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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)	19781	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 Moretary : 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,

"Y" , "X_1" , "X_2" , are the same as indicated in the broiler function I.

"Y_3", refers to the labor input which are used in broiler production. It is measured in terms of man-work days.

"Y_4", represents the sum of variables "X_3" and "X_5" as presented in the broiler function I, and denoted as capital input measured in value terms (SR).

4.1.3) BROILER FUNCTION III.

$$Y = \propto X_1^{a} X_2^{b} X_3^{c} \quad \ldots\ldots, \qquad (3)$$

Where
The variables "Y" and "X_1" are the same as indicated in broiler function I. But the variable "X_2" represents the variable "X_3" in the broiler function II. Also, the variable "X_2" and "X_3" are presented in the broiler function II, and denoted as capital services in the broiler farms.

4.1.4 BROILER FUNCTION III

$$Y = X_1^{a} X_2^{b} \quad \ldots\ldots \ , \qquad (4)$$

Where ,

"Y" is the same as indicated in broiler function I. The "X_1" refers to the labor input which used in broiler farms. It is measured in terms of man - work days. But the variable "X_2" , presents the sum of value of land services, and the variable "X_3", in the broiler function III.

4.1.5) BROILER FUNCTION V

$$Y = \alpha X_1^a \quad \ldots\ldots\ldots\ldots , \qquad (2)$$

Where ,

"Y" is the same as broiler function III. The new variable X_1, refers to the value of all broiler inputs or the value of labor input plus the variable "X_2" in the broiler function IV.

For equation (1-5), " α " refers to the constant variables, and "a", "b", "C", "d", and "e" are the production coefficients (Parameters), with respect to productive inputs "X_1", "X_2", "X_3", "X_4", and "X_5" respectively.

5. CHARACTERISTICS OF BROILER FARMS IN THE AREAS STUDIES:

5.1. DEFINITIONS: Some important terminology and definitions are used for studying the main characteristics sample farms in the areas studied. These terminology and definations are as follows:

5.1.1. MAN - EQUIVALENT is a measure of the farm labor - force. The computation of man - equivalent depends not only on how many days laborers actually warked on the farm, but also depends on the number of days which laborers are available on farms. It represents the stock of the farm labor force. rather than the flow of farm labor. An adult male, aged 16 To 60, working full time on a farm during the year is considered to be a standard unit of man - equivalent.

Productive man - work day, or, abbreviated as man - day, is a 10 - hour day of productive farm work by an adult male of average skill, aged 16 to 60, under average working con-

conditions. This measure only takes into account directly productive work for broiler production on the farm. The total productive work days contributed by farm force were all converted into the standard unit of man - equivalent.

5.1.2. Total value of fixed capital is the sum of the value of land, building, farm equipment and machinery, and other fixed costs on the farm .

5.1.3. Total value of production for broiler farms consits of the value of total output of chickens produced during the production period at 1987 prices.

5.1.4. Total cost of production, (farm expenditure), consists of two broad categories: total operating cost, and total fixed cost of production.

1.1.5. Total fixed cost consists of fixed charges to the producer which includes depreciation, interest on the investment, and maintenance.

5.1.6. Total variable cost consists of items of the operating cost such as feed cost, chicks cost, labor cost, and other operating costs.

5.1.7. Value of capital services consists of value of feed, chicks, and other working capital, in addition to depreciation of building and farm machinery, fuel and repairs.

5.1.8. Input of capital services per man - day is equal to the total value of capital services divided by man - day equivalent of labor.

5.1.9. Gross value product per man - day of worker is equal to the value of product divided by man - day of labor.

5.1.10. Gross value product per SR 1 of all capital services used on broiler farms, is equal to the value of product divided by the total value of annual capital services including feed, chicks, depreciation, repairs fuel, veterinary expenses, etc.

5.1.11. Average residual product of labor per man - day is equal to the gross product less the value of capital input divided by man - days of labor.

5.1.12. Average residual return on the investment is equal to the total value of production less a wage return to labor divided by the total investment.

5.1.13. Net farm returns or residual over all cost is computed by subtracting the value of all resource services (cost of feed, repairs, and other annual expenses, depreciation on buildings, machinary and rental value of land and market wage rate for all labor) from the total value of production.

5.1.14. Return of investment is equal to farm return divided by the total investment, relating input of different categories of resource services, sample average, 1987/1988.

5.2. RELATIVE INPUT OF DIFFERENT CATEGORIES OF RESOURCE SERVICES USED IN BROILER FARMS:

Statistics which characterize the sample in the areas of the areas of the scheme are averages for all farms in the

respective sample. The data refers to the production year (1987/1988). The sample was designed to include only commercial farms.

Broiler farms in the sample areas of the scheme differ in the size of the total product and the kinds & the quantities of resources employed.

The value of chicken product and the productivity of resources are given in table (8). The value of total chicken product was, with an overage of SR 829017 per farm. As an average, for all broiler farms in the sample areas, land input measured in hectare, was 2.953 In relative terms, land represents about 1.2% of the input for broiler farms in the area of the scheme.

Table No (6)

Relative input of different categories of resources for broiler farms, sample average, 1987/1988.

Input Category	Percentage
Land services	1.16
Labor services	12.89
Feed Services	43.08
Chick services	26.61
Other Capital services	16.26
All broiler input services.	100.00

On the other hand, labor input (measured in man - days) was 964 which represents about 12.9% of the total input. Feed and chick inputs were the most important input in broiler production. The high proportion of these items was due to the high amount of capital resources and the small amount of labor requirements. This means that the major portion of input for broiler farms was represented by working capital (feed and chick) services.

As a summary, land input represents, about 1% of the total input. Broiler farms depend on labor for about 13% of all resources services used. Nearly 70% of all used resources services come from working capital (feed and chick services). About 16% of the total inputs can be represented by other capital services. In other words, nearly 86% of all input comes from used capital services, as it is shown in table (7).

Table No.(7)
Relative input of different categories of resources for broiler farms, sample average, 1987/1988

Input Category	Percentage
Land services	1.16
Labor services	12.89
Capital services	85.95
All broiler input services	100.00

It is true, however, that capital investment in broiler farms does not represent a new method or technique in poultry industry. This traditional method or technique which is now used in broiler production in the area of the scheme is less efficient because the used quantity of capital as an average in the farm sample is still relatively low.

In general, the residual return on capital tends to be high, while the average residual product of labor tends to be low due to the lower of Capital/Labor ratio.

In the next sections, various types of estimates have been prepared to know the nature of resource productivity in the sample area, and to measure the returns and productivity, Therefore, production functions or regression estimates will be involved. This type of data is presented to give a picture as complete as possible of resource combinations and resource returns in the studied area.

6. PRODUCTIVITY AND COMBINATION OF RESOURCES FOR BROILER FARMS.

The economic model for broiler farms which consits of equations 1 to 5 in more general expression, can be transformed into a statistical framework by introducing random disturbances, U, into a linear function by converting all variables to logarithms.

The statistical equation system corresponding to the economic model of equations 1 to 5 is shown in equations 7 to 11.

$$Y = a + \sum_{i=1}^{m} B_i X_i + u \quad \ldots\ldots \qquad (6)$$

Where, $y = \log Y$, $a = \log A$, $X_i = \log X_i$,
$u = \log U$.

The logarithmic form of production function, in general, is a linear form as shown in equation (6).

A linear function, in a statistical sense, is linear in parameters, but not necessarily in the variables. One of the advantages of using a Cobb-Douglas function is its economical in the use of degree of freedom, or parameters, and yet gives us a nonlinear relationship in original form.

6.1 REGRESSION EQUATIONS FOR PRODUCTIVITY ESTIMATES:

The model used for empirical analysis in this study has been discussed in the previous sections. The parameters of an "average" or "representative production function of the Cobb-Douglas form were estimated for the group of random farms in the Qatif agricultural area of the scheme.

Single equation least-squares method has been employed for estimating the parameter coefficients of production functions for the area under consideration.

The empirical broiler production function or regressions estimated for the set of alternative groupings of resource input in the schem's area are as follows:

$$Y = 34.22 \; X_1^{0.1201***} \; X_2^{0.2413**} \; X_3^{0.5783***} \; X_4^{-0.0077} \; X_5^{0.0192} \quad \ldots (7)$$

$$Y = 132.1 \; X_1^{0.0835*} \; X_2^{0.3348**} \; X_3^{-0.0423} \; X_4^{0.5735***} \quad \ldots (8)$$

$$Y = 3.12 \; X_1^{0.2650**} \; X_2^{0.1238} \; X_3^{0.5479***} \quad \ldots (9)$$

$$Y = 8.999 \; X_1^{0.1011**} \; X_2^{0.0369} \; X_3^{0.8425***} \quad \ldots (10)$$

$$Y = 6.265 \; X_1^{0.2378**} \; X_2^{0.5621***} \quad \ldots (11)$$

---

* Probability level of 10 - Precent.

** Probability level of 5 - Precent.

*** Probability level of 1 - Precent.

Table (9)

Regression Coefficients and Related Statisties for Broiler Farms in the region of the Scheme, 1987.

ITEM	AMOUNT
BROILER FUNCTION (MODEL (1):	
Number of sample farms (n):	14
Value of constant (Log A) :	3.53225
Value of Production coefficients.	
Land (ha.)	0.12005 ***
Feed (SR)	0.24127 **
chicks (SR)	0.57833 ***
Labor (man-day)	-0.00765
Capital (SR)	0.01916
Sum of production coefficients:	0.95116
Value of standard error:	
Land	0.03595
Feed	0.10914
Paults	0.10588
Labor	0.08544
Capital	0.08388
T-Value:	
Land	3.33955
Feed	2.21058
Paults	5.46208
Labor	0.08951
Capital	0.22846
Multuple Correlation	0.9948

* Probability level of 10-percent
** Probability level of 5 -percent
*** Probability level of 1 -Percent

Table (10)(1.)

ANALYSIS OF VARIANCE

Source of Variation	Degree of Freedom	Sum of Squares	Mean Squares	F-Value
Due to Regression	5	10.74867	2.14973	154.20703
Deviation from Regression	8	0.11152	0.01394	
TOTAL	13	10.86020		

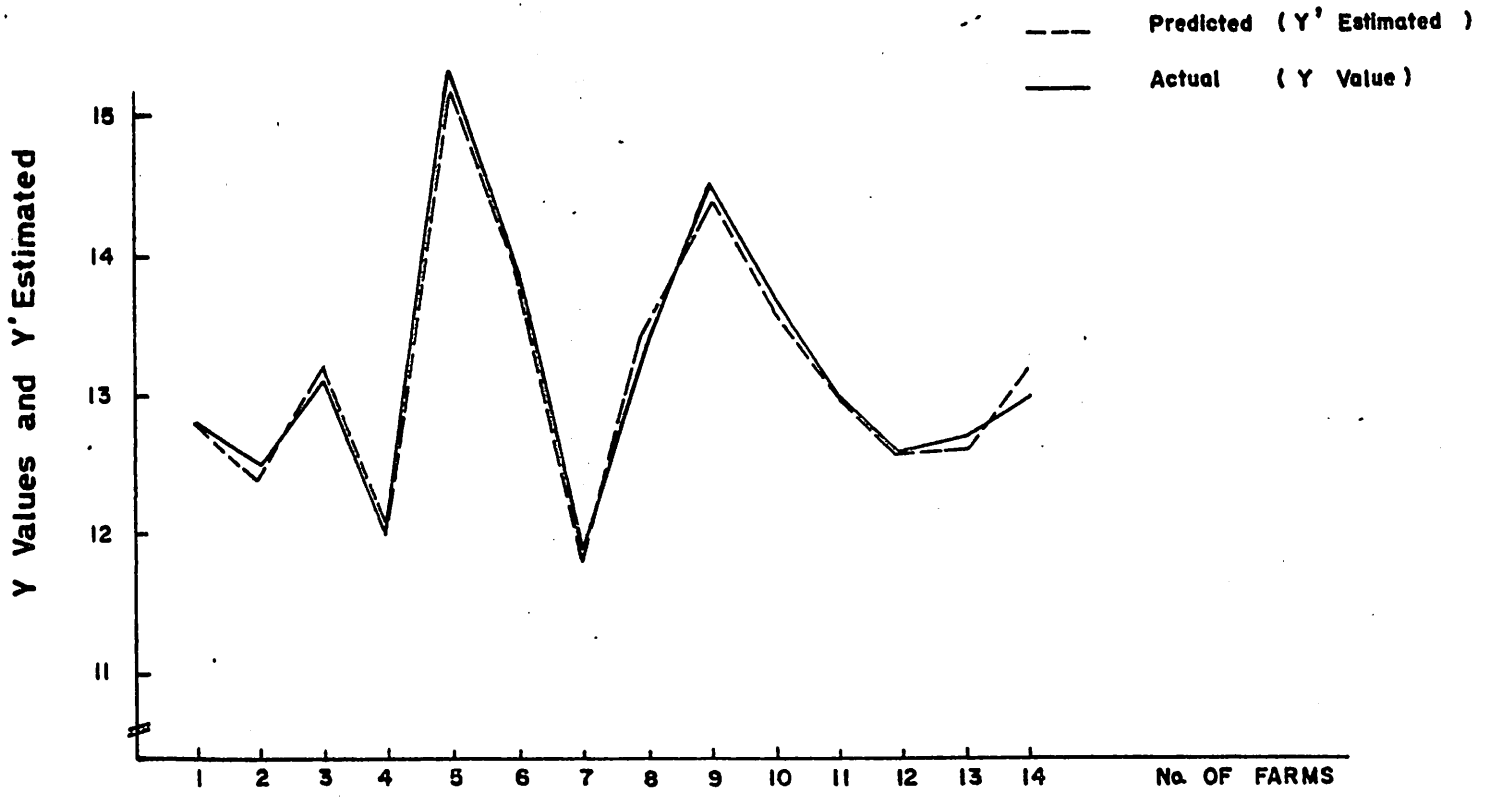

FIG. (1) Y Value (actual) and Y'estimated (predicted) for the economic model representing by Equation (7)

First Model:

This model which is presented by equation (7) includes five variables : land, feed, chicks. labor, and capital. Statistical studies of this production function is presented in Table (9). All of the production coefficients are significant at the 5-percent probability level, excepting two coefficient which are not significantly different from zero at 10-percent level of significance. In other words, the elasticity of labor and capital services are not significently different form zero at 10-percent significant level. This indicates that these factors are not an important input affecting broiler production within the observation of data in this model. In other words, the total amount of broiler building and other fixed capital have played no important role of production process in the short run. It was clear, that the main factors affecting chicken production are feed and chicks which play an important role in broiler farms.

The multiple correlation coefficient is 0.9 and it is significant at 1% level. Thus, we may conclude that the hypothesis of a relation between chicken production, land, feed, chicks, labor and capital of the assumed form is supported by the statistical material.

All these equations were estimated by the least-squares method. Tables (9) till (17) present the elasticity or regression coefficients, along with other statsitics of interest in this analysis for this set of equations in the scheme.

The result was deemed entirely satisfactory. Only 9 out of 17 production coefficients are significant at the probability level of 5-percent. Some of the coefficient of production for labor factor are negative in value. These negative coefficients or elasiticity of production are hardly conceivable, and it is not significantly different from zero at 10 - percent significiant level. This indicates that the labor factor in this model is not an important input affecting broiler production within the observation of data in this study. In the current situation of broiler production in the area of the scheme, particularly in the short run, it is quite possible that the investors carry out their production plan without the taking into account of how the much quantity they have in the form of labor input.

Second Model:

The analysis of broiler production function which is expressed by equation (8) gives interesting findings. It was observed that the elasticity of production of feed and capital input is less than one in the area under facus. That is, in the Qatif agricultural area of the scheme, it was observed that elasticity of production of land input is 0.0835 which is not significant (Table 11). When the feed of broiler production is analyzed, its elasticities of production is found to be 0.3348, which is significant at 0.01 percent level. However, the elasticity of production of labor factor in broiler production, estimated in this study, is -0.0423. This coefficient of production is not significant at 10-percent level of significant. These figures might reflect that more labor input is used in broiler production. It was observed that capital elasticity of

production shows. in general, intermediate productivity, for broiler enterprises. This elasticity is statistically significant at 0.01 significant level. These findings might be interpreted by the fact that capital services of broiler farm enterprises in the area of the scheme, show their significance after after adding the value of chicks to other capital inputs which are expressed by the first model.

The negative elasticity or production coefficients of labor in the area under focus is hardly concevable that the total value of production would decrease, if more of this inputs was employed in the region. However, this neative coefficients is not significantly different from zero at 0.50 percent level of significance. They could arise with a probability of more than an-half even if the true population elasticity is zero.

The overall effect of the independent variables explains nearly 0.98% of the variability of the broiler production i.e. $R^2 = 0.98$.

Table (11)
Regression Coefficients and Related Statistics
for Broiler Farms in the region of the Scheme.
1987.

ITEM	AMOUNT
BROILER FUNCTION (Model (2):	
Number of Sample farms (n):	14
Value of Constant (Log (A):	1.83483
Value of Production Coefficients:	
Land (SR)	0.08347*
Feed (SR)	0.33481***
Labor (man-day)	-0.04232
Capital (SR)	0.5754***
Sum of Production Coefficients:	0.95136
Value of standard error:	
Land	0.05242
Feed	0.12241
Labor	0.08423
Capital	0.15562
T-Value:	
Land	1.59239
Feed	2.73512
Labor	-0.50246
Capital	3.68547
Multiple Correlation:	0.99212

* Probability level of 10- Percent.

Table (11)

TABLE OF VARIANCE.

Source of Variation	Degree of Freedom	Sum of Squares	Mean of Squares	F - Value
Due to Regression	4	10.68975	2.67244	141.10826
Deviation form Regression.	9	0.17045	0.01894	
TOTAL	13	10.86020		

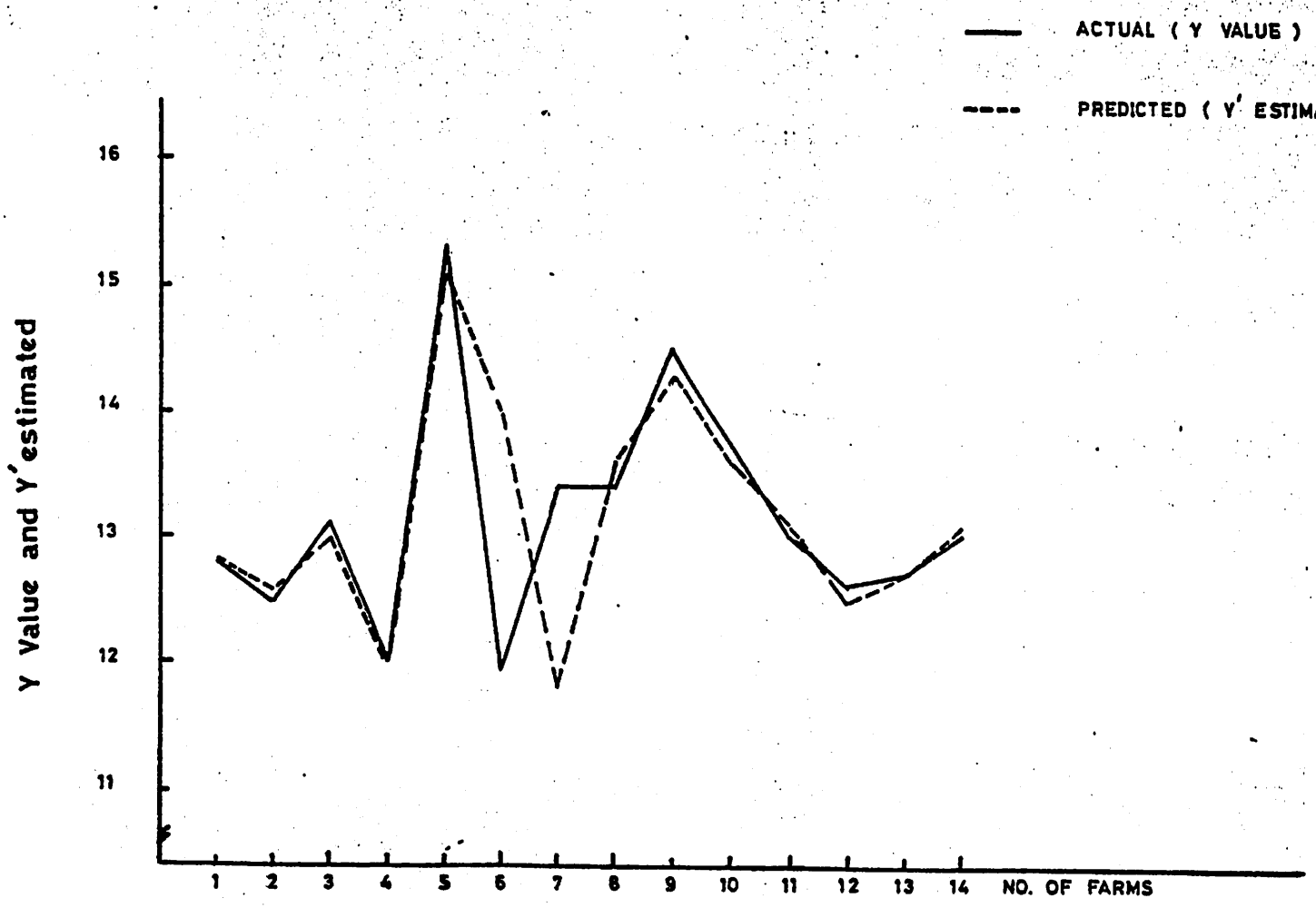

Fig.(2.) Y Value (Actual) and Y' estimated (Predicted) for the economic model representing by Equation (8).

Third Model:

A third model which is expressing by equation (9) obtained by combining the variables X_2 and X_4 presented in the equation (8) and treated as a single bundle of resource service. Hence, the function presented in this equation includes only land, labor, and capital services as resource inputs.

Statistics for this production function is presented in Table (13). The analysis shown that the production coefficient of capital, in logorithmic form, is significant at the 0.01 percent probability level while the production coefficient of land factor is significant at the 0.10 percent probability level. But the labor production elasticity reflects very low productivity, which is not statistically significant.

It has been found that the capital coefficient reflect intermediate productivity of capital in chicken farms.

The variability of the independent variables explains nearly 93% of the variability of the value of chicken product. ($R = 0.93$).

Table (13)

Regression Coefficients and Related Statistics for Broiler Farms in the area of the Scheme.

ITEM	AMOUNT
BROILER FUNCTION (Model (3):	
Number of sample farms (n)	14
Value of constant (Log A):	2.19714
Value of production coefficients:	
Land (SR)	0.2695**
Labor (may-day)	0.1238
Capital (SR)	0.5479***
Sum of Production Coefficients:	0.9412
Value of Standard error:	
Land	0.1177
Labor	0.2759
Capital	0.2029
T-Value:	
Land	2.2891
Labor	0.449
Capital	2.7010
Multiple Correlation:	0.9322

Table (14)

ANALYSIS OF VARIANCE

Source of Variation	Degree of Freedom	Sum of Squares	Means of Squares	F-Value
Due to Regression	3	9.43791	3.14597	22.12038
Deviation from Regression.	10	1.42220	0.14222	
TOTAL	13	10.86012		

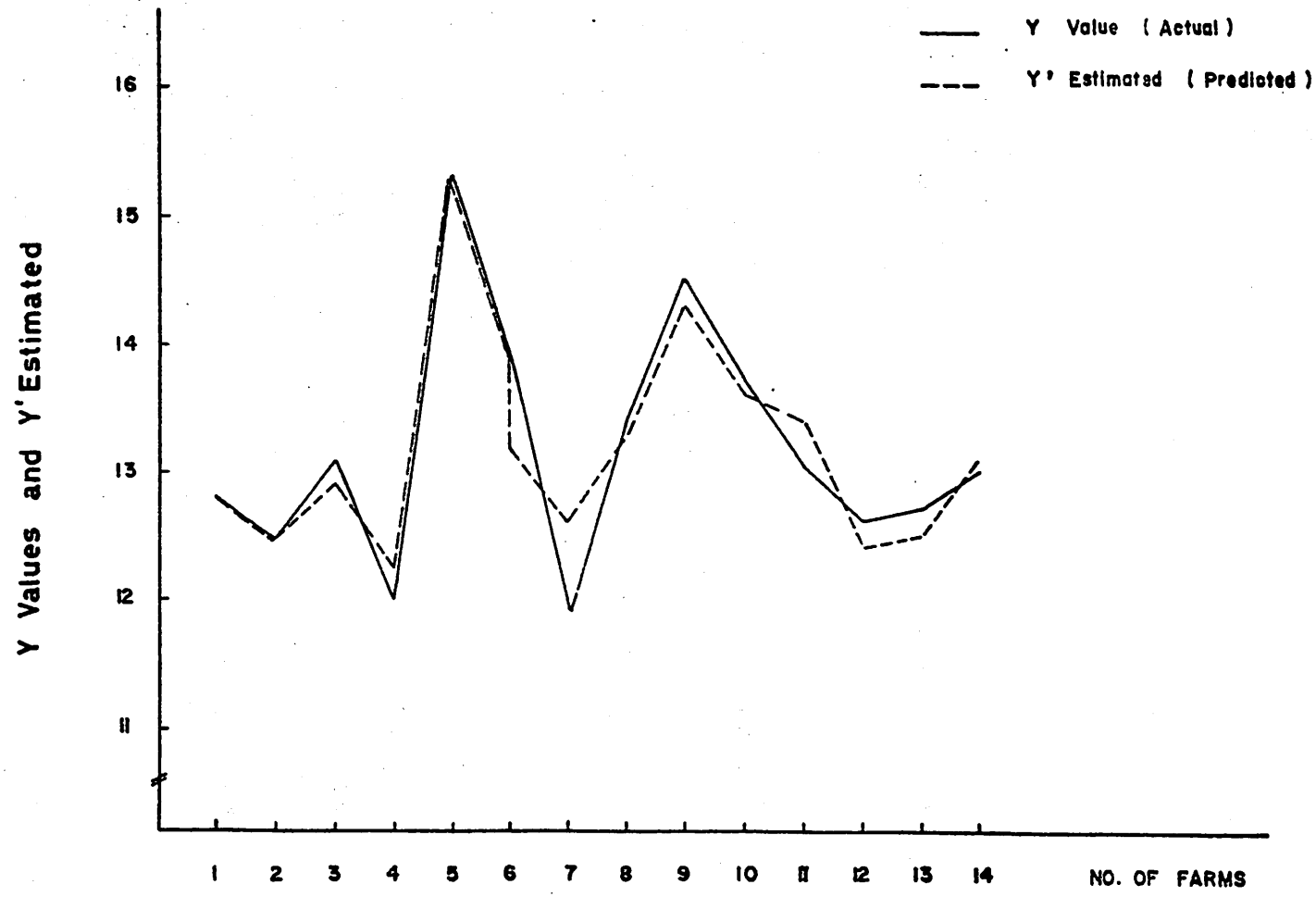

FIG. (3) Y Value (actual) and Y'estimated (Predicted) for the economic model representing by Equation (9)

Fourth Model:

In Equation (10), all variables Y, X_1, and X_3 are still the same as those presented in equation (9). But in this model the variable X_2 represents the labor inputs which is expressed in the terms of wages rather than in man-days of labor.

In this equation, diminshing returns are indicated for individual production factors since the elasticity of production is less than one, as it is shown in Table (15). The regression coefficient of land is significant at 5 percent level. But the labor production elasticity reflects very low productivity as it is not significant at 10 percent level.

The overall effect of the independent variables explains about 98% of the variability of chicken production i.e. $R^2 = 0.98$.

Table (15)

Regression Coefficients and Related Statistics for Broiler arms in the region of the Scheme, 1977.

ITEM	AMOUNT
BROILER FUNCTION (Model (4):	
Number of sample farms (n):	14
Value of constant (log A):	1.13790
Value of production coefficients.	
Land	0.10109**
Labor	0.03686
Capital	0.84250***
Sun of production coefficients:	0.98046
Value of standard error:	
Land	0.04886
Labor	0.07543
Capital	0.06871
T. Value:	
Land	2.06911
Labor	0.48880
Capital	12.26252
Multiple Correlation:	0.1969

Table (16)

TABLE OF VARIANCE

Source of Variation	Degree Freedom	Sum of Squares	Mean of Square	F- Value
Due to Regression	3	10.67947	3.55982	196.97458
Deviation from Regression.	10	0.18073	0.01807	
TOTAL	13	10.86020		

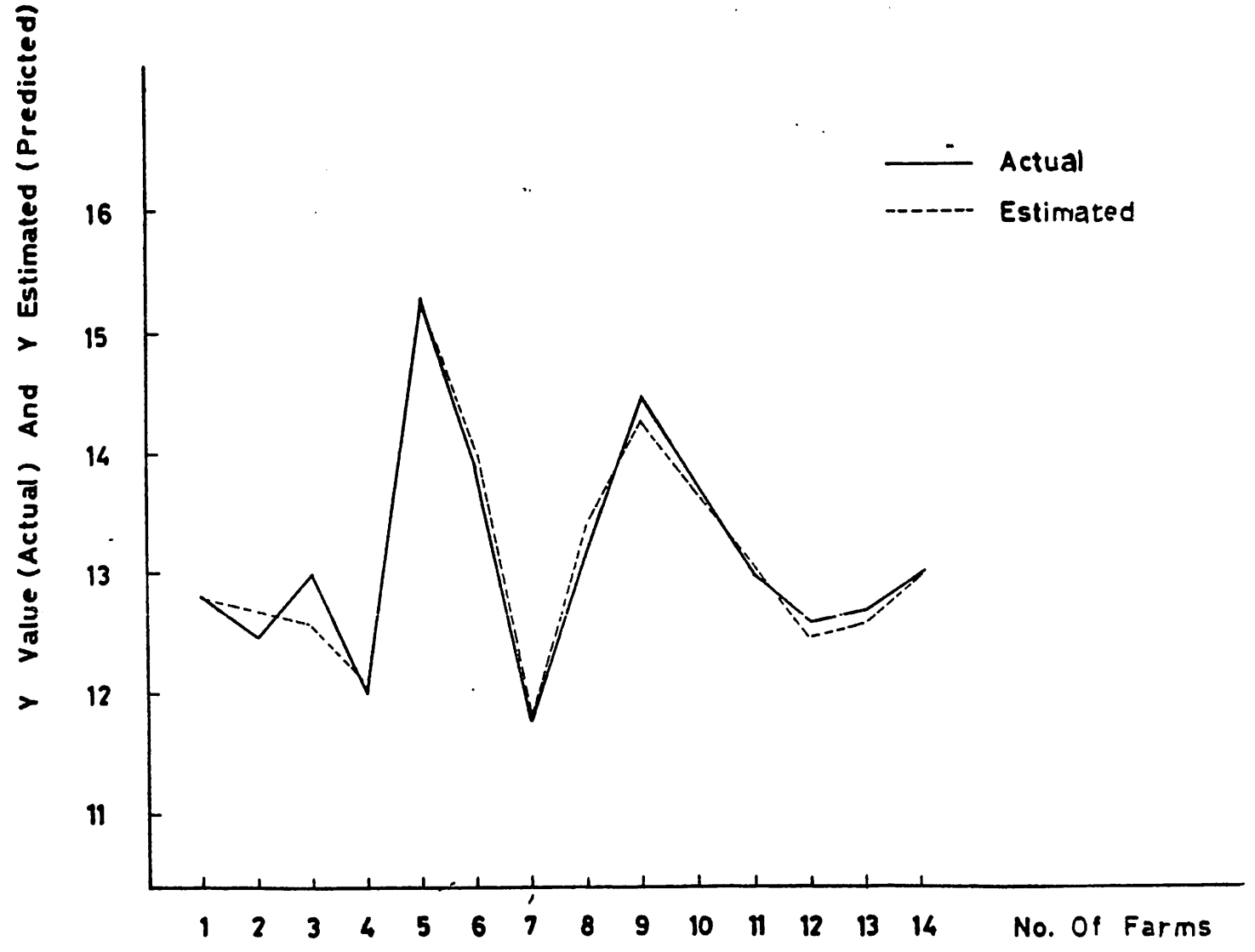

Fig (4): Y Value (Actual) And Y Estimated (Predicted) For The Economic Model Representing By Eguation (10)

Table (17)

REEGRESSION COEFFICIENTS AND RELATED STATTSTICS FOR BROILER FARMS IN THE PEGION OF THE SCHEME, 1987

ITEM	AMOUNT
BROILER FUNCTION (Model (5):	
Number of Sample Farms (n):	14
Value of Constant (Log A):	6.02138
Value of Production Coefficients:	
Land	0.23781**
Other variables	0.56205***
Sum of Production Coefficients:	0.79986
Value of Standard Error:	
Land	0.11641
Other variables	0.12050
T- Value:	
Land	2.04296
Other variables	4.66437
Multiple Correlation:	0.8850

Table (18)

ANALYSIS OF VARIANCE

Source of Variation	Degree of Freedeom	Sum of Squares	Mean Squares	F - Value
Due to Regression	2	8.50666	4.25333	19.98921
Deviation from Regression	11	2.35354	0.21396	
TOTAL	13	10.86020		

6.2 GROSS ELASTICITY COEFFICIENT AND SCALE RETURNS:

Through the discussion in the previous section, the production functions of the third model in Table (13) are accepted in the following text. Three categories of resource input were used in the production function namely land services, labor services, and capital input. As it is mentioned previously, the regression coefficients are the elasticities of production showing approximatly the average percentage change in the total value of output which would resulting if the input of any one resource is increased by one percent.

The sum of these production coefficients equals to 0.94: In testing returns to scale (i.e. the departure of sums of the elasticities from 1.0), the equation indicated constant return to scale.

7. MARGINAL PRODUCTIVITIES AND ECONOMIC EFFICIENCY OF RESOURCE ALLOCATION.

The next step in analysis is derivation of the marginal productivity of resources, with the quantity of all resources held constant at the per-farm mean of sample. Marginal productivity is a measure indicating the quantity of which the value of output (per farm in this case) is predicted to increase if one more unit of the particular resource were to be employed with input of the specific resource at stated levels and inputs of other resources held constant or increased by stated amounts. Table (19) inicates the returns which might be expected as an average for the farm sample (or the "average" or "typical" farm in the sense of a normal distribution), if one more unit of each resource were to be used while inputs of other resources are held constant at their geometric mean.

7.1 MARGINAL PRODUCTIVITIES OF RESOURCES USED IN BROILER FARMS

Based on the Cobb-Douglas production function indicated by Equation (9), the marginal productivity of any one particular resource, holding others as being given. is represented by equation (12).

$$\left.\begin{aligned}
\frac{\partial Y}{\partial X_1} &= B_1 A X_1^{B_1-1} X_2^{B_2} X_3^{B_3} \\
\frac{\partial Y}{\partial X_2} &= B_2 A X_1^{B_1} X_2^{B_2-1} X_3^{B_3} \\
\frac{\partial Y}{\partial X_3} &= B_3 A X_1^{B_1} X_2^{B_2} X_3^{B_3-1}
\end{aligned}\right\} \quad \ldots(12)$$

Equations of marginal product returns of resources are derived from the production function presented previously. With other resources held constant at their geometric means, the equation at marginal product returns of resources for the region of the scheme are as follows:

1. Marginal productivity of Land (MR_1)

$$MP_1 = 2.4252 \; X_1^{0.7350} \quad \ldots\ldots (13)$$

2. Marginal productivity of Labor (MP_2)

$$MP_2 = 1.1141 \; X_2^{0.8762} \quad \ldots\ldots (14)$$

3. Marginal Productivity of Capital (MP_3)

$$MP_3 = 4.9306 \; X_3^{0.4521}$$

The numerical values of the marginal product or return from any particular resource can be computed directly from these equations, while input of other resources are held constant at their geometric means. By inspecting these equations it can be seen that increases in returns become smaller and smaller as resources employed are increased. This is due to the fact that all the elasticities of production are less than one, and hence diminishing returns for individual resource inputs are prevailing.

Table (19) shows the returns which might be expected, as an average for the farm sample in the region under focus, or for the "average" or "representative" farm in the sense of a normal distribution in the region, if one more unit of resource

is to be used on a farm while inputs of all other resources given at their geometric means. The geometric mean quantity of resource services and the mean value of production are also presented in this Table. Also included are the "average" product or returns of resources, which is obtained by dividing the total value of production (Predicted at the geometric means again) by the geometric mean quantity of each resource. The "average" result includes the product returns of all resources, and not simply the product returns attribuable to the single resource.

The marginal product returns derived at means for the group of chicken farms in the region of the scheme are shown in Table (19). The marginal product figures indicate the quantity of total value of production which will be added as one more unit of the particular resource is used on a farm, with its input and that of other resources at the mean of the quantities shown in the table. An increase in land services in the broiler farms in the region of the scheme will add to total value of chicken production at the rate of SR. 5.19 for added SR 1.00 of land services. The product return per man-work day of labor in broiler farms at the same region is SR. 95.45, while a SR. 1.00 input in capital services return only SR. 1.24.

In evaluating the levels of marginal productivity as shown in the analysis, they were all computed at the mean quantity of sample farms for the area. The magnitude of the marginal return of any particular resource depends not only on its input level, but also on levels of other resources. The marginal product return will be larger for a given level of a resource input if larger amounts were used of other resources, under the condition of positive elasticities of production. On the other hand,

becouse of the nature of the diminishing returns, the marginal return of a resource will decrease as the amount of the resource used increases, while other resources are held at a constant level.

With the analysis of marginal productivities above, one thing to be concerned with is the equilibrium test for the difference between the value of the marginal product returns and the opportunity cost of resources, In other words, ratio of the marginal value product ot the opportunity cost for each input wos estimated statistically for its equality to unity. This ratio was used as criteria to know whether or not farm resources are efficiently used in the farming area under consideration. Resources might be efficiently used if the criteria of the marginal productivity to opportunity cost ratio are equal to the unity.

It is clear that the estimates are based on the assumption that the average farm is in the exactly optimal position. The analysis of marginal productivities shows many signifficant. The value of marginal productivities of land and capital which are used in broiler production, are significantly higher man the value of their services inputs.

Broiler producers in the studied area did not efficienly use their capital services at the acceptable propability level. The amount of this factor used on farms seems much smaller than the optimal quantity under the particular price level.

TABLE (19)

AVERAGE PRODUCTION AND RESOURCE INPUTS, MARGINAL PRODUCT, AVERAGE PRODUCTIVITY OF RESOURCES, AND MARGINAL RETURN TO OPPORTUNITY COSTS IN BROILER FARMS AT THE AREA OF SCHEME.

Item	unit	Amount
Geometric Mean:		
Product, actual	SR	520247
Land	SR	43878
Labor	Man - day	674.8
Capital	SR	230590
Marginal Product of Returns (1):		
Land	SR/SR	5.1953
Labor	SR/Man - day	95.4485
Capital	SR/SR	1.2362
Average Product of Returns (2):		
Land	SR/SR	11.8567
Labor	SR/Man - day	770.9899
Capital	SR/SR	2.2562
Opportunity Costs:		
Land	SR/SR	11.060
Labor	SR/Man - day	80.000
Capital	SR/SR	1.060
Marginal Returns to Opportunity Costs Ratios:		
Land		4.901
Labor		1.1931
Capital		1.166

1) Marginal product or returns are based on the total product returns as the geometric mean of sample farms.

2) The average product or returns are computed from geometric mean product of the sample farms dividing by mean quantity of each resource. The "average" resulting includes the product returns of all input resources, and not simply the product returns attributable to the single resource.

The elasticity of capital (i.e. marginal capital returns) differs in a significant manner from the efficient condition.

8. CONCLUSION:

Broiler growers were, on the average, not maximizing the return from the use of capital under the given condition. This result seems reasonable in view of the fact that the producers, in the region of the scheme, usually have not used their capital resource more carefully. Hence, a gap is found between the return from capital used and its cost or price in the form of interest.

Therefore, broiler production efficiency of resources couldn't be attanined. Equalibrium resources would be attained by using more capital inputs.

These findings can be of great value in setting up the national agricultural policy when dealing with resource allacations. This investigation supports the opinion that in broiler production at the Qatif area is not aware of efficient use of traditional inputs. This implies that broiler production may be increased by efficiently reallocating such resources according to the marginality principles.

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Table (24)

BROILER PRODUCTION FUNCTION PRESNTED BY EQUATION (7)

No.of Broiler Farms	Value of Output	Land (ha.)	Feed (SR)	Chicks (SR)	Labor (Man-day)	Other Warking Capital (SR)
1.	364800	1.600	78080	60000	896	42821
2.	271880	0.250	82820	45000	747	32001
3.	490090	1.440	104111	107100	933	30227
4.	164280	3.000	57400	15000	467	15097
5.	4183200	22.500	1008000	655200	5226	407034
6.	1088700	1.500	360180	204000	635	65748
7.	151200	1.200	23040	18750	233	10952
8.	650880	1.500	201390	122400	560	38319
9.	1883400	4.000	544000	325000	560	25693
10.	871200	0.800	336875	154000	1307	28317
11.	424350	0.500	126000	81000	466	41253
12.	298917	1.500	76610	43750	294	25731
13.	328525	0.150	74875	74375	429	17981
14.	434820	1.400	159960	91800	747	31190

TABLE NO. (28)

(BROILER FARM OUTPUT) AND Y'ESTIMATED FARM
THE REGRESSION EQUATION NO.(1).

No. of Broiler Farms	Y Value (Actual)	Y'Estimated (Predicted)	Residual
1.	12.81	12.82	- 0.01
2.	12.51	12.44	0.07
3.	13.10	31.21	- 0.10
4.	12.01	12.01	0.00
5.	15.25	15.17	0.08
6.	13.00	13.90	- 0.00
7.	11.93	11.80	0.12
8.	13.39	13.46	- 0.07
9.	14.45	14.37	0.08
10.	13.68	13.63	0.05
11.	12.96	12.98	- 0.02
12.	12.61	12.63	- 0.02
13.	12.70	12.64	0.06
14.	12.98	13.22	- 0.23

Table No. (20)

BROILER PRODUCTION FUNCTION PRESNTED BY EQUATION (8)

No.of Broiler farms	Vaul of output (Y)	Land (SR) X1	Feed (SR) X2	Labor (Man day) X3	Sapital (SR) X4
1.	364800	29120	78080	896	1102821
2.	271880	25000	82820	747	77001
3.	490090	24000	104116	933	137327
4.	164280	15000	57400	467	30095
5.	4183200	800000	1008000	5226	1062234
6.	1088700	220000	360180	635	267248
7.	151200	60000	23040	233	29702
8.	650880	32050	201390	560	160719
9.	1883400	90000	544000	560	350693
10.	871200	35000	336875	1307	182317
11.	424350	60000	126000	466	122253
12.	298917	13000	76610	294	69481
13.	328525	15000	74875	429	92356
14.	434820	30000	159960	747	122990

Table No (21)

Y VALUE (BROILER FARM OUTPUT) AND Y'ESTIMATED FARM THE REGRESSION EQUATION NO. (8)

No. of Broiler Farms	Y'Estimated (Actual)	Y'Estimated (Predicted)	Residual
1.	12.81	12.80	0.01
2.	12.51	12.64	-0.13
3.	13.10	13.04	0.06
4.	12.01	11.96	0.05
5.	15.25	15.19	0.05
6.	11.93	14.04	-0.14
7.	13.39	11.79	0.13
8.	13.38	13.40	-0.01
9.	14.45	14.26	0.09
10.	13.68	13.61	0.06
11.	12.96	13.14	-0.19
12.	12.61	12.54	0.06
13.	12.70	12.70	0.01
14.	12.98	13.15	-0.17

TABLE NO (22)

BROILER PRODUCTION FUNCTION FUNCTION PRESENTED BY

Equation (9)

No.of Broiler farms	Value of output (Y)	Land (SR) X1	Labor (Man-day) X2	Capital (SR) X3
1.	364800	29120	896	180901
2.	271800	25000	747	159821
3.	490090	24000	938	241443
4.	164280	15000	467	87495
5.	4183200	800000	5226	2070234
6.	1088700	220000	635	627428
7.	151200	60000	233	52742
8.	650880	32050	560	362109
9.	1883400	90000	560	894693
10.	871200	35000	156	519192
11.	424350	60000	466	248253
12.	298917	13000	294	146091
13.	328525	15000	429	167231
14.	434820	30000	747	282950

TABLE NO (23)

Y VALUE (BROILER FARM OPUTPUT) AND Y'ESTIMATED FROM THE REGRESSION EQUATION (9).

No.of broiler farms	Y Value (Actual)	Y'Estimated (Predicted)	Residual
1.	12.81	12.81	-0.01
2.	12.51	12.69	-0.19
3.	13.10	12.88	0.23
4.	12.01	12.17	-0.16
5.	15.25	15.48	-0.24
6.	13.90	13.19	0.71
7.	11.93	12.58	-0.66
8.	13.39	13.26	0.12
9.	14.45	14.22	0.23
10.	13.68	13.59	0.0008
11.	12.96	13.36	-0.40
12.	12.61	12.42	0.0119
13.	12.70	12.53	0.0138
14.	12.98	13.08	-0.10

TABLE NO. (25)

BROILER PRODUCTION FUNCTION PRESENTED BY EQUATION (10)

No.of Broiler farms	Value of output (Y)	Land (SR) X1	Labor (SR X2	Capital (SR) X3
1.	364800	29120	67200	180901
2.	271880	25000	66000	159821
3.	490090	24000	67000	241443
4.	164280	15000	26400	87495
5.	4183200	800000	318000	2070234
6.	1088700	220000	22400	627428
7.	151200	60000	24000	52742
8.	650880	32050	63600	362109
9.	1883400	90000	50000	894693
10.	871200	35000	79600	519192
11.	424350	60000	45600	248253
12.	298917	13000	42750	146091
13.	328525	15000	42000	167231
14.	434820	30000	53000	282950

TABLE No. (26)

Y VALUE OF BROILER FARM OUTPUT AND Y'ESTIMATED FROM THE REGRESSION EQUATION NO.(10)

No.of broiler Farms	Y Value	Y'Estimated	Risidual
1.	12.81	12.79	0.02
2.	12.51	12.67	-0015
3.	13.10	13.01	0.09
4.	12.01	12.07	-0.06
5.	15.25	15.23	0.01
6.	13.90	14.00	-0.10
7.	11.93	11.78	0.14
8.	13.39	13.38	0.01
9.	14.45	14.24	0.21
10.	13.68	13.70	-0.02
11.	12.96	13.11	-0.15
12.	12.61	12.51	0.10
13.	12.70	12.64	0.07
14.	12.98	13.16	-0.17

TABLE NO(27)

BROILER PRODUCTION FUNCTIONS PRESENTED BY EQUATION(11)

No.of broiler farms	Value of output(Y)	Land (ha.) X1	Other variables X2
1.	364800	1.6	248101
2.	271880	0.25	225821
3.	490090	1.44	308443
4.	164280	3.00	113895
5.	4183200	22.5	2388234
6.	1088700	1.5	649828
7.	151200	1.2	76742
8.	650880	1.5	425709
9.	1883400	4.0	944693
10.	871200	0.8	598792
11.	424350	0.50	293853
12.	298917	1.50	188841
13.	328525	0.15	209231
14.	434820	1.40	335950

10-2: FIELD INVESTIGATION OF POULTRY FARM SAMPLE

FIELD INVESTIGATING OF POULTRY FARMS

AT QATIF AREA

Owner's name : .....

* Farm Location : .....

* Region : .....

* Type of farm : .....

* Breeding System : .....

* Date : .....

I) PRODUCTION

A- FARM INVESTMENT

Farm Building and Housing

Type of Building	Area (Sq.m.)	Number	Depreciation	Repairs and main-tenance	Total Cost
General Total					

TABLE No(2)

FARM MACHINARY, EQUIPMENT, TOOLS,
AND OTHER FACILITIES ON POULTRY FARM

Item	Number	Depreciation	Transportation, insurance and erction cost	Repairs and maintenance	Total Cost
General Total					

TABLE (3)

LAND

Item	Unit	Amount
Land area	ha.	
Landholding structure		
Total Cost	SR.	

TABLE (4)

F U R N I T U R E

Item	Repairs and maintenance	Depreciation	Total Cost
General Total			

TABLE (5)

CHICKS

1. Number of flocks on the farm yearly .....

.....

2. Total number of chicks purchased yearly

.....

3. Total cost of chicks .....

4. Source .....

5. Type .....

TABLE (6)

FEED

1. Kind of feed .....

2. Quantity of Consumed feed per day .....

3. Total cost per ton .....

4. Total cost of feed .....

TABLE (7)

TOTAL REQUIREMENT OF LABOR FORCE

Jobs	Number	Total Salary and Wages per month	Total Salary and Wages Yearly
Grand Total			

TABLE (8)

TOTAL WORKING CAPITAL AND OTHER EXPENSES

Item	Unit	Quantity Consumed per day	Quantity Consumed yearly	Price	Total Cost
General Total					

TABLE (9)

TOTAL BENEFITS OF BROILER FARMS

1. Number of flocks per year .....
2. Number of chicks purchased per flock .....
3. Purchased cost per chick .....
4. Average price of a broiler (chicken) .....
5. Average weight per broiler .....
6. Total benefits of broiler farm .....

II. MARKETING

a) The investor is going to market its product by his market channel :

1. Number of distribution stores .....
2. Rent of distribution stores .....
3. The distance between the farm and the distribution stores .....
4. Number of laborers and their woges per month .....
   .....
5. Total cost of water and electicity monthly .....
   .....

TABLE (18)

TOTAL COST AND DEPRECIATION OF TOOLS AND EQUIPMENT USED IN THE DISTRIBUTION STORES

Item	Number	Value	Depreciation	Repairs and maintaince
General Total				

B) <u>The investor is going to market its product through the ordinary market channel</u> :

1. Average wholesale price of eggs .....

2. Average retail price of eggs .....

3. Average wholesale price of chicken .....

4. Average retail price of chicken .....

C) <u>Other information:</u>