. Private Revenue for 10 con variety = 750000*0.850 = 637500 ID/ Donum
   "A" Price * yield
For hybrid variety = 750000*1640 kgs = 1230000 ID/ Donum

* Source: calculated based on questionnaire data & table "1".

2. Calculate the Second Raw of the (PAM) (social prices)

As the Iraqi economy still under the conditions of nonperfect competition market a specially what concern with Government intervene to distribute food among people and export the wheat and then distribute it with support prices. So we must depend on the Border prices which gives Approximate numbers for Social prices (Jammie and Kievem, 2002; Luce, 2006) thus import parity prices were calculated according to the following function (Stoll, 2005; Sofia, A. 2005; Alwan, 2008; Anatolii, 2011; Alwan, 2016):-

IPP= $BP_{(cif)}$ * E.R + HCP + TCBM + IC - TCFM - TPC.

Were:- IPP = import parity price

ER = Exchange rate

$BP_{(cif)}$ = Border price for import

HCP = Picking and handling Costs

TCBM = Transportation costs from Border to Market

IC = Insurance cost

TCFM = Transportation cost from farm to Market

TPC = Total Processing costs

And the following table points out adjustment of world prices for wheat to the import parity price for the year 2017:-

Table 3 : Adjusting wheat world price to the IPP*

Export world price/ ton (fob)	308.5 $/ ton
Trans potation & insurance costs until port	50 $/ ton
Import price (cif)	358 $/ ton
Equilibrium exchange rate	1120.5 I.D/ $
Local import price (cif)	431760 I.D/ ton
Shipment & Transportation costs from port to main stores	45000 I.D/ ton
Import parity price	
Transportation costs from	476760 I.D/ ton
Farm gate to the main stores	20000 I.D/ ton
Social price per ton at farm gate	456760 I.D/ ton

* Source:- calculated depending on:-
- World bank data.
- Iraqi central bank data.
- Ministry of trade, unpublished data.

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A world price about 308.5 \$/ ton of imported wheat was depended, after taking care of transformation, insurance and shipment costs to calculate the import parity price (IPP) at farm gate which represents the social revenue (E) that was about 4567600 ID/ ton. After calculating social value per ton of imported wheat, a social value per Donum was calculated depending on the yield per Donum witch was pointed in table "1" So that the social revenue (E) for Local variety was 388646 ID/ Donum and about 749086 ID per Donum for hybrid variety. After calculated social revenue per Donum we will be able to calculate the farm balance in social prices as in the following table:-

Table 4 : Production costs & revenue (farm balance) in social prices

Inputs	Production factors	Price Per unit	Cost I.D/ Donum
1. Tradable inputs (F)	1. Seeds:-		
	- Hybrid Seeds	1500 ID/ kg	45*1500= 67500
	- Local Seeds	900 ID/ kg	45*900= 40500
	2. Fertilizer:-		
	- Phosphate Fertilizer	0.405 \$/ kg * 1200 ID/ \$	40*486= 19440
	- Nitrogen Fertilizer	0.19 \$/ kg * 1200 ID/ \$	60*228= 13440
	3. Pesticides	10 \$/ Litre * 1200 ID/ \$	12000*1.5= 18000
	4. Fuel	0.8 \$/ Litre * 1200 ID/ \$	50*960= 48000
Total (F)		166620 for hybrid variety 139620 for local variety	
2. Domestic resources (G)	1. Land rent:-	100.000 ID/ Dunom	$1*\dfrac{100000}{2} = 50000$
	2. Capital:-	160.000 ID*8%+160000	$= 172000$
	3. Labour:-		
	- Land arrangement	2500 ID/ hour	6*2500= 15000
	- Irrigation	2500 ID/ hour	45*2500= 112500
	- Fertilizing	2500 ID/ hour	10*2500= 25000
	- Pesticiding	2500 ID/ hour	5*2500= 12500
	4. Machinery:-		
	- Land arrangement	20000 ID/ hour	3*20000= 60000
	- Harvesting	25000 ID/ hour	1*25000= 25000
	- Gathering harvesting waste	5000 ID/ hour	1*5000= 5000
	- Packaging & Marking Cost	45000 ID/ ton	49000 for hybrid variety 25500 for local variety
Total (G)		350740 for hybrid variety 505230 for local variety	
3. Social Revenue for local variety (E) = 456760*850 kg = 388246 ID/ Donum Social Revenue for hybrid variety (E) = 456760*1640 kg = 749086 ID/ Donum Source*:- calculated based on tables (1,3).			

Estimating policy analysis matrix per donum of wheat

Table 5 : Policy analysis matrix per Donum of local variety

	Revenues	Costs		Profits
		Tradable Inputs	**Domestic Resources**	
Private Prices	A 637500	B 160500	C 250500	D 226500
Social Prices	E 388246	F 139620	G 530740	H -281740
Transfers	I 248845	J 20880	K -280240	L 805214

* Source: Calculated depending on tables (2,3,4)

Table 6 : Policy analysis matrix Per Donum of hybrid varieties*				
	Revenues	Costs		Profits
		Tradable Inputs	**Domestic Resources**	
Private Prices	A 1230000	B 187500	C 374200	D 668300
Social Prices	E 749086	F 166620	G 505230	H 77236
Transfers	I 480911	J 20880	K -131030	L 591064

* Source:- Calculated depending on tables (2,3,4)

Table 6 : Policy analysis matrix Per Donum of hybrid varieties

	Revenues	Costs		Profits
		Tradable Inputs	Domestic Resources	
Private Prices	A 1230000	B 187500	C 374200	D 668300
Social Prices	E 749086	F 166620	G 505230	H 77236
Transfers	I 480911	J 20880	K -131030	L 591064

Analyzing results of policy analysis matrix (PAM)

According to the tables (5) & (6) those specialized with estimation of policy analysis matrix for both, hybrid variety and local. variety which were calculated per Donum of crop we can see that the costs of tradable inputs and Domestic resources costs in private prices B & C and in social prices F & G as well as Transfers or Divergences were nearly (the same) except seeds price. that reflects the same production costs for both local and imported (hybrid) varieties. Results explained that transfers of tradable inputs (J) were for Local variety and hybrid variety were equaled. it's value was (20.88). While the Transfers of Domestic resources (K) was Negative. that refers to the Government price policy was supporting to the Domestic resources and not supporting to the tradable inputs. Value of the revenues for local variety (A) was (637500 ID per Donum) and private profits (D) was (226500 ID per Donum). While the revenues in private price (A) for hybrid variety was (1230000 ID per Donum) and private profits (D) was (668300 ID per Donum) which reflects too much divergeneses if a hybrid variety seeds were used in production instead of local varieties, that effects the social profitability (H) to be seen Negative value (-281714) for local variety. and positive (77236) for hybrid variety. Which impose seriously to extend with using hybrid varieties. Net transfers (L) Was positive for both hybrid and local varieties that explain the effects of intervention policies and pricing policies for the Government in Iraqi wheat market were supporting producers.

Measurement of profitability F comparative advantage for wheat at the year 2017

Table 7 : Coefficients of profitability and comparative advantage for wheat at the year 2017

Coefficients	Math function	Values for local Variety	Values for hybrid Variety
Profitability Coefficient	$P.C. = \dfrac{D}{H} = \dfrac{A-B-C}{E-F-G}$	-0.804	8.65
Domestic resure cost coefficient	$D.R.C. = \dfrac{G}{E-F}$	2.131	0.86
Producer Subsidy ratio	$P.S.R. = \dfrac{L}{E}*100 = \dfrac{D-H}{E}*100$	130.76%	78.9%
Private Cost ratio	$P.C.R. = \dfrac{G}{E-F}$	0.525	0.35

* Source: Calculated depending on tables (5,6).

Table (7) showed that social profitability coefficient (P.C.) was Negative and equals (-0.804) for local variety and positive (8.65) for hybrid variety that insured the commodity system of production and marketing wheat for hybrid varieties in Iraq is benefit from. Governmental price policy During the year 2017. While local verities don't benefit from this policy. The value of Domestic resource cost (D.R.C.) showed that production of local varieties don't have a comparative advantage as it was more than one, equals (2.131). While the production of hybrid varieties moguls with internationally comparative advantage. Where the value of D.R.C. was (0.86). That belongs to the best productivity per Donum for the hybrid varieties comparing with the local varieties. As a result expansion of hybrid verities cropping may save foreign currency for payment balance instead of importing wheat from the world market. Producer subsidy ratio (P.S.R.) which was equal (130.76%) for local varieties and (78.99%) for hybrid varieties, showed that areal supporting and positive production incentives by providing production factors and buying production with high prices, but subsidy ratio for local varieties was multiplied comparing with hybrid varieties. So expansion of hybrid varieties would reduce Governmental subsidy ratio per area to the mid. Private cost ratio (P.C.R.) which was positive and less than one (0.35) for hybrid varieties and (0.525) for local varieties explained that additional value of invested capital in wheat production in Iraq calculating with private prices is more than production costs per donum. finally it is profitable investment realize good profits for producers. and using hybrid varieties realize an addition profits Estimated a boat 17.5% more than profits realized by local varieties.

Conclusions

From assessed results that research reached we can summarize the following conclusions:-

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1- Research results showed that revenue in private prices (A) was more than it in social prices (E) which refers to real Governmental support to the price of wheat produced in Iraq.

2- Results insured than tradable inputs costs in private price (B) was more that those in social price (F). but the cost of Domestic resources "C" in private price was less than it in social price (G) that reflects Government supporting policy supports Domestic resources only and the private sector is responsible for importing durable inputs especially hybrid seeds that causes arising there prices in the market which was insured by Negative value of (K).

3- Results showed that producers of local varieties of wheat achieved positive private profits (D) but didn't achieve social profits (H). While producers of hybrid varieties achieve private and social profits so much more than those producers of local varieties achieve.

4- Analysis results explained that Net affects of Governmental price policy (L) was positive for both local and hybrid verities of wheat that means Governmental policy is subsiding Domestic production on consideration of imports.

5- From values of profitability coefficients and comparative advantage we conclude that extension of hybrid varieties production those have a comparative advantage and gives social profitability and save freight currency for payment balance and push towards self sufficient instead of importing and being a series step to achieve food security.

Recommendations

From pre results we can put some recommendations:-

1- Concentration on planting hybrid varieties of wheat that have high production efficiency and release encouraging profits for producers and release a comparative advantage for local production internationally. So as supporting payment balance.

2- Advice Farmers to use Generous soil under the water crisis in order to increase productivity per donum also total production.

3- Concentration on using new irrigation technical's that help to increase productivity and rational usage of water.

4- Necessity of maneuvering and adaptation in the Governmental subsidy policy that enable to insure providing production factors with good quality and high productivity instead of providing Agricultural Loans that farmers use them to get domestic resources with Low productivity.

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