FERTILIZER USE IN COCONUT SMALL-HOLDINGS: Is it Remunerative?

U V H Perera
Agricultural Development Authority

The current average cost of production for coconut for the small-holder who applies fertilizer at the standard rate of 3 kg per palm and who adopts the recommended cultural practices works out to about Rs. 2,450 per acre per annum. Obviously the cost of production would be much less for land owners who do not adopt the recommended practices and for those owners who are resident in their small-holdings as they do not incur overhead costs. Similarly the cost of production is higher than the average for big estates with high overhead costs.

Out of the total cost of production, the fertilizer and its application constitute about 37 per cent (Table 1).

The average production of a non-fertilized land is unlikely to exceed 2,000 nuts/ ac/ annum. The yield from lands which receive fertilizer annually average around 3,000 nuts/ acre/ annum. Thus for the purposes of our calculations, assumption of an incremental benefit of 1,000 nuts per annum due to fertilizer application is reasonable. At 3,000 nuts per annum per acre, the cost of production per nut works out to 81 cents. The current Colombo wholesale price of coconut s around Rs. 1,700-1,900 per thousand nuts. (19 October, 1989) The average wholesale price for 1989 (up to October) works out to Rs. 1,938. The farm gate price received by the small-holder is about 20 per cent less than the estate prices. Thus the average price received by the small-holder for 1989 has been around Rs. 1,550. Therefore the return on his cost of production for this year is as given in Table 2.

Remunerative price

What is more important for the grower is the return on his total investment of land and cost of production. The coconut areas in Sri Lanka are highly populated and the land values in coconut increase much more rapidly than in tea, rubber and paddy. The average price of bearing coconut land is around Rs. 45,000/ac. Thus the total investment for an acre of coconut land is Rs. 47,450. This investment at the present interest rate of 15 per cent on savings deposits should yield an annual income of Rs 7,118. The average annual income from coconut is only Rs. 4,650 for 1989, for a small-holder. The return on investment is only around 10 per cent under monocropped conditions.

The price of coconut which will at least give him the interest rate on savings (low interest at no risk) or the remunerative price works out to Rs. 2,373 per 1000 nuts at farm gate. The remunerative price could allow for fertilizer application and other standard cultural practices and still leave a minimum margin to the small-holder. However we see that the coconut prices are subjected to extreme fluctuations in response to fluctuations in production, and the prices received by the small-holder are more often than not have been below remunerative levels.

Return on Fertilizer application

As most of the benefits of fertilizer are to be reaped in the following year, the quantum of financial benefit depends on the coconut price of that year, which in turn depends on the total coconut production of the island in the following year. The incremental benefits due to fertilizer application could be calculated on the basis of an average incremental production of 1,000 nuts per acre. The return on the basis of 1989 prices of coconuts and fertilizer would be as given in Table 3.

Assuming current prices to remain unchanged in 1990, a return of 50% could be expected from fertilizer application. Conversely, the break-even price for fertilizer (no-loss-no-gain price) per MT of fertilizer works out to Rs. 5,583 as against the current price of Rs. 3,520 per MT. The break-even price roughly equals the price of fertilizer if the present subsidy were to be removed.

The return on the investment on fertilizer since 1980 is worked out in Table 4. The current investment is compared with the incremental income in the successive year.

During this decade, the financial return from fertilizer application has ranged from a negative return of 3 per cent to a positive return of 173 per cent. There has been three years out of 10, with negative or very low return.

During seven years the returns have been over 50%. On the average, the chance of successful investment is 70 percent. It would be interesting to find out the salient characteristics of high and low return years.

Table 1 – Average cost of production per acre of coconut

Fertilizer, 3 kg per palm	Rs	676
Transport, storage and application	Rs	225
Other costs covering crop work, cultural practices maintenance and overheads	Rs	1,540
Total	Rs	2,441

Source: Coconut Development Authority

Table 2 – Returns from coconut cultivation

Cost of production per acre	Rs	2,441
Income from 3000 nuts Rs 1,550 per 1000 nuts	Rs	4,650
Margin per acre	Rs	2,209
Per cent return on cost of production		90%

Table 3 – Incremental Return on Fertilizer on the basis of 1989 prices

Fertilizer		
Cost of fertilizer	Rs	676
Application	Rs	225
15% interest p.a.	Rs	135
	Rs	1,036
Income		
Income from 1000 nuts at 1989 average small-holder price	Rs	1,550
Return	Rs	514
Per cent return		50%

We see from the data in Table 5 that the return on fertilizer has been very high during periods of very low coconut production and resultant high prices of coconut. The fertilizer application has paid dividents, when the coconut production has ranged from 1,937 to around 2,450 million nuts. At production levels of over and above 2,500 million nuts, the coconuts prices have fallen to very low levels so as to nullify the financial gains of fertilizer application. The price receivable by the farmers for coconut is the crucial factor in the application of fertilizer. Although the return is dependant on the price of coconut in the succeeding year, the current price is also important in influencing the farmers to apply fertilizer, since high prices will result in more disposable income in the hands of the farmers.

The fertilizer prices have increased over the time and will continue to rise in the future. The demand for the major coconut products has not increased with the increasing population and the rising standards of living in the importing countries. The periodic price rises in the past were mainly the result of sharp drop in the supply position. Coconut oil, the major coconut product in the world trade, lost the premium position it held in world oil and fats market in the early seventies due to:

(a) increased production of soya bean oil and palm oil
(b) new found possibilities of technical substitution of coconut oil by other oils
(c) issue of health hazards due to cholesterol

The continuation of high prices at remunerative levels cannot be expected since the dethronement of coconut oil from its premier position.

Coconut Cultivation - Some thoughts on investment

Increasing the productivity of existing coconut lands and increasing the income of the coconut producer have been accepted and remained unchanged since 1920's as development objectives for the coconut sector. With the low prices for coconut, the concept of increasing productivity per palm has been replaced by the more wider concept of increasing productivity per acre by more intensive land use through utilizing the potential of coconut lands for intercropping and animal husbandry. It has been already pointed out that the return on the total investment per acre is around 10 per cent as against the average interest of 15 per cent from capital. Such a low return does not ensure re-investment of earnings within the sector for further development. During the expansion phase of the coconut cultivation in the last century which coincided with the birth of the soap industry in Europe, the income generated within the sector, particularly in the tapping industry was re-invested in coconut lands. Today the coconut land has become more desirable as a potential saleable asset of rising value than as a means of production for income generation through agriculture.

The rising local consumption of coconut and coconut oil in household diet has now become the determining factor of the price of coconut. Although the world demand for coconut oil has become highly elastic since 70's, the local household demand for coconuts and coconut oil is highly inelastic. It is only the surplus after satisfying the household demand that can be exported. With the local demand absorbing around 70 per cent of the coconut production on the average, it exerts an equivalent demand pull on the supply availability. The coconut production is subjected to annual variations as well as within the year seasonal variations. The unimodel production curve for coconut in Sri Lanka results in a bimonthly variation in the supply of coconut (Table 6).

The coconut production in 1988 was very low and the prices were exceptionally high. The household food nut consumption of fresh nuts remains constant throughout the period. However, the consumption of coconut oil is less inelastic than food nuts and adjusts itself to availability up to some extent. Nuts seasoned for about two months are utilized in processed production, and we can expect a production cycle with a two month lag for the processed kernel products. It is seen from Table 6, that in a low production year the supply availability for processed products is very low resulting in low exports.

Table 4 – Returns on investments in fertilizer; 1980 - 1989

Year	Cost of fertilizer and application per ac - Rs	15% interest on cost - Rs	Total investment on fertilizer Rs	Small-holder farmgate price for 1000 nuts Rs	Return per acre - Rs	% return
1980	455	68	523	965		
1981	781	117	898	1068	+545	+104
1982	781	117	898	870	−28	−3
1983	899	135	1034	1425	+527	+59
1984	933	140	1073	2559	+1525	+147
1985	672*	101	773	1112	+39	+4
1986	679*	102	781	762	−11	−1
1987	797*	120	917	1512	+731	+94
1988	901*	135	1036	2502	+1585	+173
1989	901*	135	1036	1550	+514	+50

*at the standard dosage of 3 kg per palm as against 4.5 kg in previous years.
Farm gate price is estimated at Colombo wholesale price less 20%.

Table 5 – National coconut production and fertilizer usage

Year	Coconut production (Million nuts)	Total fertilizer applied MT	Farmgate price per 1000 nuts	Percent return
1980	2026	55,774	965	
1981	2258	37,710	1068	+104
1982	2521	30,331	870	−3
1983	2312	34,508	1425	+59
1984	1942	49,422	2559	+147
1985	2958	41,016	1112	+4
1986	3039	31,498	762	−1
1987	2292	41,261	1512	+94
1988	1937	31,374	2502	+173
1989	2455*	N/A	1550	+50

*Forecast
N/A - not available.

Table 6 – Variation in the supply of coconut

Pick	% of annual production	1988 crop (Mi. nuts)	Food nut consumption (Million nuts*)	Balance available for processed production (Mi nuts**)	Average wholesale (Colombo) price for 1000 nuts Rs
Jan-Feb	13	252	246	6	3757
Mar-Apr	16	310	246	64	3065
May-Jun	21	407	246	161	3069
Jul-Aug	20	387	246	141	3053
Sep-Oct	16	310	246	64	3185
Nov-Dec	14	271	246	25	2644
	100	1937	1476	461	3128*

*Average

In fact in 1988, the total exports were only 236 million nut equivalant. The local consumption of coconut oil was about 28,125 MT as against the normal usage of about 60,000 MT. The peculiar seasonal pattern of coconut production, when confronted with inelastic consumption of food nuts results in high fluctuations in prices. In a low production year, there is a scarcity of nuts for desiccated coconut and copra production. The seasoning of nuts mitigates the fluctuations to a small extent. During very high production years, the low prices do not result in increased consumption of fresh coconut, although coconut oil consumption may increase. If there is no expansion in the world demand to absorbs the increased surplus, the prices will come down to very low levels. One of the most practical ways to mitigate the fluctuations of supply availability and to ensure reasonably high prices is to maintain a buffer stock of coconut oil using the 20,000 MT bulk oil storage facility. Such a scheme also ensures increased nut supplies to desiccated coconut mills, and an increased supply of coconut oil during low crop seasons. All the available opportunities to ensure a higher return, viz.

(a) intensive land use
(b) buffer stock scheme for coconut oil
(c) improving production efficiency in coconut, and
(d) organizing the farmers into farmer groups to improve production, marketing and their bargaining strength

have to be made use of if coconut cultivation is to continue as a profitable investment.