AN ECONNOMICAL STUDY OF SOME INDICATERS OF FOOD SECURITY IN IRAQ DURING THE PERID (1990-2015)/ WHEAT AS CASE STUDY

***O. A. Gasim** **A. S. AL-Hani**
Researcher **Prof.**
Dept. of Agricultural Economic. Coll. of Agri. University of Baghdad
omeradil@yahoo.com

ABSTRACT

This research was aimed shedding light on some indicators that reflect the ability of the society to achieve an adequate degree of food security from the wheat crop. The length of the two periods of production adequacy and coverage of imports for local consumption of wheat and the stability of these periods were estimated. The period of the annual change in the rate of self-sufficiency, the per capita share and the gap between the per capita share and the need for wheat in Iraq for the period 1990-2015was estimated. It was found that the rate of self-sufficiency of the wheat crop was 54%. The annual increase in the period of production adequacy for the domestic consumption of the wheat crop was estimated at 11.5 days, or about 5.74% of the average period of production efficiency for domestic consumption. The study showed that the average period of coverage of imports for domestic consumption of wheat was estimated at 164.66 days, about 5.52 months during the study period. The period of coverage of imports for domestic consumption decreased. The annual decrease in the period of coverage of imports for domestic consumption of wheat was estimated at 0.86 days, about 0.52% of the average period of import coverage. To the lack of agricultural potential, but they are available well enough to achieve national food security and even possible to contribute to solving part of the problem of global food security, and that food security in Iraq in its current situation causes a negative impact on development to the large financial allocations to him, Other agricultural products, including the agricultural sector.

Keywords: period of import coverage for domestic consumption, self-sufficiency, instability coefficient, stock replenishment period for domestic consumption. .
. ***Part of Ph.D .Dissertation of the first author**

مجلة العلوم الزراعية العراقية -2019 :50(1):456-464 **جاسم والهاني**

التحليل الاقتصادي والقياسي لبعض مؤشرات الامن الغذائي في العراق للمدة (1990–2015) القمح انموذجا

عمر عادل جاسم* **عفاف صالح الهاني**
باحث **استاذ**
قسم الاقتصاد الزراعي – كلية الزراعة – جامعة بغداد

المستخلص

استهدف البحث القاء الضوء على بعض المؤشرات التي تعكس قدرة المجتمع على تحقيق درجة مناسبة من الامن الغذائي من محصول القمح ، كما تم تقدير طول فترتى كفاية الانتاج وتغطية الواردات للإستهلاك المحلى من القمح ومدى استقرار هذه الفترات ،وحساب مقدار الفائض والعجز في القمح المخصص للمخزون الاستراتيجي للاستهلاك المحلي وفترة كفاية المخزون للاستهلاك المحلي خلال فترة الدراسة ،وكذلك حساب قيمة الفجوة الغذائية ومقدار التغير السنوي في نسبة الاكتفاء الذاتي ومعدل نصيب الفرد والفجوة بين معدل نصيب الفرد وحاجته من محصول القمح في العراق للفترة (1990–2015). وقد وجد ان معدل نسبة الاكتفاء الذاتي من محصول القمح بلغ (54%) وقدرت الزيادة السنوية لفترة كفاية الإنتاج للاستهلاك المحلي من محصول القمح بحوالي (11.5) يوم أي حوالي 5.74 % من متوسط فترة كفاية الإنتاج للاستهلاك المحلى ، وبلغ متوسط فترة كفاية الإنتاج خلال سنوات الدراسة حوالي (200.34) يوم أي حوالي (6.59) شهر ، وبين البحث أن متوسط فترة تغطية الواردات للاستهلاك المحلى من القمح قدرت بحوالي (164.66) يوم أي حوالي (5.52) شهر وذلك خلال فترة الدراسة . كما تناقصت فترة تغطية الواردات للاستهلاك المحلى فقد قدر التناقص السنوي لفترة تغطية الواردات للاستهلاك المحلى من القمح بحوالي (0.86) يوم أي حوالي 0.52 % من متوسط فترة تغطية الواردات ومن الاستنتاجات التي توصل اليها البحث من دراسة واقع الامن الغذائي العراقي يتضح ان تدني مستواه لا يرجع الى قلة الامكانات الزراعية بل انها متوفرة بشكل جيد يكفي لتحقيق امن غذائي وطني ، وان الامن الغذائي في العراق بوضعه الحالي اخذ يلقي بظلاله السلبية على التنمية لضخامة التخصيصات المالية له مما يحرم القطاعات الاقتصادية الاخرى ومنها القطاع الزراعي المنتج للغذاء.

الكلمات المفتاحية : فترة تغطية الواردات للاستهلاك المحلي ، الاكتفاء الذاتي ، معامل عدم الاستقرار ، فترة كفاية المخزون للاستهلاك المحلي .
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INTRODUCTION

we can not to look at the issue of food in Iraq in isolation from the issue of food at the global level(12), Under features and developments economic, which began appear in the world, especially with the increasing trend towards the economic blocs and orientation towards the international trade liberalization(9), perhaps of the most notably the world crises last two years in the food and energy, it was so clear impact in Iraq in terms of the effects in the march of agricultural development in which at the food security, which is one of the main challenges to them(8). And control group of factors and determinants in the amounts of agricultural production and size of the food gap in Iraq is to the lack of the cultivated area and scarcity of water resources and low irrigation efficiency and lack of irrigated area(12). It also suffer of the agricultural sector from the" technological divide" is not to meet the output of agricultural research and the requirements of agricultural development, and low crop productivity as well as low livestock. crop of the most important food crops in Iraq, where a reliable a its own food daily, as contributing to about 65% of the total per capita daily calories by about 40 -45% of the total protein necessary per capita per day in order in the form of bread(2). Food has become aday of the most dangerous weapons used by countries in its relationship with other countries(10) In particular food exporters and imported to him, no doubt often that this situation creates a turn many of the negative effects of which the difficulty of planning and agricultural production and the difficulty of planning and exports and imports of agricultural goods, which constitute together the risk of the in the policies and decisions(11). Magnified the importance of agriculture in the moment look the presence of food gap large and influential in the national economy in the major cereal crops making the issue of food security of the most important priorities, which must attention and work on the narrowing of the gap and work to achieve self- sufficiency of wheat crop(4)

MATERIALS AND METHODS

The reality of cultivation of wheat crop in Iraq for the period 1990-2016: The average production and productivity and area of wheat crop in Iraq within a period of the study about 2. 03 million tons and 347 kg/ acres and 5. 90 million acres, respectively, while average domestic consumption imports of wheat crop within a period of the study was 3814.5 ,1826.3 tons, respectively, we will look to some specific indicators of security and food and we will be calculated these indicators, namely

First: The period of adequacy of the production of wheat according to consumption and the stability of this period: The period of adequacy of local production of a particular commodity can be estimated on its consumption by dividing its total output by the average daily(6) consumption of the local. The increase of this equation reflects the temperature rise in Forest,(13) where the value of the stability coefficient is equal to (7) . Table (1) and Figure (1) show that the period of production efficiency is short-lived in 2015 BC 358.22 days, ie about 11.76 months, and the lowest period of the 2000 adequacy period for about 89.86 days about 2.95 Month. The average period of production adequacy during the study years is about 200.34 days, ie 6.59 months. 11.5 days, or about 5.74% of the average period of production efficiency for domestic consumption, the degree of stability was estimated During the period of study, by calculating the instability coefficient, it was found that the general average stability rate for the period was about 31.5495, while the value of the engineering average was 19.9898, indicating that the period of production adequacy to cover domestic consumption is relatively unstable, The period between a minimum of about 0.54967 in 1994 and a maximum of 120.504 in 2000, indicating that 1994 was the most stable years for the period of production adequacy to cover domestic consumption compared with 2000, which was the least stable years of study .

Second: The period of imports adequacy to cover the domestic consumption of wheat and the stability of this period: The period of import adequacy of a particular commodity to cover its consumption can be estimated by dividing the total imports by the average daily domestic(1) consumption. The increase in this period reflects the inability of the society to self-sustain the provision of this commodity

and the dependence on imports. It is considered the sole implementing country to cover the local consumption requirements that domestic production fails to meet(16). Export is also the necessary outlet for the leak of domestic production from domestic consumption, the society is under the burden of dependence on others, which is a negative indicator of the national economy(3). While the second scope represents an advantage for the community, adding to its trade balance, and a positive indicator of achieving the security of the food society. In order to estimate the stability of the import coverage period for domestic consumption, the percentage of mean deviations of this period was used during the study period(5). The value of the instability coefficient, which is zero, indicates the optimum stability of the variable under study. It means instability(7). (Same as previous source) , Table 1 and Figure 1 show that the import coverage period for domestic consumption of wheat ranged from a minimum of 6.78 months in 2015 to about 0.22 months and a maximum of 275.14 in 2000, ie about 9.17 months. With an average of about 162.97 days or about 5.43 months during the study period. The import coverage period for domestic consumption also decreased. The annual decrease in the period of import coverage for domestic consumption of wheat was estimated at 0.86 days, or about 0.52% of the average import coverage period. The stability rate for the period of adequacy of imports to cover domestic consumption during the study period was calculated by calculating the instability coefficients. It was found that the general rate of stability for the period was 34.5836, while the engineering average was 22.8980. The average stability of the period ranged from a low of about 0.61895 in 1994 to a maximum of 95.5987 in 2015, indicating that 1994 was the most stable period for the period of production adequacy to cover domestic consumption. By 2015, which had the lowest years of studying .

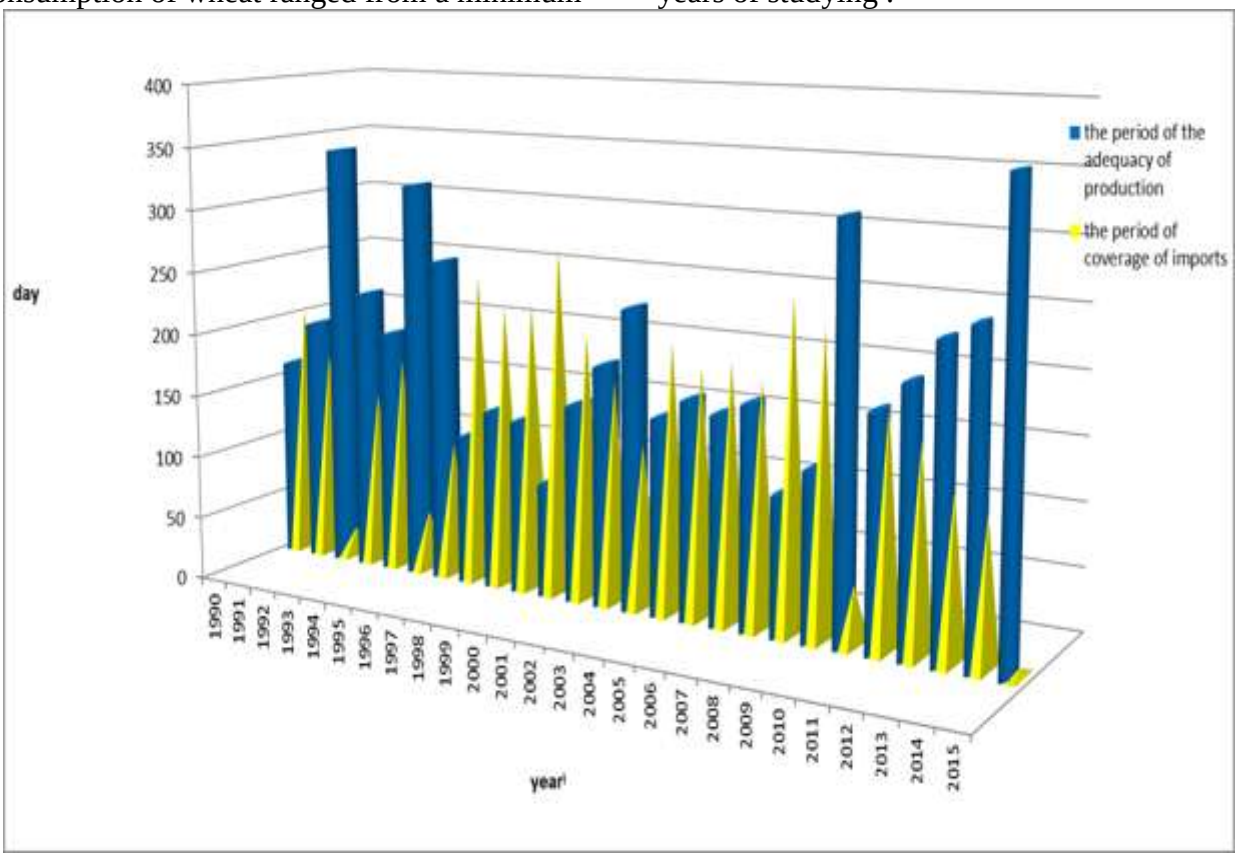


Figure 1. Evolution of production and import coverage periods for domestic consumption of wheat for the period 1990-2015

Table 1. Evolution of production and import coverage periods for domestic consumption of wheat for the period 1990-2015

Year	coefficient of non coverage of imports	coefficient of instability for the adequacy of production	the period of coverage of imports per day(3)/(2)=(5)	the period of the adequacy of production per day(3)/(1)=(4)	domestic consumption daily in Thousands of tons (3)	Imports tons (2)	domestic production 1000tons(1)
1990	16.04934	17.44613	203.6113	161.39400	7.40931507	1508.62	1195.819
1991	3.053939	2.722976	169.2581	195.73790	7.54273973	1276.67	1476.4
1992	86.85209	44.09953	22.8523	342.16936	3.83068493	87.54	1310.743
1993	18.86864	14.51412	140.2592	224.74107	4.05342466	568.53	910.971
1994	0.618952	0.54967	170.9522	194.06420	4.40082192	752.33	854.042
1995	72.28802	38.95915	47.4290	317.57561	3.43671233	163	1091.416
1996	36.8814	24.38975	107.5071	257.51489	4.46575342	480.1	1149.998
1997	45.62436	65.35913	246.7563	118.27002	8.00465753	1975.2	946.711
1998	32.50609	38.68657	223.4135	141.63150	10.41342466	2326.5	1474.869
1999	36.15109	44.36306	228.3415	136.66075	8.06082192	1840.62	1101.598
2000	64.90175	120.5039	275.1412	89.86368	11.57671233	3185.23	1040.326
2001	26.38968	28.22204	209.7942	155.20899	14.29972603	3000	2219.446
2002	6.722447	5.879548	176.2315	188.76682	13.71780822	2417.51	2589.467
2003	21.33387	14.86465	129.2279	235.77494	9.87890411	1276.63	2329.198
2004	28.93354	30.63858	210.6937	162.73546	11.87287671	2501.54	1932.138
2005	19.51072	18.57418	194.2654	170.73241	13.05178082	2535.51	2228.362
2006	24.9397	24.74031	202.0171	162.98578	14.02767123	2833.83	2286.311
2007	18.89185	17.48226	191.2153	173.78442	12.67534247	2423.72	2202.777
2008	60.28593	88.80524	256.4095	108.59016	11.55698630	2963.321	1254.975
2009	47.29586	57.60245	234.3655	130.63680	13.01616438	3050.54	1700.39
2010	70.68672	35.10997	46.3885	318.61753	8.62739726	400.212	2748.84
2011	17.58612	15.38188	185.0816	179.93761	15.61041096	2889.2	2808.9
2012	3.050076	2.34285	161.3309	203.69645	15.03369863	2425.4	3062.311
2013	18.12309	11.87756	127.4578	237.54102	17.59013699	2242	4178.379
2014	26.0289	16.0877	114.5147	250.49084	20.18082192	2311	5055.111
2015	95.59871	41.08494	6.7761	358.25414	7.38364384	50.032	2645.221
	34.58357	31.54954	162.9651	201.98664	10.5477133	med	
	95.59871	120.5039	275.1386	358.22421	20.1808219	MAX	
	0.618952	0.54967	6.7758	89.86144	3.43671233	MIN	
	*22.89809	*19.98978	-0.863231	11.54371	0.69352	growth rate	

Source: Collected and calculated according to the data of the Ministry of Planning and Development ooperation - Central Organization for Statistics and Information Technology for Statistics and Information Technology .
(*) Geometric mean

Third: The amount of surplus and deficit in wheat allocated to the strategic stock for domestic consumption and the period of inventory adequacy for domestic consumption during the period 1990-2015: The study was based on measuring the amount of change in strategic stocks or the surplus and deficit in strategic stocks on the following equations: Surplus or deficit = Length of production and import coverage periods) x Actual daily domestic consumption (14). As the surplus is the amount of the crop that is directed to the development of strategic stocks and the deficit represents the amount that the state is forced to withdraw from the stock to cover the needs of domestic consumption of wheat. Table 2 shows that a surplus of 102.38 thousand tons was achieved for the average period of the period estimated at 8.677 days. While the deficit in this surplus was estimated at 0.109 thousand tons for 0.0096 days, so that the amount of surplus directed to the development of this strategic stock exceeds the amount of deficit that is withdrawn from stock

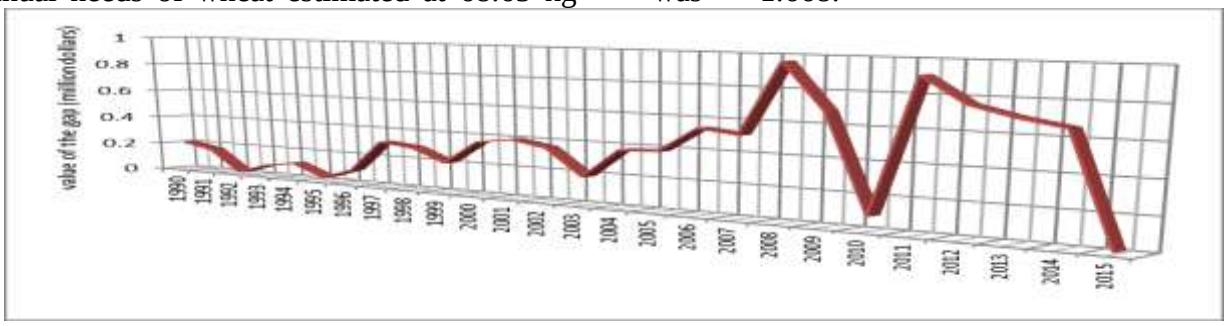
Table 2. Development of the surplus and deficit allocated to the strategic stock for local consumption and the two surplus periods and the deficit in the wheat crop for the period 1990-2015

Year	The amount of strategic stock Thousand tons	Deficit period in strategic inventory (day)	The amount of deficit in the strategic stock (Thousand tons)	Period of adequacy of surplus in strategic stock (day)	The amount of surplus in the strategic stock (Thousand tons
1990	0.039	0		0.00526364	0.039
1991	0.03	0.003977335	0.03	0	
1992	0.083	0		0.02166714	0.083
1993	0.001	0		0.0002467	0.001
1994	0.072	0		0.01636058	0.072
1995	0.016	0		0.00465561	0.016
1996	0.098	0		0.02194479	0.098
1997	0.211	0		0.02635965	0.211
1998	0.469	0		0.04503802	0.469
1999	0.018	0		0.00223302	0.018
2000	0.056	0		0.0048373	0.056
2001	0.046	0		0.00321684	0.046
2002	0.023	0.001676653	0.023	0	
2003	0.028	0		0.00283432	0.028
2004	100.078	0		8.42912821	100.078
2005	0.028	0.002145301	0.028	0	
2006	0.041	0		0.00292279	0.041
2007	0.003	0.00023668	0.003	0	
2008	0.004	0.000346111	0.004	0	
2009	0.03	0		0.00230483	0.03
2010	0.052	0		0.00602731	0.052
2011	0.3	0		0.01921794	0.3
2012	0.411	0		0.02733858	0.411
2013	0.021	0.001193851	0.021	0	
2014	0.111	0		0.00550027	0.111
2015	0.223	0		0.03020189	0.223
Sum	102.492	0.00957593	0.109	8.67729946	102.38

Source: prepared by the researchers depending in the data table (1).

Fourth: Evolution of the value of the food gap and the amount of annual change in the self-sufficiency rate, per capita share, and the gap between the per capita share and the need for wheat and rice crops in Iraq for the period 1990-2015. Table 3 and Figure 2 show Iraq During the study period, the value of the food gap for wheat in Iraq during the study period ranged from a high limit of about 0.965 million dollars in 2008 due to the significant decrease in local production due to the weather conditions and the lack of rain in that year and the minimum amounted to about 0.010 million dollars in the year 2015 due to the decrease in domestic consumption, while the average value of the food gap is 0.373 million dollars, while the annual growth rate of the value of the food gap was 0.023. The percentage of self-sufficiency of the wheat crop in Iraq during the study period as show in Figure 3 ranged from a high of about 98.15% in 2015 due to the significant decrease in domestic consumption and the increasing interest of the state in this crop Which was reflected in the increase in production through the support of production requirements, the provision of improved seeds and various chemical fertilizers, their distribution to farmers at subsidized prices and the use of modern technologies and technologies (Blasem, 2007, p. 9, p. 12) and a minimum of 24.62% As a result of the decrease in domestic production, while the average was in Self-sufficiency is 54.98% , while the annual growth rate of self-sufficiency rate was 0.239%. The annual variation in the self-sufficiency rate of the wheat crop in Iraq during the study period, as shown in Figure 4, ranged from a high of 285.97 in 1990 to a minimum of 54.07. In 1997, while the mean of the change in the self-sufficiency ratio was 21.67. The annual growth rate of the change in

self-sufficiency rate was -1.917%. As for the average per capita share and the gap between the average per capita share and the annual needs of wheat kg as in figure 5, the value fluctuated throughout the study period 1990-2015 was 140.4 kg/year in 2014. This means that there was a surplus above the annual per capita needs of wheat 32.4 kg/ year due to the interest in the agricultural sector and the agricultural initiative and supporting the farmer to a certain extent, 39.35 kg/year in 2008, which means that there was a large gap between the average per capita share and annual needs of wheat estimated at 68.65 kg per annum due to the sharp decline in domestic production due to the water shortage in Iraq and its reflection on the shrinking of agricultural areas as a result of Turkey's water policy towards Iraq, as well as the climate changes (lack of rain), which negatively affected the amount of water and cultivated areas, while the average per capita rate of wheat was about 72.01 kg / year on the individual needs of wheat 35.99 kg / year. The annual growth rate of wheat per capita was 1.668 while the annual growth rate of the gap between per capita share of wheat and its need was - 1.668.



shape 2. The regilily of the value of the food gap of wheat crop in Iraq for the period(1990-2015)

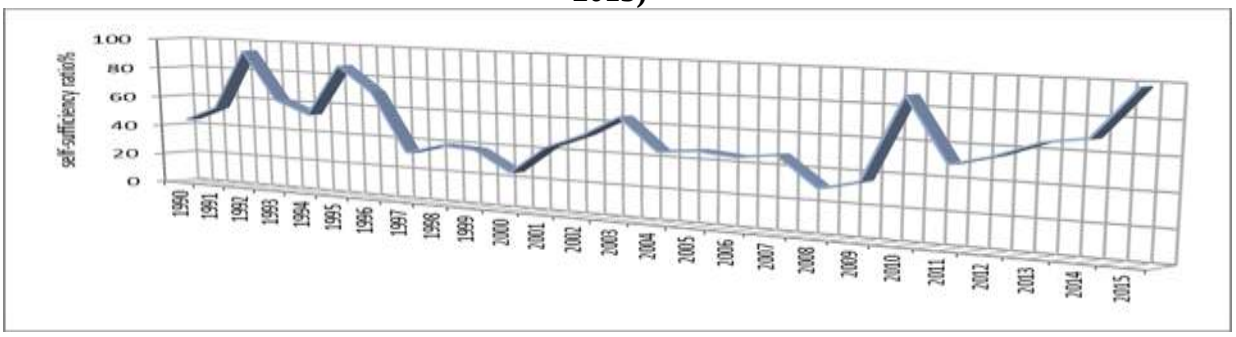
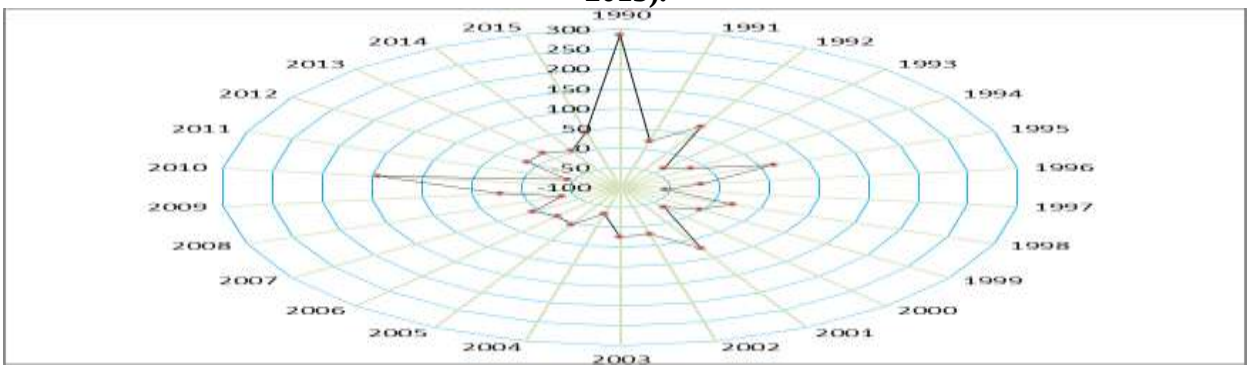


Figure 3. The regilily of self- sufficiency ratio of wheat crop in Iraq for the period(1990-2015).



Source: from the preparation of the researchers depending on the table data(11).

Table 3. the development of the value of the food gap and the amount of annual change in the proportion of self-sufficiency rate per capita gap between the rate per capita and his need of wheat crop in Iraq

year	domesti producti o tons	consump tion(100 0) tons	the world price of dollars/ tons	value of the gap(million dollars)	self-sufficiency ratio%	amount of annual change proportion of self- sufficiency rate	per capita of wheat kg/ year	the gap between the rate per capita and his need of wheat/ kg**
1990	1195.8	2704.4	136	0.205167	44.22	285.97	66.84	41.16
1991	1476.4	2753.1	129	0.164694	53.63	21.28	80.16	27.84
1992	1310.7	1398.2	151	0.013206	93.75	74.81	69.17	38.83
1993	911.0	1479.5	140	0.079594	61.57	-34.32	46.77	61.23
1994	854.0	1606.3	150	0.112839	53.17	-13.65	42.69	65.31
1995	1091.4	1254.4	177	0.028848	87.01	63.64	53.15	54.85
1996	1150.0	1630	207	0.09936	70.55	-18.91	54.44	53.56
1997	946.7	2921.7	160	0.315998	32.40	-54.07	42.94	65.06
1998	1474.9	3800.9	126	0.29308	38.80	19.75	64.97	43.03
1999	1101.6	2942.2	112	0.206147	37.44	-3.51	47.11	60.89
2000	1040.3	4225.5	114	0.36311	24.62	-34.24	43.19	64.81
2001	2219.4	5219.4	132.2	0.396594	42.52	72.72	89.45	18.55
2002	2589.5	5007	148.1	0.358037	51.72	21.62	101.29	6.71
2003	2329.2	3605.8	146.1	0.186512	64.60	24.90	88.43	19.57
2004	1932.1	4333.6	156.9	0.376789	44.59	-30.98	67.51	40.49
2005	2228.4	4763.9	152.4	0.386416	46.78	4.91	79.69	28.31
2006	2286.3	5120.1	192	0.544087	44.65	-4.54	79.36	28.64
2007	2202.8	4626.5	213.8	0.518192	47.61	6.63	74.21	33.79
2008	1255.0	4218.3	325.7	0.965155	29.75	-37.51	39.35	68.65
2009	1700.4	4750.9	224	0.683314	35.79	20.30	52.96	55.04
2010	2748.8	3149	224	0.089636	87.29	143.90	84.74	23.26
2011	2808.9	5697.8	316	0.912892	49.30	-43.53	84.54	23.46
2012	3062.3	5487.3	313.2	0.759507	55.81	13.20	89.52	18.48
2013	4178.4	6420.4	312.2	0.699959	65.08	16.62	117.91	-9.91
2014	5055.1	7366	284.9	0.658372	68.63	5.45	140.40	-32.40
2015	2645.2	2695.1	204.5	0.010186	98.15	43.02	71.61	36.39
			Med	0.372946	54.98	21.67	72.01	35.99
			Max	0.965155	98.15	285.97	140.40	68.65
			min	0.010186	24.62	-54.07	39.35	-32.40
			growth rate	0.023	0.239	-1.917	1.668	-1.668

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1996	1150.0	1630	207	0.09936	70.55	-18.91	54.44	53.56
1997	946.7	2921.7	160	0.315998	32.40	-54.07	42.94	65.06
1998	1474.9	3800.9	126	0.29308	38.80	19.75	64.97	43.03
1999	1101.6	2942.2	112	0.206147	37.44	-3.51	47.11	60.89
2000	1040.3	4225.5	114	0.36311	24.62	-34.24	43.19	64.81
2001	2219.4	5219.4	132.2	0.396594	42.52	72.72	89.45	18.55
2002	2589.5	5007	148.1	0.358037	51.72	21.62	101.29	6.71
2003	2329.2	3605.8	146.1	0.186512	64.60	24.90	88.43	19.57
2004	1932.1	4333.6	156.9	0.376789	44.59	-30.98	67.51	40.49
2005	2228.4	4763.9	152.4	0.386416	46.78	4.91	79.69	28.31
2006	2286.3	5120.1	192	0.544087	44.65	-4.54	79.36	28.64
2007	2202.8	4626.5	213.8	0.518192	47.61	6.63	74.21	33.79
2008	1255.0	4218.3	325.7	0.965155	29.75	-37.51	39.35	68.65
2009	1700.4	4750.9	224	0.683314	35.79	20.30	52.96	55.04
2010	2748.8	3149	224	0.089636	87.29	143.90	84.74	23.26
2011	2808.9	5697.8	316	0.912892	49.30	-43.53	84.54	23.46
2012	3062.3	5487.3	313.2	0.759507	55.81	13.20	89.52	18.48
2013	4178.4	6420.4	312.2	0.699959	65.08	16.62	117.91	-9.91
2014	5055.1	7366	284.9	0.658372	68.63	5.45	140.40	-32.40
2015	2645.2	2695.1	204.5	0.010186	98.15	43.02	71.61	36.39
			Med	0.372946	54.98	21.67	72.01	35.99
			Max	0.965155	98.15	285.97	140.40	68.65
			min	0.010186	24.62	-54.07	39.35	-32.40
			growth rate	0.023	0.239	-1.917	1.668	-1.668

****average per capita wheat per year (108)kg (Ahmed,1999).**

Source: collected and calculated data from the ministry of planning and development cooperation.

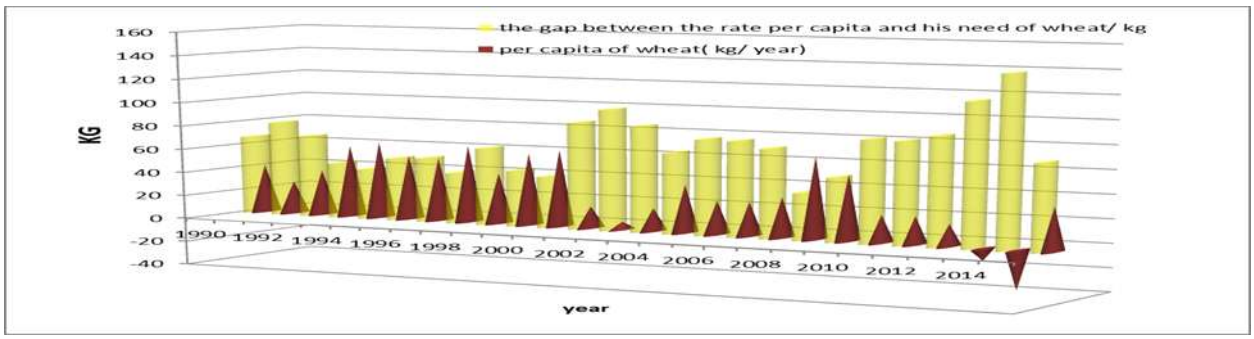

Figure 4. The regilily of the amount of change in the self- sufficiency ratio of wheat crop in Iraq

Figure 5. the development of rate per capita and the gap between the rate per capita and his need the annual of wheat in Iraq for the period(1990-2015).

Source: from the preparation of the researchers depending on the table data(11)

RESULTS AND DISCUSSION

The research reached a number of conclusions from the study of to the reality of Iraqi food security. It is clear that its low level is not due to the lack of agricultural potential, but it is available well enough to achieve national food security and even contribute to solving part of the problem of global food security. Agricultural technological services and the lack of investment financial allocations and credit facilities and qualified human cadres, showing the existence of large deficiencies in agricultural production of Iraq to cover the continuing increases in population growth and compensate for imports from foreign markets, and food security P Iraq's current-cum-taking cast a shadow on the negative development of the magnitude of the financial allocations depriving him of other economic sectors, including the agricultural sector, food producers .

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