

# Agricultural Subsidies in the GCC: Between Cost and Benefit

# — The Case of Kuwait

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Abstract: Agricultural reform has become of pivotal interest for many governments in response to the requirements of globalization and economic liberalization, which are embodied in the World Trade Organization (WTO). In Kuwait agricultural reform, which is essentially a reform of the subsidy program operated by the government takes on an additional simultaneous objective-and that is in fact designated as one of the priorities for the government-to increase the productivity and efficiency of the sector's utility of the subsidies that are allocated to the agricultural sector, which today exceed, K.D 100 million, a 25% increase over the previous year (Al Watan, 2012). Hence, it has become essential for the concerned authorities in the State of Kuwait to review, evaluate and reconsider the current and prevalent agricultural subsidy program, in order to present a strategy to restructure agricultural subsidies that is constructive to the agricultural sector in Kuwait and permissible by the WTO since Kuwait is a member. Integral to this process is a thorough economic impact analysis of consumers and producers, in order to consider the expected economic and financial impacts of various reform scenarios on these groups before introducing reforms. In order to achieve the objectives of this study, the methodology selected employs a macroeconomic assessment of the restructured agricultural subsidies policy, delineating the expected economic and social costs and benefits of this reform-revealing the impacts (this sector includes agriculture (plants and horticulture), livestock and fisheries) in Kuwait; analyzed in the form of a modeled impact analysis using a computational general equilibrium model (CGE) and a partial equilibrium model (PEM). Recommendations for applied reform policies include utilizing indirect subsidies more intensively than the prevailing emphasis on direct subsidies. In addition, select economic indicators were used to set parameters and criteria for the allocation of agricultural subsidies that agree with commitments to the WTO, since the current system employs no specific rationale. Key recommendations include: reducing indirect subsidies, increasing other indirect subsidies in the green box under general services, justifying direct subsidies and benefiting from exceptions to provide direct support for farmers under certain conditions, while reducing interference in the market for agricultural products and strengthening market forces of supply and demand. Several scenarios and numerous recommendations are developed and provided with the objective of raising the level of productivity of

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the agricultural sector and increasing its contribution to the country's gross domestic product (GDP).

Key words: world trade organization (WTO); globalization; agricultural subsidy program; reform

JEL codes: Q, R, C

### **1. Introduction**

Agricultural reform has become of pivotal interest for many governments in response to the requirements of globalization and economic liberalization, which are embodied in the World Trade Organization (WTO). Hence, it has become essential for policy-makers in Kuwait to reconsider and restructure the current and very generous agricultural subsidy program, in order to present a reform strategy that will focus on efficiency, performance and productivity; that is constructive to the agricultural sector in Kuwait and permissible by the WTO. Integral to this process is a thorough economic impact analysis of consumers and producers, in order to consider the expected economic and financial impacts of various reform scenarios on these groups before introducing reforms.

In spite of the generous government subsidy program that supports the agricultural sector in Kuwait, it has failed to achieve its prescribed developmental objectives and its contribution to the country's GDP has typically failed to surpass 0.87%. Agriculture performs an interesting and untraditional role in this oil surplus, arid country; where its value added is motivated by geopolitical considerations and environmental gains as opposed to the typical benefits of food and produce supply. It is mostly in this regard that the value added of the agricultural sector in Kuwait is perceived and valued, unlike other parts of the world that include the United States, the European Union and South America, where the agricultural sector is of strategic economic value added to these economies and a primary contributor to their GDPs. To this effect, the USA and OECD countries together subsidize their agricultural sectors in excess of \$300 billion annually, in spite of the market distorting impacts of these policies which become particularly visible when manifested in the prices of staple commodities like milk, sugar and cheese. From another perspective, continued support of the agricultural sector comes also in light of the country's vision toward environmental protection and sustainable development. Kuwait's agricultural, dairy, livestock, poultry and egg industry may not place the country in self sufficiency status, but domestic production is meeting a good portion of local demand and that has always been viewed by Kuwait's authorities as an important step toward partial or relative food security.

In this light, the objective of this paper is primarily to rationalize agricultural reform and provide recommendations for agricultural reform based on economic analysis, to:

• Restructure agricultural subsidies and redirect much of direct subsidies into indirect subsidies;

• Raise the effectiveness and efficiency of agricultural subsidies in Kuwait in order to increase the productivity of the sector; and

• Reduce waste and limit financial burdens on the national budget on one end; while on the other end, and in accordance with economic liberalization and the WTO's implications.

Based on this, the major tools of this study will include a macroeconomic assessment of the restructured agricultural subsidies policy, delineating the expected economic and social costs and benefits of this reform (this sector includes agriculture, livestock and fisheries) in Kuwait; analyzed in the form of a modeled impact analysis. A computational general equilibrium (CGE) model and a partial equilibrium model (PEM) are the methodology of analysis that will be employed in this paper; an unprecedented approach and application to the agricultural sector in Kuwait. After analyzing the agricultural subsidies program in Kuwait and after delineating a thorough

economic assessment of its implications on prices, productivity, producers and consumption in all three sub-sectors, a number of alternate scenarios of operation will be developed with the objective of forming a holistic and applied strategic reform approach to develop the sector and the market. A number of specific recommendations and options will be the product of this analysis. Eliminating or reducing subsidies on a number of identified products that are deemed infeasible to produce is a probable recommendation. Key foreseen recommendations may include: reducing indirect subsidies, increasing other indirect subsidies in the green box under general services, justifying direct subsidies and benefiting from exceptions to provide direct support for farmers under certain conditions, while reducing interference in the market for agricultural products and strengthening market forces of supply and demand. Several scenarios and recommendations will be developed with the objective of raising the level of productivity of the agricultural sector and increasing its contribution to the country's gross domestic product (GDP).

#### 2. The Agricultural Sector in Kuwait

Aside from the world's general agricultural challenges, Kuwait has additional hurdles of its own that include limited and scarce land resources, low land fertility, scarce water resources and hostile environmental and climatic conditions for agricultural feasibility. In spite of these constraints, Kuwait is adamant and ambitious about augmenting its agricultural sector, by historically investing generous financial, human and know-how resources in the sector, to achieve this objective. In 2007/8, over KD 23 million in direct subsidies were allocated to farmers, this in addition to the indirect subsidies that are already enjoyed by the sector, predominantly in the form of heavily subsidized water and electricity. Justifications for supporting the agricultural sector in Kuwait are multi-factorial and mostly uneconomic. Partial food security, self sufficiency in some products, in addition to geopolitical concerns that include securing the country's strategic northern borders and recruiting Kuwaiti nationals to join the agricultural labor force. To these ends, the agricultural sector in Kuwait has failed to accomplish most of its objectives nor has its contribution surpassed 0.78% of the GDP.



Figure 1 Gross Domestic Product by Economic Activity at Current Prices

The Public Authority for Agriculture and Fish Resources (PAAFR) manages the agricultural sector in Kuwait and it is through this authority that direct subsidies are disbursed. PAAFR manages land distribution, water management, vaccinations and immunizations, training and even R&D to a certain extent. PAAFR encourages the use of diversified crops, in order to sustain the environmental balance in Kuwait, in addition to the use of efficient and effective crops. On an industrial scale PAAFR has played a very cooperative role with operators participating as in kind contributors on many occasions to rehabilitate and develop the sector. It encourages operators and farmers to utilize the outputs of its research and it has consistently encouraged the development of the food industry in Kuwait. Water is heavily subsidized and so is electricity.

PAAFR has developed clear targets for the sector since 1968, prior to that it was a small department within a ministry operating with modest resources and plans. Although plans have varied over the years regarding the strategy to develop the sector, one fact has become clear, and that is there are a set of differentiated and justifiable objectives for the agricultural sector. Typically partial food security is one. In fact Kuwait is approaching self sufficiency in certain products that include eggs and poultry to some extent; the dairy industry is acceptable and in many agricultural products great strides have been made as the study will show. More importantly, cultivating and supporting this sector is of great political value for Kuwait. Geopolitically, the bulk of agricultural activity exists to the North, bordering the Kingdom and Saudi Arabia, and to the South, forming a buffer with Iraq. If one asks at what cost is Kuwait subsidizing its agricultural sector? Primary and secondary research through this study has clearly revealed that the cost will never be "too dear", for these two very important twin objectives. This is where the agricultural sector's strategy emanates in Kuwait. It is critical to understand and appreciate this point because it will offset unjustifiable economic costs and illogical government expenditure. This has become especially true after the Iraqi invasion in 1990.

# 2.1 Agricultural Subsidies Provided in the State of Kuwait

The agricultural subsidy policies in the State of Kuwait are centered on a limited number of mechanisms that are basically direct and easily applicable. Such mechanisms are totally different from those applied in the European Union country members and several other countries which wrap-around the World Trade Organization's agreements. In this section we will review the features and mechanisms of the direct subsidy provided by Kuwait through The Public Authority of Agriculture Affairs and Fish Resources (PAAFR) for the agricultural sector and fishermen on one hand and to the various types of indirect subsidies provided to this sector on the other hand.

In general, PAAFR follows a general strategy that aims to achieve:

• Horizontal development by means of expanding cultivated areas.

• Vertical development by raising agricultural productivity using high yielding seeds and plants that withstand disease and adverse climates, in addition to

- Protected cultivation (greenhouses)
- Direct Subsidies

This subsidy includes the total amounts disbursed by the government directly to the farmers without passing through other entities. The agricultural subsidy policy in the State of Kuwait includes numerous direct subsidy mechanisms, pertaining to the subsidy for the fruitful palms, fisheries, locally born and bred calves, plant production and milk production. In the following section, we will review the most prominent types of direct subsidy, the modality of its disbursement and its total amount if relevant data is available.



Figure 2 Agricultural Subsidies in Kuwait

**Subsidy for Fruitful Palms:** The government endeavors to encourage planting of palms as this tree acclimatizes with the desert environment on one hand and the peculiarities of the Kuwaiti consumers who give special preference for the various kinds of dates. The subsidy is being disbursed according to the number and types of the planted palms. As for the palms' type, a subsidy of K.D 5 is disbursed for the Barhi, Sukari, Khalas and Magddol and a subsidy of K.D 2.5 for other differentiated types. In both cases, the maximum subsidy is disbursed for 1000 fruitful palms of each 6,500 square meters and within the limits of the amount allocated in PAAFR's budget for each fiscal year.

**Subsidy for Fishing Ships and Boats Owners as well as Fish Fodder:** PAAFR carries out a periodic review of the direct subsidy amount it provides annually for both fishing ships and boats owners and fish fodders for fish farming companies. As for the subsidy for fishing ships and boats owners, it is defined according to the type of the ship or the boat used for fishing whereby the total subsidy disbursed for the year 2008 averaged between K.D 500 to K.D 5000 according to the type of the ship or the boat used in the form of free fodders according to the size of the farm, its productivity and the farming system it applies. The subsidy amount of the fish farms fodders for the years 2008 has reached K.D 100,000. It is worth mentioning that the fodders' subsidy is considered as one of the indirect methods which is mentioned here only for a methodological rather than a classificatory reasons of the subsidy.

**Subsidy for the Fresh Milk Producers:** In line with its policy to motivate the local production of fresh milk which is one of the strategic consumption products, the State of Kuwait subsidizes the fresh milk producers with the amount of 80 fils for each liter produced by Kuwaiti farms and delivered to the Kuwaiti dairy manufacturing companies which should meets the Kuwaiti standards and specifications of the fresh milk. Similar to all the other types of direct subsidy in the State of Kuwait, the total amount of the fresh milk subsidy is disbursed within the limits of the amount already allocated and approved in PAAFR's budget for the relevant fiscal year.

Subsidy for Locally Born and Bred Calves: PAAFR provides direct cash subsidy for the calves born and bred locally to the owners of the private farms engaged in breeding cows and providing fresh milk to the local

dairy factories which amounts to K.D 150 for each calf provided that the subsidy is disbursed into two equal payments according the age of the calf.

**Subsidy for Plant Production:** A cash subsidy is provided for the producers according to the types of the vegetables planted and the amount allocated in PAAFR's budget for subsidy of plant production. The subsidy is disbursed for the farmer based on the value of the products supplied to the market during the fiscal year in which the products have been marketed. The calculation of the total amount of subsidy for each farmer is based on PAAFR's local statistics and estimation of the subsidized production. PAAFR has set a list of the specific crops that can benefit from the governmental subsidy, and the amount of subsidy is specified annually by fils per one kilogram of the crop. The subsidy amount for the 2008/2009 agricultural season, for instance, ranged between 25 to 65 fils per kilogram according to each type of vegetables.

Indirect Subsidies

The State of Kuwait provides indirect subsidy whether through PAAFR or other governmental entities. Such type of subsidy basically includes the fodders' subsidy for the livestock sector, providing water and electricity in subsidized prices, exempting producers from products' taxes and other services. In the following section, we will review the most prominent types of indirect subsidy, the modality of its disbursement and its total amount if relevant data is available.

**Subsidy for Fodder:** The State of Kuwait is providing subsidy for fodders for the breeders or the cows, poultry, and ostrich farms once a month according to fodder cards and the lists issued by PAAFR specifying quantity of the subsidized fodders according to its type. Such fodders are received via Kuwaiti Flour Mills & Bakeries Company according to the price specified by PAAFR. As an instance of the mechanisms of disbursing the subsidy, the amount of 2008/2009 subsidy has ranged between K.D 46 to 99 per ton according to the type of the fodder provided. It is worth mentioning that PAAFR defines the subsidized selling price periodically based on the fluctuations of international fodders prices as well as the import costs. One of the most negative aspects regarding the provision of subsidy through the Flour Mills Company is not being able to make sure that this company is providing the best services, lowest import costs, manufacturing and distribution of fodders to the producers, the fact that raises questions about PAAFR's reluctance to call for local or international offers to provide fodders of the best quality and at lowest prices as this will reduce both the amount of fodders subsidy and the selling prices for the producers.

**Subsidy for Energy:** Energy consumption in the State of Kuwait is subsidized by the government whether it is electricity which is provided by the country at a subsidized price that are below the generation costs or the gasoline which is provided at a reduced and tax-free prices, contrary to what is prevailing in other countries of the world. It is worth mentioning that subsidy for electricity and selling gasoline at cost prices is not limited to the agricultural sector as all other sectors and social segments are benefiting from it and it is not expected that it will be affected by the restructuring of agricultural subsidy policies since energy prices in Kuwait are controlled by other governmental entities and aim at improving the standard of living for both citizens and the expatriates in addition to enhancing the Kuwaiti economy's competitiveness by curbing the costs of the of production factors.

**Subsidy for Water:** Kuwait is one of the poorest countries with respect to the availability of fresh water resources due to being located in a desert region. To secure its needs for water, the State of Kuwait depends on three main resources of water, namely extracting groundwater, desalination of sea water and purifying the used water especially for agricultural purposes. Both consumers and the farmers enjoy a huge governmental subsidy with respect to water provision and usage. Such subsidy, coupled with the absence of water consumption

rationalization policies had led to a fast increase in the rations of total consumption of water and to an increase in the salination of ground water which may become non usable water on the midterm.

**Commercial Protection:** Customs protection is one of the most prominent mechanisms for supporting local production of any given country. This type of subsidy is considered to be the most successful one as it leads to an increase in consumer prices in a ratio equal to that of the customs protection and consequently leads to an increase in the production price without the need for direct governmental subsidy to the producers. This mechanism of the indirect subsidy also provides an extra financial resource for the government that can be used in subsidizing the agricultural sector through different mechanisms. Despite the advantages of the customs protection, Kuwait is one of the countries which impose the lowest customs tariff all over the world since the average customs protection does not exceed 5% for all fresh and manufactured agricultural products with the exception of tobacco products. Kuwait's fish and sea products imports are subject to the same protection level although Kuwait's obligations within the World Trade Organization (WTO) allows it to impose customs tariff up to 100%.

**Other Mechanisms of Indirect Subsidy for the Agricultural Sector:** PAAFR subsidizes the agricultural sector through the building of numerous constructional and service projects financed by funds specially allocated in its budget. The most noticeable of these projects are the developing of scientific researches pertaining to the agricultural and fisheries sector, paving the roads in the agricultural areas, delivering treated water to the agricultural areas, providing veterinary and laboratory services etc. The government has also provided direct subsidies for the farmers and the breeders in cases of natural disasters (like frost and cold) and upon encountering a crisis that hits some of the livestock sectors such as Swine Flu.

## 3. Implications of Kuwait's Agricultural Subsidy Program

The above exposition on the mechanisms and features of the agricultural subsidies in Kuwait shows that such policy is characterized by both the lack of clear goals and the complexity of the mechanisms currently applied in implementing this policy particularly in respect of subsidy disbursement. It is quite discernable that mechanisms of direct subsidy for the agricultural, livestock and fisheries production is characterized by non clarity of methods used in calculating its levels, its annual evolvement and ways of disbursement. As it is the case with the direct subsidy, some mechanisms of indirect subsidy are characterized by the inefficiency of its processes, complexity of calculation and disbursement methods as well as its inconsistency on the midrange as it is subject to the principle of abiding by the resources allocated for the subsidy budget of PAAFR through the country budget which in return is subject to the fluctuations of the international oil market in respect of prices or extent of demand change. This section addresses the governmental subsidy programs for the agricultural sector in Kuwait and analyzes it in light of its compatibility or incompatibility with the agricultural agreement of the World Trade Organization (WTO). Considerable significance is assigned to this section as it outlines the recommendations that can be presented regarding the need to restructure the subsidy programs in accordance with the provisions of the agriculture agreement.

#### 3.1 Total Cost of Subsidies Provided by the Government: the Direct and Indirect Subsidies

The State of Kuwait provides considerable subsidies for both plant and animal categories of the agricultural sector. The total subsidy provided by the government during the fiscal year 2008/2009 amounted K.D 44.9 million with an 8% increase against previous year and 27.9% compared to the fiscal year 2005/2006. The total subsidy in the fiscal year 2008/2009 is divided into direct subsidy with the amount of K.D 42.9 million (95.5%), subsidy for the natural disasters with the amount of K.D 533 thousand (1.2%) and indirect subsidy with the amount of K.D

1.4 million (3.1%). It is apparent that the direct subsidy has considerably increased during last year compared to previous years. Average percentage of the three subsidy programs during recent years has reached 78.9%, 12.7% and 8.4% respectively. Table 1 shows the total amount of the governmental subsidy for each type during the four consecutive years covering the period from 2005/2006 till 2008/2009.

Culturida Trans	Total Expenditures on Subsidies (KD)					
Subsidy Type	2005/2006	2006/2007	2007/2008	2008/2009		
Direct Subsidies (Total)	9,736,580	16,205,041	22,944,731	42,987,702		
Subsidy for Plant Productions	5,036,580	7,379,898	6,772,233	6,578,800		
Subsidy for Fodders	3,200,000	6,104,185	12,220,702	31,883,803		
Subsidy for Milk	1,500,000	2,720,958	2,859,986	2,868,616		
Subsidy for Date Palm Trees	0.0	0.0	1,091,810	1,656,483		
Natural Disasters Subsidies (Total)	0.0	1,843,798	16,742,154	533,175		
Frost Damages	0.0	1,843,798	2,939,959	0.0		
Birds Flue	0.0	0.0	13,201,245	0.0		
Bovine TB	0.0	0.0	600,950	533,175		
Indirect Subsidies (Total)	2,114,897	1,648,027	1,760,644	1,432,774		
Medicines & Drugs	1,244,879	781,761	828,884	648,565		
Pesticides	380,642	362,159	449,534	464,728		
Rental of Machinery & Equipment	225,223	232,866	241,726	193,893		
Research & Studies	251,853	251,441	240,500	125,588		
Bovine TB Control	12,300	19,800	0.0	0.0		

Table 1	Total Government	Subsidies for th	e Period from	2005/2006 to	2008/2009
Table 1	Total Obverminent	Substates for th	ic i crioù ii oin	2003/2000 10	2000/200/

Source: Annual Statistics Bulletin for PAAFR & Annual Statistical Abstract for CSO.

## 3.2 Indirect Subsidies Provided by the Government to the Agricultural Sector

The agriculture agreement of the World Trade Organization (WTO) permits providing several subsidy programs for the agricultural sector as long as it does not distort the domestic production or trade and this subsidy is included within the so called "the green box". Examples of subsidy programs allowed within this box are: Governmental services programs (such as: research programs, pest control, training, inspection, marketing and infrastructure) and the direct payments to producers (such as: income security programs, natural disasters aids, environmental programs payments). These programs are characterized by being not subject to the reduction obligations, but rather can be increased. This is added to the fact that developing countries have got the exception allowing them to provide some subsidy to the agricultural producers (either in a direct or indirect way) to encourage rural and agricultural development that are usually incorporated within those countries development programs. The State of Kuwait presents several programs of the agricultural subsidy which are compatible with the limits of the permitted subsidy within the green box. Such subsidy programs include: indirect subsidy, natural disaster subsidy (constructional projects).

## 3.3 Direct Subsidies Provided by the Government to the Agricultural Sector

The agriculture agreement of the World Trade Organization (WTO) has imposed limits on providing indirect subsidy for farmers as it results in distorting the domestic production and trade, either through the cash subsidy or through market price supporting procedures which lies within "the brown box" scope. The main condition is that this subsidy (for the developing countries) should not exceed 10% of the total amount of production either within the level of a specific product or the total production and this is the so called the minimal amounts of domestic support (De mimimis). In December 2008, the agriculture committee of the World Trade Organization has reached the base level for reductions of Overall Trade-Distorting Domestic Support (OTDS) for the developing countries

with the percentage of 20% from the total average of the agricultural production during the period 1995-2000 or 1995-2004 subject to the choice of the member. Through studying the levels of the direct subsidy provided by the State of Kuwait to the agricultural sector with its plant and animal categories during the period from 2001/2002 till 2005/2006, we can clearly judge if the provided support lays within the limits permitted by the Agriculture Agreement and the December 2008 Agreement of the World Trade Organization (WTO). Through studying the direct subsidy levels, we have come to the following conclusions:

• The total amount of the direct subsidy for the agricultural sector exceeds the permitted limits in some years and Table 2 clearly indicates exceeding the limit permitted by the (De minimis) in all years except the year 2001/2002. As per the December 2008 (OTDS), the override was evident only in the year 2004/2005.

		2002/2001	2003/2002	2004/2003	2005/2004	2006/2005	
Production		70,045,100	78,249,000	81,068,600	99,334,200	95,139,000	-
Values of Su	ıbsidy	6,850,000	7,842,871	8,199,443	14,186,472	9,736,580	
De minimis		7,004,510	7,824,900	8,106,860	9,933,420	9,513,900	
OTDS	2000-95	11,080,000	11,080,000	11,080,000	11,080,000	11,080,000	
	2004-95	11,674,100	11,674,100	11,674,100	11,674,100	11,674,100	

Table 2Direct Government Subsidies for the Agricultural Sector for the Period from 2002/2001 to 2006/2005 (in KD)

Source: Finance Affairs Department, Budget Section, PAAFR.

• The total amount of direct subsidy for the plant sector exceeds the permitted limits in some years. Table 3 clearly indicates that direct subsidy for the plant sector has exceeded the allowed limits according to the agriculture agreement (De mimimis) in the years 2001/2002, 2003/2004 and 2004/2005. As per the December 2008 (OTDS), the provided subsidy has exceeded the permitted limit in all years taking in consideration the average of the period 1995-2000, but as for the period 1995-2004, the violation occurred only in the year 2004/2005. In the meantime, the study also shows that direct subsidy for the plant sector on the product level has exceeded the permitted subsidy limits especially in the last three years.

						( )	
		2002/2001	2003/2002	2004/2003	2005/2004	2006/2005	
Product	ion	38,095,300	43,650,600	47,974,500	62,791,000	60,343,000	
Values of	of Subsidy	4,000,000	4,162,900	4,999,443	9,902,547	5,036,580	
De mini	imis	3,809,530	4,365,060	4,797,450	6,279,100	6,034,300	
OTDO	2000-95	3,830,400	3,830,400	3,830,400	3,830,400	3,830,400	
OIDS	2004-95	5,553,500	5,553,500	5,553,500	5,553,500	5,553,500	

Table 3 Direct Government Subsidies for the Plant Sector for the Period from 2002/2001 to 2006/2005 (in KD)

Source: Finance Affairs Department, Budget Section, PAAFR.

• The sole direct subsidy provided by the government to livestock sector is represented only in the fodders due to the desert nature of Kuwait and the lack of natural pastures. Table 4 indicates that the direct subsidy for the livestock sector has exceeded the allowed limits in the last five years according to the agriculture agreement (De mimimis), namely the years 2002/2003, 2004/2005. As per the December 2008 (OTDS), the provided subsidy has not exceeded the permitted limit in any of the above mentioned five years either for the average period of 1995/2000 or the period 1995/2004.

Agricultural	Subsidies i	in the GCO	: Between	Cost and	Benefit-	The C	ase of Kuwait

		2002/2001	2003/2002	2004/2003	2005/2004	2006/2005	
Productio	n	31,949,800	34,598,400	33,094,100	36,543,200	34,796,000	
Values of	Subsidy	2,850,000	3,679,971	3,200,000	4,283,925	3,200,000	
De minim	is	3,194,980	3,459,840	3,309,410	3,654,320	3,479,600	
OTDC	2000-95	5,897,800	5,897,800	5,897,800	5,897,800	5,897,800	
01D5	2004-95	6,120,500	6,120,500	6,120,500	6,120,500	6,120,500	

Table 4	Direct Covernment	Subsidios for the	I ivesteek Sector	for the Deriod from	2002/2001 to	2006/2005 (in KD)
Table 4	Direct Government	i Subsidies for the	Eliveslock Sector	for the Period from	l 2002/2001 lo	2000/2005 (in KD)

Source: Finance Affairs Department, Budget Section, PAAFR.

• The subsidy for milk production has started in the year 2005/2006 and as indicated in the below Table 5, this support exceeded the allowable limits either for the agricultural agreement (De minims) or December 2008 agreement (OTDS).

						· · ·
		2002/2001	2003/2002	2004/2003	2005/2004	2006/2005
Productio	n	6,196,000	6,471,000	7,561,000	6,705,000	7,313,800
Values of	Subsidy	0	0	0	0	1,500,000
De minim	iis	619,600	647,100	756,100	670,500	731,380
OTDS	2000-95	1,285,580	1,285,580	1,285,580	1,285,580	1,285,580
	2004-95	1,298,728	1,298,728	1,298,728	1,298,728	1,298,728

Table 5Direct Government Subsidies for the Milk Production for the Period from 2002/2001 to 2006/2005 (in KD)

Source: Finance Affairs Department, Budget Section, PAAFR.

• According to December 2008 agreement of the World Trade Organization which give members the option to choose either the period 1995-2000 or 1995-2004 to measure the Overall Reduction of Trade Distorting Domestic Support (OTDS) and in light of the basic levels of subsidy for the agricultural sector in the State of Kuwait for the periods 1995/2000 and1995/2004, it is quite clear that the support level provided in the second period is much higher than that of the first period. Therefore, it is better for the State of Kuwait to choose the second period for measurement of the Overall Reduction of Trade Distorting Domestic Support (OTDS).

#### 4. Methodology

The Global mobile model for general equilibrium was used to assess the effects of the World Trade Liberalization Agreement under the Doha round on world prices for agricultural and fish products. Some of technical characteristics of this model are its consideration of the classical economic theory for agricultural and fishery activities and the modern economic theory to industrial and service activities, plus that it adopt a series of static equilibrium as this model feature of the interdependence of the various time periods covered by external non-static parameters such as population, employment development and evolution of capital accumulation and productivity change plus its ability to measure the evolution of world prices. The version used in this study was developed by the Centre for studies, the International Paris BIA (MIRAGE), which is one of the major quantitative methods currently supported in global trade negotiations. The most prominent users of this form include the World Bank, the international trade centre of the United Nations. The assessment of the effects of alternative economic policies as the Doha Round agreement with this kind of transnational models is done through comparing simulation results by simulation of alternative development of the world economy in the absence of further liberalization of world trade, by adopting the hypothesis of a fixed global trade policies during the simulation.

#### 4.1 Production or Supply

There are two basic methods most commonly used in applied studies for modeling economic production process. First, what is known as the arithmetic mean Flex (Flexible Functional Form) that depend on discretionary account for technical relations (Constant Flash of Substitution) or technological, and measured based on a set of special and elasticity of prices, and the second based on the interdependence of descending relationship type flexible interactive static (Constant Elasticity of Substitution) in measuring technological ties.

In terms of the model (MIRAGE) used in this study, the production elements were divided into different sections, and they are intermediate inputs, capital, specialized employment, non specialized employment, land and natural resources. And the model consider that all the various production elements are totally used in production processes with these elements amounts to develop external image of the model, depending on the studies concerned with population growth, employment, land use, and natural resources stocks. The model depends on the assumption that savings rates for each State or entity is external to the model so that it changes the total income in savings associated with distribution by country and economic activities based on the return on capital.

The Modeling the production process is done as a close integration of value added and intermediate consumption for each productive sector. Intermediate consumption for each economic activity is distributed by using the fixed exchange flexibility (CES) with a value the same flexibility as those adopted in the final consumption function (LES-CES) and it was to adopt the same technical structure for each productive sector or final demand. In the second phase, the added value is divided between the demand for land and natural resources group and non-specialized labor and capital group and specialized employment on the other hand, depending on the function of CES type. This method for value-added modeling is taking into account the interdependence existing between capital and specialized employment where the flexibility equals 0.6 which make the elasticity between the value-added and other production elements within 1.1. The model used in this study is based on the premise of full competitive markets (Perfect Competitive Market) and economies of scale (Constant Returns to Scale) in some sectors (such as agriculture and transport) but presumably non-absolute and different competitive landscape with the presence of economies of scale by Krugman (1979) theory and properties of partial equilibrium model (1988) Smith and Venable and based on these assumptions, each enterprise produce one specific type of goods. All enterprises compete according to the ASHN-GUNOT theory that assumes that the production decisions of these institutions do not affect the total volume of production and their competitors. In addition, the production decisions of these institutions can affect the level of global demand through the income effect (Ford Effects). However, it is important to note that all production enterprises using their power or dominate the market, enabling it to influence the sector based price indices.

## 4.2 Income Distribution and Final Demand

The model contains a household example includes consumers from every region of the world by geographic parameters of the model. And the total household income consists of profits from production processes and total salaries and Government transfers and those derived from other States for the domestic sector. With regard to household expenditure it consists of the value of capital tax erosion, final consumer demand, taxes of various kinds, and the rest of the available savings income. Household consumption is divided by function (Douglas-Cobb) to spread consumer choices of goods of various kinds by horizontal expenditure system linked fixed-flexible reciprocity (ES-CES Function L) and enables the model for calculating the evolution of demand structure for each region of the world associated with the evolution of household income as the model is fixed to flexible manufacturing for sectoral consumption that exceeds the minimum level of consumption and installed within one-third of the registered

consumption for the base year for the developed countries and two thirds for developing States and growth. The model also add an extra CES primary function of type (Armington-DixitStiglitz)—which take into account the volume and quality of competition that characterize each of the economies of the countries of the world. The model distinguishes between two levels of quality products selected on a geographical basis so that goods produced in developing countries are different from those produced in developed countries. The premise implies the goods produced in developing countries to compete directly with goods from other developing countries, but less with goods produced in developed countries. The total demand consists of Household sector final consumption, intermediate consumption of goods, investment goods and sectoral demand follows these three components coordinated measuring final consumption itself. It is important to note that the household sector in the model also contains accounts of the country which makes the household sector in this model and pay taxes at the same time which means absence of the country budget directly in this version of the model.

#### 4.2.1 Capital Investment and Total Closure Form

Whatever is the source of capital, each unit invested in any region of the world was modeled through CES function, the method adopted for intermediate consumption but that distribution function SCE different according to the available data. The model considers that capital does not move between the productive sectors and different regions of the world. The premise of the acclimatization is gradual capital stock. The sectoral distribution of investment is optimized, which means that any economic loss associated with changes in economic policy can be considered as the economy adapts variables, and that investment returns may differ between sectors. And according to that the investment is the only determinant to the development of capital stock, with regard to the distribution of investment between different economic sectors and countries around the world linked by capital revenue. The model takes into account many parameters for FDI and affecting rates of investment returns such as market size, economic growth, and market potential. The model also addresses two types of FDI in the first type includes the possibility of acquisition of foreign investors. Both types of FDI aim to achieve the same goal with a clear difference with regard to the difference that related to the dynamic of model in the short term since the acquisition of existing companies does not change in the number of types of commodities unlike sent new institutions.

#### 4.3 Dynamic Form

Most mobile determinants are considered external to the model form (Exogeneous) especially among associated solutions with the time periods covered by the model is considered a function of capital accumulation is exceptional for the locomotive model. It is known in general for mobile equilibrium models the importance of building a normal evolution scenario for the economy before any simulation of alternative economic policy. Depending upon the normal development of the economy (for each entity included in the model) on a set of assumptions for moveable variables including population and employment growth rates and growth factor productivity at each other time periods covered by the model. Since the model accommodates all the productive variables and demographic growth (population and employment), raw real GDP growth obtained in normal simulation is often not matched with other studies or Government expectations and attributed the development of GDP for foreign crude from the model in the simulation, thus making the other variables have differences in expectations is one of the main means used to address these issues.

And according to the objective of this study, which is to measure the evolution of world prices in the case of access to the Convention of trade liberalization under the Doha Round had been adopted include geographical distribution the most productive groups and countries that support the agricultural sector as well as leading

developing countries and consumer groups which do not provide significant subsidy to the agricultural sector, these States and groups as follows:

Developed countries	Developing countries
The European Union (27 countries)	China
Unites States	India
Japan	North Africa
The rest of the developed countries	Middle East (Gulf
	The States of Latin America
	The rest of the developing countries

As for the agricultural sectors, all agricultural products and fisheries were integrated to construct the global information bank for social accounting matrix in order to examine global trade policies (GTAP). User model includes the following sectors by three groups:

Agricultural sectors include:	Industrial sectors include:
Rice	Mining industries
Wheat	Meat industry transferred
Other mills	Canning and Mills
Vegetables and beans	Drinks and tobacco yields
Vegetable oils	Textile and clothing
Milk	Petroleum and chemical industries
Meat	Non-metallic industries
The rest of the vegetable sector products	other industries
The rest of the animal products	
Fish sector	
Forest products	
Finally, the service sector includes:	
International transport services	
Other services	

It is important to note that the Doha round simulation scenario features chose the time period for implementation of the various provisions of the Convention. With respect to agricultural export subsidies, it is understood that the wholesale value of this subsidy will be removed during the period between 2011 and 2013 by agreement in principle for the Hong Kong ministerial meeting in December 2005 with regard to local subsidies of the agricultural sector; simulation assumes in this study a reduction in levels of subsidy as shown in the previous section for the period of 5 years, between 2011 and 2015 and finally in terms of customs reduction on agricultural and non-agricultural imports will be implemented over a period of 5 years for rich countries and 10 Years to developing countries.

## 4.4 Measuring Demand and Supply Elasticities

Notable features of quantitative methods to the economy related to the measurement of demand forecasts and supply when prices change either with consumption or production. Indicators provide the elasticity of demand and supply price or change the income families means of measuring the impact of demand and supply on a specific product as a result of the changes touched on prices which can therefore gauge the demand and supply growth prospects as a result of changing domestic and global economic policies that impact directly on the level of the prices of these products.

#### 4.5 Various Demand and Supply Elasticities

• Elasticity of demand as a result of the change in consumer prices (Price Elasticity of Demand):

This Elasticity highlights the relative change in demand for a particular product as a result of evolution or relatively high prices on the level of consumption, assuming that the rest of the determinants influencing demand are constant. If the elasticity is more than 1% (negatively or positively) the commodities are highly sensitive to price changes due to a change of price level which leads to a reduced level of demand or increase supply by more than 1%, for goods which are characterized by less than 1 which may be goods less sensitive to price change. Finally, when elasticity is equal to zero, the demand or supply of these goods are not affected by any price change.

• Production Elasticity as a result of the change in price (Elasticity Of Producer Price):

Compared with the elasticity of supply, production elasticity as a result of price change for the producers highlight the increased in production anticipated as a result of the increased price of 1%, and therefore are positive.

• Elasticity of demand as a result of the change in income (Income Elasticity-Demand):

This elasticity measures relative change in demand for a particular commodity as a result of the development in household income with 1%, this is an important indicator of the elasticities predicted for the household consumption structure and its development in the light of the continuing economic growth in most of the world, especially the developing ones. One of the most important advantages of the elasticity of demand affected by household income change is the classification of goods according to three different groups as highlighted in Table 6. For goods known as "bottom" is back, the higher the family income. As for "normal" goods, the demand is growing but less than the high level of domestic income. Finally, the demand for goods "high end" is rising faster than family income.

The level of income elasticity of demand	Type of good
0 >	Inferior goods
[0-1]	Normal goods
1<	Luxury goods

Table 6 Classification of Consumer Goods

#### • Supply Elasticities:

To measure the supply elasticities for prices of agricultural and fisheries products of the State of Kuwait was using the econometric model or rather a model of multivariate linear regression in the preliminary phase was used logarithms for all the variables. In order to measure the elasticities, local production quantity (tons) is adopted as the dependent variable that can be explained by four main parameters independent variables of the model. These variables are: production available for consumption (tons), water used in the production of each product, product price, and crop area—it is noteworthy that it optimal to initially adopt a known production function that takes into account the major factors of production, in particular labor and capital, as is the case in Cobb-Douglas (Cobb-Douglas) or flexible Constant Elasticity of Substitution, but the available data does not lend itself to precise measurement of such functions, hence a relationship based on horizontal interdependence between the dependent variables and independent variables was used. It is known that four independent variables are the variables that affect the display of the other variables.

In order to diagnose and recognize the relationship between these variables "elasticities", the least squares was adopted in the first stage and then the quality criteria for appreciation was used in particular statistical "T" or

"F" for statistical summary null hypothesis and "Durban and enact" (DW) to detect the premise link, in addition to the use of the coefficient of determination "R2" so that the model's ability to interpret the greatest possible number of twists in the dependent variable may be identified.

• Demand Elasticities:

In addition to demand price elasticity and demand household income elasticity, measuring the elasticity of demand to change the consumer price index plus to change in population in addition to the demand income elasticity to the change in household or consumers income. Similarly to measuring the production elasticities, an attempt was made to measure the elasticities of demand through an integrated function for consumption as a function of the LES or Linear Expenditure System, but the results were not acceptable for two main reasons: lack of some basic data and poor quality data available. So are relying on standard economic model or accurate model of multivariate linear regression in the preliminary phase on the logarithm of total variables. Volume was considered consumption (in tons) as the dependent variable was the integration of income per capita, general index of consumer prices, wholesale price, and number of people as variables.

**Partial equilibrium model**—to measure the impact of alternative policies of agricultural support in the State of Kuwait.

A partial equilibrium model was developed specifically to study the alternative proposals for agricultural and fish subsidies in Kuwait. A partial equilibrium model assumes that an economic sector or activity is characterized by the absence of interlacement relations or important links with the rest of the various economic sectors of the country's macroeconomic structure. Partial equilibrium models are not used normally when it is subjected to the analysis of many economic policy instruments at the same time as when assessing the economic impact of the application of free trade agreements, customs union and which typically include all or at least most commercial exchanges between States and the introduction of several simultaneous changes on trade policy and financial tools which include all economic sectors on the one hand, and the different sectors such as the country, enterprises, and household sector and the rest of the world. For these reasons, partial equilibrium models are most suitable for studies associated with a specific set of goods or economic sector. The application of partial equilibrium models assume that an external shock or a change in policy instrument linked to a particular economic sector or group of goods that are made will lead to a limited or a weak impact on the rest of the economy. Based on this premise, the effects or impacts of external shocks or any change in the economic policy instruments on income distribution and sectoral disruptions cannot be measured using partial equilibrium models.

Since the agricultural sector in the State of Kuwait has doubled its contribution to the overall economy of the State, both at the level of gross domestic product (GDP), total exports and the creation of jobs for Kuwaitis; applying a partial equilibrium model to study the agricultural sector of the State of Kuwait is appropriate. In addition to simple contribution to macroeconomics, the agricultural sector in the State of Kuwait is characterized by poor integration with the rest of other economic activities is a fundamental reason behind the use of this second type of models in this study. Following are the most important characteristics and components of the model used in this study.

# 4.6 World Prices

"Border Prices" represent the cost of production of a certain good for economy of a certain State that imports the product, which could therefore determine the competitiveness of the country in the production of that commodity. Hence, based on the theory of comparative advantage compared with the price at the border, any country will consider that it is "wasting" productive resources in the case where the cost of production of a certain good exceeds the border price value of its imported rivals. Measuring the domestic price of imports at the border by using the following formula:

Pb = ePw

And represents, e: exchange rate

Pw: the world price at the border prior to the completion of customs procedures.

Pb: the domestic price of imports at the border after the completion of the customs formalities.

It is important to note that the default exchange rate represents the cost of the foreign currency for the national economy of the country under the study. The exchange rate which measures the price at borders should reflect the true economic cost of the national currency. It is also important to take into account all aspects of trade protection, both those based on tariffs or other in any assessment of the restructuring subsidy policy to a particular economic sector. Numerous studies have highlighted how macroeconomic policies affect the internal price and hamper the growth of the agricultural sector through strengthening the competitiveness of the imported goods on domestic markets of many countries in the world, especially the developing ones.

In order to measure the relationship between the price at the border, Pb, Pw, world, price is usually resorting to the use of long-term time series models for reducing the effects of global price fluctuations in the short and medium term.

It is important to note that the goods under the study, whether exported or imported, require some corrections to prices by introducing transport and insurance costs and margin cost. For exported goods, the price at the border represents the price at the point of export after the transportation costs from the estate or exploited. This price is known as the free price when transport (F.O.B). As for imports, the price at the border represents the cost or price of the product plus insurance and freight costs are known accurately at cost, insurance and freight (C.I.F).

# 4.7 Consumer and Producer Surpluses

As mentioned earlier, one of the most important advantages of partial equilibrium models is that they reveal the effects of any economic policy structure associated with a product or a certain surplus or products and the impacts that occur to welfare of consumers and producers in particular and sometimes the government sector. Reed (2001) offers an integrated analysis on consumer and producer surplus and the importance of measuring comparative changes in welfare levels.

# • Consumer Surplus

The main tools used to measure changes in the level of welfare of consumers following the acquisition of products at prices below what it should be. To highlight this, assume that the regular demand function is of type bend downward (downward sloping), meaning that consumers usually they enable to choose their consumption levels increase whenever the prices were low compared to what it should be. This is the profit the consumers known as consumer surplus. Figure 7 shows the supply and demand of specific product and interrupt them to achieve balance in the domestic market. Among the presented shape, abc which is usually under the demand function and above the market price and consumer surplus represents the size of the total consumer gains that can be achieved and that are paid in cash is a result of the real level of market prices.

• Producers' Surplus

As for consumers, producer surplus measures the increase in the level of welfare of producers to sell their products at prices exceeding production costs. Since the normal view function is characterized by steep upward (upward sloping), producers usually have the capacity to produce some quantities of the product in question, even at prices lower than market prices. The accumulated net profits are of the so-called surplus producers. Using the

same example above, Figure 4 shows "bcd" that are higher than the additional cost of the function the last unit produced (marginal cost) and lower than the market price.



4.7.1 Mathematical Equations of the Partial Equilibrium Model

The developed model can calculate the new partial balance from an alternative scenario to restructure agricultural support in the State of Kuwait. To provide this new package the model depends on the integrated system of equations for all goods or products under the following four basic equations:

(1) 
$$\hat{D}_{i} = n_{i,j} \hat{P}_{e,i} + \sum_{j=1}^{j} n_{i,j} \hat{P}_{e,j}$$
;  
(2)  $\hat{S}_{i} = \varepsilon_{i,j} \hat{P}_{p,i} + \sum_{j=1}^{l} \varepsilon_{i,j} \hat{P}_{p,j}$ ;  
(3)  $\Delta X_{i} = \Delta M_{i} - D_{i} \hat{D}_{i} + S_{i} \hat{S}_{i}$ ;  
(4)  $\Delta M_{i} = \frac{A \text{ new}}{1 + A \text{ new}} D_{i} \hat{D}_{i} \left[ \frac{A \text{ init}}{1 + A \text{ init}} - \frac{A \text{ new}}{1 + A \text{ new}} \right] D_{i}$ ;

Where:

$$\mathbf{A}_{y} = \left[\frac{\alpha m}{\alpha d} \left(\frac{Pd}{Pm}\right)_{y}\right]_{i,y}^{\sigma}$$

Equations (1) and (2) highlight the new supply and demand after simulations subject to price change and trade policy concerning the product in question on the one hand, and proportions of various elasticities of supply and demand and cross rates. Equation 4 defines the relationship between imports and domestic supply on the basis of the link between domestic supply and price when supply as evidenced by the following equation:

$$\frac{M}{D-M} = \left(\frac{\alpha m}{\alpha d} \frac{Pd}{Pm}\right)^{2}$$

While Equation (3) highlights the market equilibrium so that even total domestic production and imports with total consumption and internal demand exports.

Price: all domestic prices associated with world prices on the one hand and trade protection and local subsidy tools for the product under consideration on the other, which is precisely why building such model does not require price data collection or trade exchange costs such as transportation costs, insurance and trade margins. With regard to the protective tools and subsidies, they are accounted in the model after being converted into percentages of prices (advalorem rates). As the relationship between local and global prices is quite complex especially when there are opposite directions of trade for the same product (import and export), it is important to address this problem to unite various levels of prices for the same product. To address this problem, the methodology that adopted in this study is to measure the price of mixed (composite price) and well known mixed (composite tariff) to calculate the price change in production and price when no impact consumption simulation of new support policies in the country exist. Furthermore, to measure price, products are divided into three basic groups: imports, exports, and domestic production in the local market (Sd). Mixed price measurement in the local market (td) over average weights (Weights) two types of taxes if applicable: export tax (tx), and tax on imports (tm) with exports (X) and imports (M) according to the following equation:

$$td = (Xtx + Mtm) / (M + X)$$

Either price when domestic supply is measured by the following equation:

$$Pd = Pw(1 + ta)$$

with:

Pw: the world price

As the domestic price of imports, measured through the following equation:

$$Pm = Pw(1 + tm)$$

Based on the above the mixed price is measured when consumption through the following equation:  $1^{1}$ 

$$\mathbf{P}_{c} = \left(\alpha_{m}^{\sigma} \mathbf{P}_{m}^{1-\sigma} + \alpha_{d}^{\sigma} \mathbf{P}_{d}^{1-\sigma}\right)^{1-\frac{1}{e}} \mathbf{e}$$

With respect to the mixed price: when production is measured by the average weights of the export tax (tx) and the average market price (td) compared with total exports (X) and domestic supply (Sd) in addition to the support procedure (tp) by the following equation:

$$ts = (Xtx + Sd td) / (S + tp)$$

So the price can be measured at the output (Ps) by using the following equation:

$$\mathbf{Ps} = \mathbf{Pw} \left(1 + \mathbf{ts}\right)$$

It is important to note that this method is not supported for prices when consumption and production occur

during normal simulation modeling (calibration) or during the simulation of alternative agricultural support policies. This methodology basically enables the measurement of prices and changes associated with the simulation of the direct agricultural support structure with different situations. In the absence of exports of a particular product, the prices used reflect when production is subject to influence of tariff protection on imports and domestic subsidies.

• Welfare change indicators

Total welfare change consists of three basic parts: the welfare of producers (Producer Surplus), the welfare of consumers (Consumer surplus) and the country welfare. The level of change the welfare of producers varies as income levels change from product price and quantity change of local production. Consumer welfare is linked to the relative change of depreciation cost resulting from the price change when consumption and quantities change. Finally, public welfare changes because of the relative change in a specific sector spending as a result of the change in the subsidy policy. The following equations highlight how to measure these changes in the welfare of the three sectors that determine the beneficiary and the loser of the subsidy policy structure and utilization and loss. These are the three important indicators in decision-making regarding the option to approve or reject alternative subsidy policies.

-Changes in the level of well-being of producers:  $\Delta PS = \sum_{i=1}^{n} \Delta P_{P_i} \left[ S_i + 0.5 \left( \Delta S_{id} \right) \right]$ 

-Changes in the level of well-being of consumers:  $\Delta C S = \sum_{i=1}^{n} \Delta P_{ci} \left[ D_{i} + 0.5 \left( \Delta D_{di} \right) \right]$ 

-Change the welfare state: the change in net income ( $\Delta$ NGR), which in turn includes the change in revenues from taxes on imports and changes in levels of sectoral support:  $\Delta$ NGR =  $\Delta$ TR- $\Delta$ DS

$$\Delta NGR = \sum_{i=1}^{n} \left[ \left( t_{w_{i}} + \Delta t_{w_{i}} \right) \left( M_{i} + \Delta M_{i} \right) - t_{w_{i}} M_{i} \right] - \sum_{i=1}^{n} \left[ \left( td_{i} + \Delta td_{i} \right) \left( S_{i} + \Delta S_{i} \right) - td_{i} S_{i} \right]$$

So the total change in the overall welfare of the economy measured by the following equation:

$$\Delta N = \Delta PS + \Delta CS + \Delta NGR$$

## 4.8 Database Construction of Partial Equilibrium Model

One of the most important characteristics of equilibrium models, whether an individual balance or partial or total lie in the fact that statistical data may be limited to one time period, usually a year, unlike time series models where statistical data covering periods typically requires long time series. Given the structure of the model used in this study and to provide the required statistical data density, fiscal year 2006/2007 has been identified as the selected base year (base year for partial equilibrium model building because it is the most recent year or period where more complete data is available) statistical data are required to build static partial equilibrium model (static) into two basic:

- Statistical data for the products in question.
- Data on the value of various elasticities for equations of the form.

Regarding statistical data, which includes many variables, it is provided by PAAFR for 2006/2007 include:

- The value of production for each agricultural produc.
- The value of exports of each agricultural product.
- Imports of each agricultural product.
- Direct support for each agricultural product.

It is important to note that some products have enjoyed subsidies from the 2006/2007 and to integrate these products in the database for the model we assume that the level of subsidy received in the years in which the subsidy data are available is the same at the level of production value registered in 2006/2007, for lack of these data sets after

the base year. To clarify further, for example, adoption of this hypothesis for dates and products that enjoyed subsidy first from year 2007/2008, as well as for the production of strawberries and watermelon. For these three plant products limited existing data on the amount of funding spent since 2007/2008 is available. With respect to livestock products, the subsidy rates were calculated using a special method as a result of the dominance of feed subsidies on the total resources for this sector. In the first phase, total value of feed subsidy was calculated and distributed in the same proportion to the total value of production of meat, dairy products and eggs. In the second phase a special subsidy value was added for each product as a way to achieve the total subsidy associated with each product. For example milk subsidies consist of direct subsidies on the price level and indirect subsidies on feed prices.

Regarding the fisheries sector, the subsidy rate was calculated from the direct subsidy of houseboats while private subsidy has been closely involved in aquaculture by calculating the subsidy given as feed.

The second phase of building the database relates to elasticities of the form which consists of the following list:

- Supply associated with price elasticities of production by product.
- Demand elasticities associated with consumption rate by product.
- Convert local production elasticities between domestic supply and export by product.
- Compensation elasticities between the consumption of domestic products and suppliers by product.

With respect to customs duties on imports, Kuwait currently imposes a tariff of 5% on all agricultural imports, animal products included.

# 4.9 The Questionnaire

A comprehensive questionnaire was carried out in the agricultural sector, targeting the operators of farms themselves, the producers. This part of the study focused on deriving primary, soft and hard data that may contribute to the study's understanding of other complementary factors that include management and human resources, as an additional source of information. The surveys involved visits to all the farms and businesses that participated in the questionnaire which was initially tested on a pilot group of operators and then reviewed and re-evaluated, before it was conducted on a wide scale

Surveys				
The total number of questionnaires	337			
Agriculture sector	118			
The livestock sector	110			
Fisheries sector	98			
Aquaculture sector	11			

# 5. Results and Conclusions

Based on the analytical framework of this study, the primary and secondary research, together with results generated by the model, the following may be deduced:

The bulk of subsidies distributed in direct form should be restructured so that they formulate a greater portion of the indirect package in order to reduce rent seeking behavior amongst operators in the sector, increase the efficiency and effectiveness of production.

The government of Kuwait operating through the Public Authority for Agriculture and Fish Resources (PAAFR) increases the subsidy bill annually because of political pressures produced by the collective bargaining power of Kuwaiti farmers rather than in favor of the productive capacities of the sector. The agricultural sector in

Kuwait will continue to be supported for geopolitical and security reasons, which is a small price for Kuwait to pay regardless of the cost or the irrationality behind it.

Restructuring agricultural subsidies within in a holistic and developmental framework for Kuwait will require the government and PAAFR to quality the subsidy program that it operates so that it addresses a number of challenges that can be summarized as follows:

• To specify targeted products based on their relative comparative advantage; especially in terms of resource utility, productivity and economic feasibility.

• To identify minimum levels of productivity for each produce and commodity produced, so that resources efficiency could be benchmarked.

• To establish a transparent mechanism of disbursement.

• Greater use of indirect subsidies should be the primary target in the coming phase; it will reduce rent seeking behavior on the part of farmers and operators in the sector, and increase the productivity of the sector, in addition to reducing market distortion.

• Introducing modern farming techniques and technology in the agricultural sector, in addition to the provision of basic management training to farmers and operators will increase efficiency and productivity.

• Developing clear regulations, legal procedures and rules that can be a point of reference to the farmers and operators in the sector.

• To eliminate subsidies on products where the subsidy exceeds 50% of the cost of production.

• To eliminate subsidies for products that have surpassed the infant stage of development and have well established and mature markets and private sector operators, like the poultry industry in Kuwait, where energy intensity is an issue of debate.

• Minimum pricing (production and consumption) should be encouraged in place of direct subsidies.

• PAAFR should focus on subsidizing investment in the sector rather than the farmers, so that the benefits may be globalized across the board. Subsidizing new technology, new water saving devices, technology and fish farming methods is more rewarding to the sector at large.

• Subsidizing though feed and fodder.

• Subsidizing the sector through R&D and infrastructural investment. This will give PAAFR additional resources for investment.

## 6. Recommendations

The study provides an analysis of Kuwait's WTO commitments and implications on the agricultural sector, revealing that in accordance with the agricultural agreement, Kuwait's "direct" subsidy program surpasses "allowable" limits. The most critical recommendation that the study produced regarding the country's WTO commitments and international trade, prescribe; reducing direct subsidies; increasing indirect subsidies allowed under the "Green Box", usually referred to as "general services"; providing adequate and convincing justifications for the provision of direct subsidies and reducing the intervention of the Public Authority for Agriculture and Fish Resources (PAAFR) in the market and allowing the forces of supply and demand to operate undistorted.

Upon analyzing the agricultural subsidies program in Kuwait and after delineating a thorough economic assessment of its implications on prices, productivity, producers and consumption in all three sub-sectors, a number of alternate scenarios of operation have been developed with the objective of forming a holistic and

applied strategic reform approach to develop the sector and the market. A number of specific recommendations and options have been the product of this analysis, the most important of which include the following:

- Eliminating or reducing subsidies on a number of identified products that are deemed infeasible.
- Eliminating direct price subsidies.
- Compensating producers by raising protection levels and introducing the lowest entry price policy.
- Employing a mechanism of local price ceilings in order to protect producers' incomes.
- Subsidizing investment-oriented activities that encourage developing and upgrading the agricultural sector.
- Subsidizing investment in infrastructural projects and research and development (R&D) activities.

• Prioritizing agricultural products and activities in accordance with a set of criteria that factors in the suitability of Kuwait's environmental, ecological and climatic conditions, in addition to the economic feasibility of producing specific agricultural products or investing in agricultural activities, especially considering their over-consumption and depletion of water and other scarce resources.

• Identifying the value of investments required for each sub-sector in order to accomplish the agricultural sector's strategic objectives.

• Conducting studies to cost products and evaluate profit margins in order to identify price levels of production and distribution, for each product.

• Utilizing excess financial resources to establish a developmental agricultural fund, in collaboration with the Ministry of Finance (MOF).

• Exploring the viability of establishing an agricultural bank to support investments in the sector in order to achieve its objectives and implement its developmental strategy.

## 6.1 Specific Recommendations with Respect to Agriculture Agreements under the WTO

Based on the above mentioned outcomes and the review of other subsidy programs that falls under the permitted programs such as the green box and the development programs, it is now appropriate to draw a number of recommendations to PAAFR. Such recommendations are mainly centered on ways to benefit from the several exceptions included in the agreement, and consequently lead to avoidance of any conflict between the subsidy programs and the agreement. Such recommendations are as follows:

• Endeavoring to reduce direct subsidy and keep it within the permitted limits.

• Increasing other types of indirect subsidy included in the agreement within the green box under the "supporting the general services" item.

• Providing acceptable justifications for provision of direct subsidy and benefiting from the exceptions included in the agreement which allows providing direct subsidy to the farmers facing unusual circumstances.

• Lessening PAAFR's interference in the agricultural products market as much as possible and allowing the market's supply and demand forces to determine both prices and produced quantities.

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