Farm Machinery Costs Influnced by Tax Relif and Variable Costs

El-Banna, E. B. ; Z. E. Ismail ; T. H. Elshabrawy and Asmaa A. Belal
Department of Agricultural Engineering - Faculty of Agriculture - Mansoura University

ABSTRACT

The selection of correctly matched machinery implements involves both technical and economic data. For solution to more complex machinery management problems, the annual machinery costs are calculated using the actual cash flows, which occur each year. The calculation of annual costs of machine ownership is based on three types of cash flow; capital cost repayable by equal mortgage installments, recurring annual repair and insurance changes and income from selling the machine. For this reason the aim of study is elicitation of modeling for calculating the total cost of tractors and agricultural machinery under suggest Egyptian conditions. The concluded results clear that the present annual cost of machine ownership is substantially altered by tax relief and allowances. By applying a (0%, 30% and 60%) tax on calculation of tractor annual cost, the present annual cost was reduced from to 8374.1Cv to 7519.3 Cv. While, using the conventional methods the present annual cost was 9228.9 Cv. The present approach yields an intermediate cost figure within the range spanned by the present annual ownership costs with and without tax.

Keywords: Current value (Cv), Capital allowance (C_A), Balancing charge (B_C),Annual interest   charge(I_A), Repair cost(R_C), Mortgage value(M_V), Insurance charge(I_{NS}), Resale value(S_N), Annual cost(A_N), Loan rate (I_r) and inflation rate (j_f).

INTRODUCTION

Investment in machinery plays a vital role in the profitability of the farm business. Every tractor has a certain capacity of doing the work. The maximum drawbar horsepower available from the tractor is seldom put to be continuous used. The tractor, in part of the time, is usually used in light operations, while it is utilized in medium or heavy duty operations for only a certain period of the year. Therefore, the economic benefits from the tractor depend upon the manner of its use. Also, machinery that is too large for a particular farming situation will cause machinery costs to be unnecessarily high over the long run. On the other hand, machinery that is too small may result in lower crop yield and reduced quality.

Most of the modern agricultural projects today are built on large areas and need different sizes of agricultural equipment, whether the equipment is related to the projector leased from the market. It is found that most researchers use the prices of purchase of agricultural equipment, which change clearly from year to year, if they imposed the use of tractors of one old or new, it found a large difference in purchase prices, and if the assumption that the old tractors work with new efficiency, it is a mistake to calculate the total costs. So the equations were studied for the variable purchase prices agricultural equipment bring the old prices for the prices of per/day until fixed cost calculations are approximate to use the equipment operate efficiently with high operation and study the impact of prices and operation of equipment agricultural purchases of taxes and excise from pay taxes on equipment prices agriculture, give real costs and invest them in the agricultural field where the use gives a yield or increases the yield of the farm.

Srivastava *et al* (2006) mentioned that the machinery costs include costs of ownership and operation; ownership costs include depreciation of the machine, interest on the investment and cost of taxes, insurance and shelter can be estimated at 2% of purchase price of machine. Elbanna and Witney (1986) stated that in a highly competitive market, the list prices various categories of tractor are closely determined by the manufacturing costs for the design specification, plus a realistic profit margin. Tractor list price July, 1977 and September, 1983 were analyzed for 2-wheel drive and 4-wheel drive (unequal and equal) and crawler tractors. It is not surprising, therefore, to find that the 1983 prices of 2-wheel drive tractors, all basically of the same design are a linear function of the maximum power-take-off.

Elbanna *et al*. (1987) used machinery available list prices and developed price equations for 2-WD tractors and common farm machines. However, they stated that purchase price data for only one year is severely limited in its usefulness. To extend their procedure to a current price guide is easier and quicker than reapplying the price equation. The availability of official price indices simplified the updating of machinery prices on a monthly or annual basis as Elbanna and Witney (1986) and Elbanna *et al*. (1987) stated the list price of a machine varies from a year to another and from country to another. However, from analyzed market data of tractor purchase prices from 1951 to 2005, it is possible to convert historical prices to current values and vice versa by using the appropriate index price values.

Batterham (1973) and Liang *et al* (1979) used terms of the present value of a future sum, which brings the future sum back to the value of the present sum at a discounted investment rate. Statistical models were developed by Schoneyand Massie (1979), SChoney and Finner (1981) and Rotz (1985) to estimate "as is" value during periods of high inflation rate for five categories of farm tractors and three groups of combines. The results indicated that, at current inflation rates, most tractors and combines were likely to retain a very substantial portion of their original prices. Tractors and combines represent sizeable investments generating - substantial ownership costs for most farmers, where 60 to 70 percent of the total cost of ownership and operation is associated with capital recovery. Audsley and Wheeler (1978) produced a procedure to calculate the annual cost of a machine ownership. The procedure is based on four types of cash flows; the capital cost to buy the machine, recurring annual maintenance and repair charge, the resale value and interest paid on borrowed capital. They combined these cost elements to present the annual cost. This procedure is including the affect of taxation, tax allowance and balancing charges in the annual cost of the machine ownership.

The aim of study is elicitation of modeling for calculating the total cost of tractors and agricultural machinery under suggest Egyptian conditions.

MARERIALS AND METHODS

Information was gathered on the operation costs of an extensive variety of many machines, at the Agricultural Engineering Stations (e.g EL-simbilawan, Mubarak, EL-Mehala, Bilqas, Sakhaa and MitAldepa), Ministry of agriculture, (Economic Affairs Sector), Agricultural Economics department at Mansoura University and (previous publish researches and thesis). The purchase index prices and the operation costs were incorporated 2-wheel drive and 4-wheel drive (unequal and measure up to) tractors, traditional mounted and reversible furrows ordinary and trailed grain drills and driven – control cultivators. Starting value condition for those machines sorts were produced utilizing related examination and contrasted and before information by methods for value list. The stat program used in the analysis of equipment data and obtains the values of the variables of the equations used in the search and also the Excel program to solve some formulas to create an integrated table to obtain the annual operating costs of the machines.

1. Tractor Purchase Prices

In a highly competitive market, the list costs of different classes of tractor are firmly controlled by the assembling costs for the plan particular, in addition to a sensible overall revenue. All fundamentally of the same design are linear functions of the maximum power-take-off (Pto) control. Most of research on tractor's list prices was found to be a function; Eqn2.1 was discussed after (Ebanna, 1984) and developed without constant and purchase prices trends for implements can be evaluated similarly concerning tractors, it alsothat was discussed after (Ebanna, 1984) and developed without constant for tractor as in form (2.1) and for implements as in form (2.2) as follow:

$$PP_t = a_t \times P_{pto} \qquad \text{......... (2.1)}$$

where: PP_t = tractor purchase price, LE;

P_{pto} = tractor power take off power, kW.

a_t = coefficient constants depend on tractor type.

$$PP_I = a\,(M_w) + b\,(N_b) \qquad \text{....... (2.2)}$$

Where: PP_I = Implement purchase price, LE;

M_w = width of implement, m;

a = price coefficients dependent on width of implement;

N_b = number of bodies or disks or coulter of implement;

b = price coefficients dependent on number of bodies or disks or coulter of implement.

In the next section will give more details after the math and statics analysis. The evaluation difference in their list prices coefficients and their standard errors of 2WD, for unequal and equal wheels drive (4-eq WD), tractors and equipment are listed in Table (1) as the difference in their PTO power and width of machine.

2. Normalized data

Buy costs for any year are extremely constrained in their value, to the degree that reference to the present value conditions. Fortunately, the accessibility of authority value records disentangle the refreshing of costs on a month to month or yearly premise.(Elbanna, *et al* 1987) Eq. 2.3, the ten year tractor and actualize (counting chisel, moldboard, rotary ploughs, cultivators, disk harrows, drills and planter machine) value files are recorded and using it to concluding the index values in Table (3), 2017and July , 2007 are I_{t1}, and I_{t2}, individually, the July ,2007 anticipated List value, PP_{T2} of a comparable tractor was given by the shape:

$$PP_{T2} = PP_{T1}\,(I_{t2}/I_{t1}) \qquad \text{...... (2.3)}$$

Where: PP_{T2}, PP_{T1} = tractor list price for year Y_1 'Y2

I_{t2}, I_{t1} = tractor price indices for year Y_1 'Y2

Table 1. 10-index prices of tractor list prices in Egypt (1990-2000).

Years	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Aver,cv	100	103	107	110	114	118	122	127	138	130	134

3. Machinery costing procedures

1. Resale value

The resale value of N year's old machine (Eq. 2.4) and their coefficients, A_s and B_s (Elbanna, 1988 and ASAE, 1996) are given and used it in the next section as form:

$$S_N = A_s (B_s)^N FL^N\,(PP/100) \qquad \text{....... (2.4)}$$

where: A_s and B_s = resale coefficient constants;

S_N = inflation/discounted resale value of the machine after N years is owned, LE;

FL = $(l_i - j_f)/(1 + j_f)$, ratio of inflation to interest rate.

2. Repair and maintenance costs

Repair and support expenses to the underlying list price since the coefficients A_r and B_r (Elbanna, 1988) for (condition 5) were evaluated in the midst of close to nothing (yet a few) swelling, by increasing this condition by the inflation/discounted ratio FL, (Eq. 2.5) and used it in next section as form:

$$(R_c)_N = \sum_{n=1}^{N} A_r (X_n)^{B_r} FL^n (PP/100)\,\text{..(2.5)}$$

Where $(R_c)_N$ = accumulatedrepairandmantenancecostsatendof N years, themachineisowned

A_r and B_r = repair and maintenance coefficients.

3. Road tax and insurance costs

It is advantageous, by and by, to safeguard cultivate hardware against misfortune by flame. The protection charges for cultivate hardware shift from insurance agency to organization and fall in the vicinity of 0.6 and 1.2 percent of the machine secured every year. Protection for tractors and self-pushed machines cover outsider Liability, fire and burglary, along these lines which is connected in Egypt for autos and tractors. Current premiums depend on a base energize of 450 LE to a present market estimation of 15,000 and hence on a sliding resale of: 1.2% LE up to 75000 LE, 0.95% LE up to150000 LE and0.85% LE up to 375000 LE. ASAE (1996) and Elbanna (1988) the current market value of the machine is considered to be the resale value, $S_{(N-1)}$ of the machine at the end of the previous $(N-1)^n$ Years:

$$S_{(N-1)} = A_s B_s^{(N-1)}\,(Pp/100)(I_r/100) \qquad \text{.....2.6}$$

After the insurance charge is identified from the sliding resale for a specific resale value, $S_{(N-1)}$ the inflation- discounted of the insurance charge over (N-1) years may be given in the form:

$$(I_{Sc})_N = \sum_{n=1}^{n-1} (I_{Na})_n FL^n \qquad \text{....... 2.7}$$

4. Annual interest charge

And the total discounted sum of the annual interest charge is given by:

$$(I_A)_N = \sum_{n=1}^{N} PP\,\frac{(1+i_i)^N - (1+i_i)^{n-1}}{[(1+i_i)^N - 1](1+i_i)^n}\,i_i \qquad \text{...2.8}$$

Where:

I_A = annual interest charge atn$_{th}$ year, LE;

$(I_A)_N$ = total discounted of annual interest charge over N years loan payment, LE;

i_i = investment interest rate ;
i_l = loan interest rate.

5. Annual repayment of loan capital

The capital cost of the machine may happen as an installment, on outward pay, at the begin of machine ownership at time zero, or else the machine may be obtained by getting the money and paying a movement of proportional yearly home advance portion as:

$$M_V = PP \frac{(1+i_l)^N}{(1+i_l)^N - 1} \qquad \ldots\ldots 2.9$$

6. Annual capital allowance value

For tax collection purposes, the yearly rate of capital remittance for a building is 4% of the sticker price, using straight line depreciation over 25 years. For equipment, the yearly rate of capital settlement is 25% on condemning equality start that is on the recorded estimation of the machine. Thusly, the yearly capital reward for a, n, year old machine is:

$$(C_A)_n = 0.25(0.75)^{n-1} PP \qquad \ldots\ldots 2.10$$

Where: $(C_A)_n$= annual capital allowance for an th year old machine, LE.

7. Present annual cost with tax relief

The presently acknowledged strategy for farming costing, utilized most much of the time for contrasting option machine, depends on straight line devaluation, with repairs and upkeep charged at a steady yearly rate as a level of the underlying capital cost of the machine. The present annual cost were found to be a function, Eq. No.11 was discussed after and used it in the next section as form:

$$A_N = \{NPM_V - [(B_C)_N + (C_A)_N + (I_A)_N]T_r +$$
$$(1 - T_r)[(R_C)_N] - S_N \}/(FL - 1)/\{FL(FL^N - 1\} \qquad \ldots\ldots 2.11$$

Where:

A_N = present annual cost of a machine ownership, CV.

$(B_C)_N$ = Balancing charge over N years, the machine is owned Cv;

$(C_A)_N$ = Summation of annual capital allowance over N year, machine.

$(I_A)_N$ = Is owned, CV.;

FL = summation of annual interest charge over N years, Cv;

NPM_V = (1+jf)/ (1+ii), inflated/ discounted ratio;

S_N = Net present mortgage value, CV;

T_r = Salvage after N years, the machine is owned, CV;

RESULTS AND DISSCUSION

1. Tractor purchase prices

The estimations of the tractors and equipment different value coefficients, their standard mistakes and per cartages of the variety clarified by the related condition for every tractor sort are given for 2017 information Table (2). Around 99.30% of the value varieties are clarified by this basic from of condition, as showed for two-wheel drive and 4-WD (equal, unequal) tractors in Figs (1and 2).
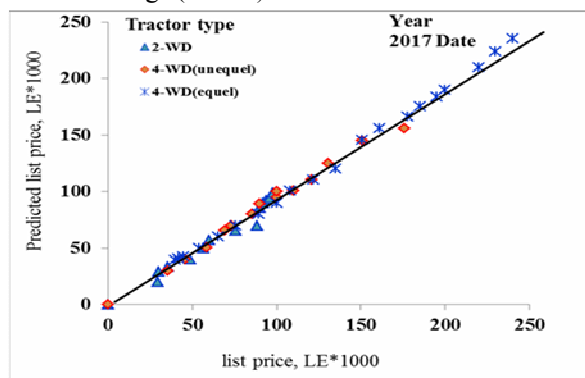

Fig. 1. Tractor list price market against predicted list price of 2-WD and 4-WD (unequal-equal), for years 2007 and 2017.
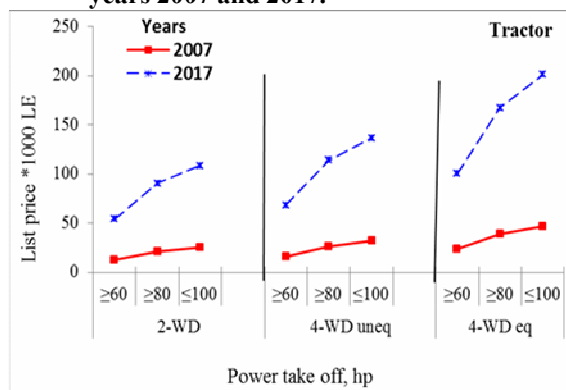

Fig. 2. A comparison between two years list prices of 2-WD, 4-Unequal and 4- equal WD.

Table 2. Tractor and equipment purchase prices' coefficients and their Standard errors and Percentage of explanation 2017data.

	Coefficient *(10^3) a_r			Standard error,*(10^3) a_r			Explanation %	DF
2-WD tractor	0.902			0.017			99.30%	109
4-WD (unequal WD) tractor	1.139			0.012			97.71%	32
4-WD (equal WD) tractor	1.674			0.046			99.56%	38
	$a(M_W)$	$b(N_p)$	c(wk)	$a(M_W)$	$b(N_p)$	c(wk)		
Chisel plough	2.272	0.945	-	0.996	0.255		95.41%	29
Mould board plough	1.557	1.113	-	0.429	0.125		97.82%	32
Rotary plough	2.050	-	-	0.235		-	96.84%	24
Driven disk harrows	2.427	0.075	0.005	0.973	0.078	0.0007	99.23%	38
Planter	3.366	9.888	-	1.829	3.215	-	96.16%	30
Grain drills	0.161	7.986	-	1.071	0.084	-	99.57%	25
	$a(M_W)$	$b(M_P)$		$a(M_W)$	$b(M_P)$			
Combine	9.112	0.643		2.789	0.096		99.58%	30

Key: a, b, c are coefficient. Constants; M_W= Machine width, m; N_p=number of bodies or disks or coulter of implement; M_P= Power- take- off of combine;Wk= Machine weight.

Table 3. Ten years-index prices of tractor list prices in Egypt (2007-2017)

Years	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Aver, Cv	100	115	124	136	148	163	184	196	214	223	329

Table 4. Performa to calculate the annual cost of machine ownership (Tractor 2-WD 100hp, pp 90200 LE) and tax rate 0%.

Col.1 Year	Col.2 Inflation rate	Col.3 Interest rate	Col.4 Current. repair cost, Cv	Col.5 Current. Insurance cost, Cv	Col.6 Current. reseal value, Cv	Col.7 Current. Rep-ins costs, Cv	Col.8 Annual mortgage value, Cv	Col.9 Actual reseal value	Col.10 Actual capital allowance	Col.11 Actual Balancing Charge	Col.12 Actual interest charge	Col.13 Total tax allowance	Col.14 Total Tax Relief	Col.15 Actual cash outgoing	Col.16 Discount cash Flow	Col.17 Inflation interest rate
1	1.050	1.100	1033.2	521.3		833.3	95003.2		22550.0		13120.0	1512.6	0	69380.0	63072.7	0.954
2	1.102	1.210	4036.2	479.6		1339.2	95003.2		16912.5		6405.3	2829.6	0	72726.5	60104.5	0.911
3	1.157	1.331	8785.4	441.2		2003.1	95003.2		12684.3		4162.0	2752.7	0	78428.9	58924.7	0.869
4	1.215	1.464	15050.8	405.9		2796.1	95003.2		9513.2		3036.8	3133.8	0	86535.7	59105.0	0.830
5	1.276	1.610	22613.9	373.4		3702.1	95003.2		7134.9		2359.3	3883.2	0	97086.2	60282.9	0.792
6	1.340	1.771	31271.5	343.6		4710.1	95003.2		5351.2		1905.9	4962.4	0	110115.0	62157.0	0.756
7	1.407	1.948	40836.4	316.1		5812.2	95003.2		4013.4		1580.8	6350.0	0	125653.6	64480.1	0.722
8	1.477	2.143	51137.8	290.8		7002.2	95003.2		3010.1		1336.2	8032.9	0	143731.4	67051.7	0.689
9	1.551	2.357	62020.0	267.5		8275.4	95003.2		2257.5		1145.4	10003.1	0	164376.3	69711.6	0.657
10	1.628	2.593	73342.1	246.1	16732.4	9628.1	95003.2	27255.4	1693.1	22175.9	992.4	12255.3	0	187615.4	72333.8	0.628

Box. 10
85120.5
Box18=Box16/Box17=81572.9

Box. 16 Box. 17
637224.7 7.811

Key: Col.2= (1.050)ⁿ
Col.3= (1.10)ⁿ
Col.11= Col 9+ Box. 10-PP
Col.14= Col.13*Tax rate
Col.16= (Col.15/ Col.3)
Present annual cost= (Box16/Box17)

Col.7= (Col.4+ Col.5)* Col.2
Col 9= (Col 2*Col 6)
Col.13= Col.7+ Col.10+ Col.12- Col.11
Col.15= Col.7+ Col.8- Col.9- Col.14
Col.17= (Col.2/ Col.3)

Table 5. Performa to calculate the annual cost of machine ownership (Tractor 2-WD 100hp, pp 90200 LE) and tax rate 30%.

Col.1 Year	Col.2 Inflation rate	Col.3 Interest rate	Col.4 Current. repair cost, Cv	Col.5 Current. Insurance cost, Cv	Col.6 Current. reseal value, Cv	Col.7 Current. Rep-ins costs, Cv	Col.8 Annual mortgage value, Cv	Col.9 Actual reseal value	Col.10 Actual capital allowance	Col.11 Actual Balancing Charge	Col.12 Actual interest charge	Col.13 Total tax allowance	Col.14 Total Tax Relief	Col.15 Actual cash outgoing	Col.16 Discount cash Flow	Col.17 Inflation interest rate
1	1.050	1.100	1033.2	521.3		833.3	95003.2		22550.0		13120.0	1512.6	453.7	68926.2	62660.2	0.954
2	1.102	1.210	4036.2	479.6		1339.2	95003.2		16912.5		6405.3	2829.6	848.8	71877.6	59403.1	0.911
3	1.157	1.331	8785.4	441.2		2003.1	95003.2		12684.3		4162.0	2752.7	825.8	77603.1	58304.3	0.869
4	1.215	1.464	15050.8	405.9		2796.1	95003.2		9513.2		3036.8	3133.8	940.1	85595.5	58462.9	0.830
5	1.276	1.610	22613.9	373.4		3702.1	95003.2		7134.9		2359.3	3883.2	1164.2	95921.2	59559.5	0.792
6	1.340	1.771	31271.5	343.6		4710.1	95003.2		5351.2		1905.9	4962.4	1488.7	108626.3	61316.7	0.756
7	1.407	1.948	40836.4	316.1		5812.2	95003.2		4013.4		1580.8	6350.0	1905.1	123748.6	63502.6	0.722
8	1.477	2.143	51137.8	290.8		7002.2	95003.2		3010.1		1336.2	8032.9	2409.8	141321.5	65927.5	0.689
9	1.551	2.357	62020.0	267.5		8275.4	95003.2		2257.5		1145.4	10003.1	3000.9	161375.4	68438.9	0.657
10	1.628	2.593	73342.1	246.1	16732.4	9628.1	95003.2	27255.4	1693.1	22175.9	992.4	12255.3	3676.5	183938.8	70916.3	0.628

Box. 10
85120.5

Box. 16 Box. 17
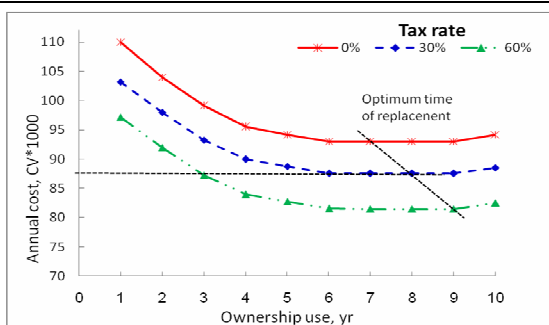628492.3 7.811

Box18=Box16/Box17=80454.1

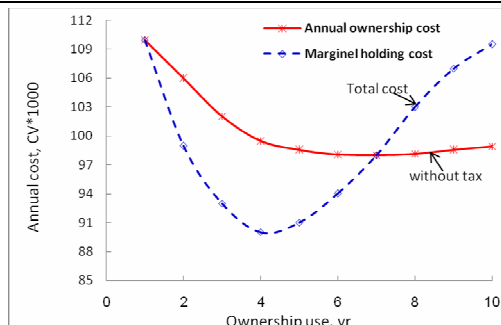Fig. 3. The effect of tax rate on 100hp -2-WD tractor in annual cost.

Fig. 4. Present annual and margin, ownership costs against machine period ownership use.

2. Tabular method to calculate the annual cost of a machine (Excluding tax relief)

The unthinkable techniques are intended to compute the yearly possession cost of a machine by finishing a professional forma (Table 4 and 5). The accompanying case represents the system:

a) **Tractor**: 100hp (2-WD); Purchase value: CV: 90,200 LE; Yearly utilize: 1000 hr.; Period of possession (10 years); Credit financing cost (10%); Inflation rate (5%); Investment loan fee (16%).

b) **Chisel plow:** Purchase value: CV: 7,000 LE; Yearly utilize: 1000 hr.; Period of possession (10 years); Credit financing cost (10%); Inflation rate (5%); Investment loan fee (16%).

The inflated cost of acquiring one of the present Cv worth of merchandise is entered in column 2 of Table (5). The sum to which Cv contributed now will become because of a fitting interest rate is focused in column 3. The yearly repair costs are computed from (Eq. 2.5) utilizing information recorded in Table (5). The yearly insurance

costs are figured by methods for resale esteems toward the finish of each earlier year from (Eq. 2.6) utilizing the system.

The present resale value toward the finish of the time of possession is additionally acquired from (Eq. 2.7) utilizing the components recorded in Table (5). The resale value is embedded in column 6 against the last year of utilization. The actual repair and insurance costs in column4 and 5 are acquired by duplicating the present repair and insurance costs by the Inflation calculate column7. (Eq. 2.8) is utilized to figure the yearly mortgage repayment for every year as it entered in column 8. So also, the actual resale value in column9 is acquired by duplicating the present resale value in column6 by the inflation rate in column 2.

The capital allowances for every year of proprietorship are ascertained from (Eq. 2.10) and entered in column 10. The total of these capital allowances in column 10 for the entire time of proprietorship is entered in enclose 10 and utilized (Eq. 2.10) to ascertain the adjusting charge for definite year of possession which is entered in the last line of segment 11. Yearly intrigue charges from (Eqn. 2.11) are keen on column 12. The tax allowances for repair and insurance, for capital venture and interest less the balancing charge ((column7+ column10+ column12-column11) are entered in segment 13.The aggregate assessment help in column 14 levels with zero for this situation in view of the standard duty rate of 0% is utilized.

The actual outgoing on a yearly premise is found from the whole of the yearly mortgage payment and actual repair and insurance costs less the actual resale value (column 7 + column 8-column 9-column 14). These gross money outgoings (excluding tax relief) are entered in column 15 and isolated by the interest factor in column 3 to give the reduced cash outgoing in column16.

The whole of the marked down trade outgoings out column16, for each time of proprietorship, is recorded in box 16. The inflated discount rates for every year are entered in column17 by separating the inflation rate by the markdown calculate (column 2/column 3). The aggregate of the inflated discount rates column 17, for each time of possession, is entered in box 17. Isolating the total of the reduced money active by the entirety of the inflated discount components (box 16/box 17) gives the annual cost of machinery proprietorship as appeared inbox 18.

CONCLUSION

If there is an easy way to estimate the annual costs of the machine and this by several points: comparison of changes in the value of cash for the composition of different size of agricultural machinery and the availability of inflation evidence, and the purchase price of a set of tractors and equipment. Such as power rating for tractors. And take

into account the monetary value of any investment in any agricultural, the calculation of the annual cash flow resulting from any investment and reduce this flow and the assumption of several years. Taxation likes the costs of maintenance, insurance and capital loan less than the cash balance of these vessels change the current annual cost of ownership of the machine (30% and 60%) on a tractor account from the current annual cost of the machine. It was reduced from 80454.1 Cv to 7519.3 Cv with 81572.9 Cv. This study gives Average annual costs of machine applying the tax or not to apply them.

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تأثير تكاليف التشغيل المعدات الزراعيه بشرائح الضرائب والتكاليف المتغيرة

الشحات بركات البنا ، زكريا ابراهيم اسماعيل ، طارق حسني الشبراوي و أسماء بلال عبد الحميد

قسم الهندسة الزراعية ــ كلية الزراعة ــ جامعة المنصورة

تعددت الطرق تقدير التكاليف التشغيل المعدات الزراعيه واختلفت بين الاماكن منها ما يصلح للظروف المصريه ومنها مالا يصلح ان تطبق تحت الظروف المحليه . وهذا البحث الحالي أجري لتقدير تكاليف التشغيل السنويه مستخدما أحدث الاساليب والنظريات بطريقه بسيطه يمكن تطبيقها في داخل المزرعه عن طريق عدة نقاط:مقارنة التغيرات في القيمة النقدية بالنسبة إلى تركيبة مختلفة الحجم من الآلات الزراعيه توافر أدلة التضخم. ودورة سعر الشراء لمجموعة من الجرارات والمعدات.حيث ترتبط أسعار الشراء لآلات المزرعة ارتباطا خطيا بحجمها، مثل تصنيف الطاقة للجرارات.الاخذ في الاعتبار القيمه النقديه لأي استثمار في اي أله زراعيه اي حساب التدفق النقدي السنوي الناتج عن اي استثمار وتخفيض هذا التدفق وافتراضه لعدة سنوات .الاعفاء الضريبي يحب لتكاليف كل من الصيانه والتأمين وقرض راس المال مطروحا من الميزان النقدي للأله وعلى هذا تم تغيير التكلفة السنوية الحالية لملكية الأله بشكل كبير من خلال الإعفاء الضريبي والبدلات.حيث قلت التكاليف السنويه من خلال تطبيق ضريبة (30٪ و 60٪) عن عدم حساب الضرائب مقارنة بالتكاليف الحاليه للجرار ، قتم تخفيضها من 80454.1 جنيه إلى 7519.3 جنيه مقارتة بـ81572.9 جنيه في حالة عدم تظبيق الي قيمه ضريبيه وهذا المثال امكن تطبيقه لجميع المعدات في المزرعه.واوصي بأن هذا البحث يمكن تطبيقه في مجالات حساب تكاليف تشغيل المعدات الزراعيه بطريقه جديثه وبسيطه بثلاث أخطاء تقديرات تكاليف تشغيل للمعدات الزراعيه ميدانيا.