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Economic Efficiency and Resource Productivity on Small Broiller Farms in Saudi Arabi

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ECONOMIC EFFICIENCY AND RESOURCE PRODUCTIVITY ON SMALL BROILER FARMS IN SAUDI ARABIA

By,

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I. INTRODUCTION:

Increasing attention has been focused upon resource Productivity and adjustment problems of agriculture during recent years in the kingdom of Saudi Arabia, more foods have to be produced each year to satisfy the increasing needs of the population and to provide sufficient row matirial for industrial development.

In current prices, Gross Dross Domestic Product of agriculture's sector in Saudi Arabia rose from SR 994 million in 1389-90 to SR 18.3 billion in 1407 - 08. Real GDP of the agriculture's sector grews from SR 4.4 billion in 1389 - 90 to SR 18.4 billion in 1408 - 90. The agriculture sector's contribution to real GDP increased from 2.8 percent in 1389 - 90 to 5.3 precent in 1407/08.

In support of the government's policies to promote the development of the agriculture sector, interest free credits provided by the Saudi Arabian Agricultural Bank (both short-term and miduim - term loans) rose rapidly until recently. Total agricultural Bank loans rose from SR 16.6 million in 1390 - 91 to SR 4.2 billion in 1402 - 03 and have since gradualy declined to SR 755 million in 1908 - 09.

Government subsidies at the present time include payments to subsidize the cost of food, payments made to farmers, social security payments, subsidies to electric utilities, and a miscellaneous of other payments related to social care, youth clubs, public transport etc. Agricultural subsidies had paid to farmers in order to promote the development of the agriculture's sector. These subsidies rose from SR 4 million in 1392 - 93 to SR 1.5 billion in 1404 - 05, and reduced to SR 404 million in 1408 - 09 (table no: 4-)

Table (1)

The agriculture sector's contribution to GDP in Producer's value during the priod (1389/1407-08)

million Saudi Riyals (in current Breces)

Year	Agriculture, Forestry & Fishing	GDR	Percentage %
1389-90 (1969/70)	994	16,612	5.00
1390-91 (1970/71)	1025	19,540	5.25
1391-92 (1971/72)	1063	25,250	4.21
1392-93 (1972/73)	1127	33,779	3.34
1393-94 (1973/74)	1218	66,938	1.82
1394-95 (1974/75)	1347	120,397	1.11
1295-96 (1975/76)	1529	155,534	0.98
1396-97 (1976/77)	1788	190,603	0.94
1397-98 (1977/78)	3067	221,396	1.39
1398-99 (1978/79)	4193	244,415	1.72
1399-1400 (1979/80)	4601	339,147	1.32
1400-01 (1980/81)	5398	483,345	1.12
1401-02 (1981/82)	6535	536,427	1.22
1402-03 (1982/83)	8345	459,907	1.82
1403-04 (1983/84)	9645	392,139	2.46
1404-05 (1984/85)	11620	347,425	3.34
1405-06 (1985/86)	13789	310,032	4.44
1406-07 (1986/87)	16861	267,846	6.30
1407-08 (1987/88)	18312	272,041	6.73

Source: Ministry of Planning, Kingdom of Saudi Arabia, "Achievements of the Development Plans (1970 - 1989)."

Table (2)

The agriculture sector's contribution to GDP in Producer's value

(at 1984 constant prices)

(million Saudi Riyals)

Year		Agriculture, Forestry & Fishing	GDP	Percentage %
1389-90	(1969/70)	4449	157,475	2.83
1390-91	(1970/71)	4,598	178,177	2.58
1391-92	(1971/72)	4,756	209,799	2.27
1392-93	(1972/73)	4,935	253,738	1.94
1393-94	(1973/74)	5,104	302,265	1.69
1394-95	(1974/75)	5,297	326,849	1.62
1395-96	(1975/76)	5,521	336,621	1.64
1396-97	(1976/77)	5,802	373,747	1.55
1397-98	(1977/78)	6,428	403,262	1.59
1398-99	(1978/79)	7,017	418,785	1.68
1399-1400	(1979/80)	7,402	448,849	1.65
1400-01	(1980/81)	7,861	483,007	1.63
1401-02	(1981/82)	8,325	485,915	1.71
1402-03	(1982/83)	9,065	414,852	2,19
1403-04	(1983/84)	10,211	374,613	2.73
1404-05	(1984/85)	11,620	347,425	3.34
1405-06	(1985/86)	13,707	321,157	4.27
1406-07	(1986/87)	15767	360,493	4.37
1407-08	(1987/88)	18351	343,366	5.34

Source: Ministry of Planning, Kingdom of Saudi Arabia "Achievements of the Development Plans (1970 - 1989)".

The Saudi Arabian government give subsidies and short and midium term credit to develop the poultry production sector. The subsidies and credit apply to all farms of poultry production (egg and broiler farms, parent stock farming, hatcheries etc.).

Since 1393 A.H. (1973 A.D.) the government had allowed a subsidy on feed concentrates of 50% of the C.I.F. value of these concentrates. Besides, it was decided to allow a subsidy of 50% of the C.I.F. value for imported maize used in the feed in 1973. Also, the government had allowed a special subsidy for poultry farms upon their purchase of imported installations and equipment in 1394 A.H. (1974 A.D.). This is set at 30% of the C.I.F. value upon the condition that the goods are not financed by the Agricltural Bank. When So, then the subsidy is reduced to 20%. The subsidy applies to practically all installations, apparatus and equipment a poultry farm could need, for instance complete cage battery systems, incubators for hatching automatic feeding installations, feed mixing equipment, saultering equipment, refrigeration systems, etc.

The Saudi Arabian Agricultural Bank grants paultry farms short and midium term interest free credit for financing their new or extension undertakings or for covering running costs on exsting farms. By this means the total investment for a poultry farm equal to SR 3 million and less can be up to 80% financed by the Bank, and up to 60% for the investment over SR 3 million. For the purchase and installation of technical equipment appliances and buildings, the Bank allows midium term credity with a repayment period of 5 years. In order to finance the purchase of chicks and feed, short term, 2 years credit is given to egg farms but a 1 year repayment

Table (3)

Investment credit to private sector by government through the Saudi Agricultural Bank during the period

(1398/90 - 1408/90)

million Saudi Riyals

Year		Number	amount (SR)
1389-90	(1969/70)	4356	16
1390-91	(1970/71)	4381	17
1391-92	(1971/72)	3865	17
1392-93	(1972/73)	4477	20
1393-94	(1973/74)	5414	36
1394-95	(1974/75)	16251	146
1395-96	(1975/76)	19702	269
1396-97	(1976/77)	21377	490
1397-98	(1977/78)	20298	586
1398-99	(1978/79)	23758	709
1399-1400	(1979/80)	19782	1129
1400-01	(1980/81)	45128	2531-
1401-02	(1981/82)	37440	2933
1402-03	(1982/83)	28886	4166
1403-04	(1983/84)	23886	3496
1404-05	(1984/85)	14746	2322
1405-06	(1985/86)	9209	1551
1406-07	(1986/87)	7063	1019
1407-08	(1987/88)	4792	841-
1408-09	(1988/89)	3750	755

Source: Ministry of Planning, Kingdom of Saud Arabia "Achievements of the development plans, (1970-1989).

period only is allowed in this respect for broiler farms. The feed subsidies become now SR 13 for every 50 Kg of imported maize and baraly.

The yearly total production of broilers grew from 8.1 million birds in 1971 to 317 million birds in 1987 which represented about to 72% of the total consumption of broilers in Saudi Arabia, under the assumption that a broiler weight 1 Kg. It can be clearly seen that about 75% of the total production fall to the west region, and 12% to the central region. The share of the total production falls to 7% in Eastern region where small farms were existed. The average of flock in these farms ranged between 5,000 to 12,000 bird.

This study deals with some aspects and approaches needed to attain economic efficiency of resource productivity on poultry farms in the Saudi Agricultural sector. From the standpoint of both the whole economic program and policy, and the individial farmer, this study provides information about resource productivity when the resources are combined and used on broiler farms in a particular agricultural region (The Eastern region).

2. OBJECTIVES:

The general objective of this study is to examine and measure some aspects of production efficiency on small broiler farms in the agricultural sector of the QATIF region in the kingdom of Saudi Arabia. Since one of the major problems in the field of agricultural economics is the determination of the nature of resource productivity in agriculture, this study concerns itself with the economic efficiency and resource productivity as used by small broiler producers and deals with the tangible measure of economic efficiency and resource productivity.

Table (4)

Agricultural subsidies to private sector during the period (1390/91 - 1908/09).

(1399/1400 = 100) million Saudi Riyals

Year.	Agricultural subsidies		Total subsidies		Percentge %
	amount (SR)	Indices	amount (SR)	Indices	
1390/91		-	49.8	1.2	-
1391/92		-	60.7	1.6	-
1392/93	4.0	o.7	76.2	1.9	5.0
1393/94	20.0	3.4	469.4	11.7	4.0
1394/95	69.5	11.8	1,198.3	29.9	6.0
1395/96	333.0	58.8	1,553.1	38.8	21.0
1396/97	603.0	102.9	2,153.5	53.8	28.0
1397/98	772.0	131.7	2,825.1	70.7	27.0
1398/99	829.0	141.5	3,390.5	84.7	24.0
1399/1400	586.0	100.0	4,003.8	100.0	15.0
1400/1401	766.0	130.7	6,600.9	164.9	12.0
1401/02	1,129.0	192.7	11,187.0	279.4	10.0
1402/03	1,472.0	251.2	11,165.0	278.9	13.0
1403/04	1,173.0	200.2	8629.9	215.5	14.0
1404/05	1,478.0	252.2	9,134.2	228.1	16.0
1405/06	994.0	169.6	6,833.0	170.7	15.0
1406/07	480.0	89.3	5,696.7	170,7	8.0
1407/08	335.0	57.2	4,832.0	120.7	7.0
1408/09	404.0	68.9	2,571,4	64.2	16.0

Source: Ministry of Planning, Kingdum of Saudi Arabia.

Table (5)

Development ratio of total broiler's production to total consumption in the kingdom of Saudi Arabi during the period (1972 - 1988)

Unit = thousans ton

Year.	Local Production of broilers	Imports	Total Consumption	Ratio of Local Production to Total Consumption
1972 (1392)	8.1	10.1	18.1	44.2
1973 (1393)	8.0	11.9	19.9	40.2
1974 (1394)	11.0	18.0	29.0	37.9
1975 (1395)	14.0	36.5	50.5	27.7
1976 (1396)	21.0	69.6	90.6	23.2
1977 (1397)	23.0	100.8	123.8	18.6
1978 (1398)	26.0	109.0	135.0	19.3
1979 (1399)	30.0	140.4	170.4	17.6
1980 (1400)	40.0	193.3	233.3	17.1
1981 (1401)	57.0	181.3	238.3	23.9
1982 (1402)	86.0	196.3	282.3	30.5
1983 (1403)	124.0	182.0	306.0	40.5
1984 (1404)	143.0	164.0	307.5	46.5
1985 (1405)	177.0	166.5	343.5	51.5
1986 (1406)	240.0	122.0	362.0	66.3
1987 (1407)	317.0	125.0	442.0	71.7

Source : (1) Ministry of Planning, Kingdom of Saudi: Arabia

(2) Saudi Arabian Monetary : Annual Reports, Riyadh, Saudi Arabia.

3. SOURCE OF DATA:

A Complete primary survey for brailer farms in the eastern farming area in the Saudi Arabia has been previously done, and the data obtained was analyzed and used as the basis for the planning of the sample used in the investigation. The main statistics of this study are based on a stratified sample and survey of covering. seven sub areas at QATIF region: Al AJAM, ANIK, QATIF, SAIHAT, SAFWA, TARUT And UMM AL SAHIK. A total of 14 small poultry farms were then chosen at random in 1987 from these seven agricultural areas. All information obtained in the farm survey is related to the year 1987/1988. Specifically, the data investigated is related to the farm business year from Nov. 1987 to Oct. 1988. Information concerning the quantity and value of farm output was collected in conjunction with the magnitude of land, labor, as well as various items of capital input. The latter included such items as feed services, value of chicks, fuel, Oil, depreciation on building, machines and equipment, fences, wells, and all other capital items used directly or indirectly in broiler production activities.

4. COMPUTATION METHOD AND ALTERNATIVE FUNCTIONS:

Production functions analysis was employed for the estimation of the productivity or returns of resources used on small broiler farms in the eastern agricultural region. The Cobb-Douglas function is being used in the analysis to determine the production coefficients. Input of resources used on the farms have been classified on the basis of preliminary analysis. The variables included in this study are:

a) farm output which is the dependent variable, and b) land, labor, and capital which are independent or explanstory variables.

The regression equation is of the form below:

$$Y = \alpha \prod_{i=1}^{m} B_i X_i$$

Where, "Y" refers to the farm output; "X_i" refers to the variable input (i=1,....,m); " α " is constant variable; and "B_i" is the production coefficient with respect to productive input, X_i, respectively. This function is homogenous at degree $\sum_{i=1}^{m} B_i$, the sum of all production elasticities. If the sum of production elasticities is greater than, equal to, or less than one, then there is, correspondingly, increasing return to scale, constant returns to scale, or decreasing returning to scale. The economic model will be transformed into linear function by converting all variables to logrithms. A linear function in a statistical sense, is linear in parameters but not necessarily in variables. The least - Squares technique is used to estimate the production coefficients.

The economical analysis is going to use the ratio of marginal value product to opportunity cost for each input as a criterion to know whether or not farm resources are efficiently used in broiler farms, at the area under consideration.

4.1 STATISTICAL MODEL FOR BROILER FARMS:

The economical model conists of sets of production functions which are estimated from the sample data. Five types of production functions have been derived for broiler farms.

4.1.1) Broiler function I:

$$Y = \propto X_1^a X_2^b X_3^c X_4^d X_5^e \quad \ldots\ldots \quad (1)$$

Where,

"Y", refers to the value of total output of broilers produced during the investigation year 1987/1988.

"X_1", refers to the land services. It represents the land input which is expressed in fiscal terms (Hectare).

"X_2", refers to the feed services. It includes the value of feed for broiler farms. It includes the value of grain, protein supplements and miscellaneous minerals.

"X_3", refers to the beginning value of checks for the year 1987/1988.

"X_4", refers to the labor input for broiler farms. It is measured in terms of man-work days. Ten hours of productive work on the farm were considered as a man-work day.

"X_5", refers to the chicken capital services. It is measured in Saudi Riyals (SR). It includes annual capital inputs for broiler farms, such as the depreciation of building, machines and equipment, fences, wells, funiture in addition to expenses of verterinary supplies, fuel and other working capital used an broiler farms.

4.1.2 BROILER FUNCTION II.

$$Y = \propto X_1^a X_2^b X_3^c X_4^d \quad \ldots\ldots \quad (2)$$

Where,