VALUATION OF A TEA BUSH

H.W. Shyamalie[1]

Estimating the value of a tea bush is required where compensation should be paid to the grower/owner of crops. This is commonly occurs when agricultural land is acquired for the development of infrastructure facilities like construction of roads, highways, water & electricity for public usage. Compensation should be estimated for different situations such as area completely damaged, area partially damaged and area likely to be replanted.

There are various ways to estimate the value of a crop. However, unlike the annual crop, estimation of value for perennial crop like tea is bit difficult. The valuation method used in a given situation depends on the purpose and function of the appraisal, available data and the development stage of the crop. In tea cultivation, three development stages can be identified as immaturity, sustained maturity and decline. Almost six years of the immaturity stage, invest in land preparation, planting & other cultural activities before any income is realized. In the sustained maturity tea production will increase & come to peak level. Production begins to decrease during decline stage.

In placing a value on a growing crop to determine compensation for production termination, productive lifespan of tea bushes, yield potential & projected crop over the period, current age of the crop, investment on replanting, cost of production, market price (Net Sale Average), interest rate and discount rate are main factors to be considered.

1. **Productive Lifespan of tea bushes**

   Economical productive lifespan of tea bush may vary from one region to another and vegetatively propagated (VP) tea to seedling tea. The replacement age of well managed & poorly managed VP tea is 60 and 42 years and well and poorly managed seedling tea is 70 and 52 years. Replacement age of VP tea, which is resistant to Low Country Livewood Termite, is around 35 years and for susceptible VP tea is about 21 years (F&I Proceedings, 2003).

2. **Yield potential & projected yield over the period**

   Yield potential of tea fields vary with tea growing regions and type of tea. It is also required to have an idea on expected yield pattern over the productive lifespan at the estimation of value of a tea bush. As an example, VP tea fields in the up country achieved their highest productivity level at 21-30 years, whereas, in Uva and mid country it was at 31-40 years. The highest overall average productivity of VP tea fields in the corporate sector was achieved at the age group of 31-40 years. The declining trend of VP tea yields started at the age of 20 years in the low country, at 40 years in mid country and uva and at 30 years in the up country region (A Diagnostic study in the corporate tea sector, TRI, 2011). The rate of yield reduction was also estimated as 75kg/ha/year for well managed VP and 135kg/ha/year for poorly managed VP. Similarly for

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[1] Head, Agric. Economic Division, TRI

seedling tea, yield reduction was 17kg/ha/year and 23kg/ha/year for the respective categories in the up country. Yield loss due to the age (without pest damaged) was estimated as 140 kg/ha/year and yield loss with the pest attack was estimated as 400kg/ha/year (E&E Proceedings, 1995).

3. **Current age of the crop**

It is necessary to know the current age of tea bushes, as the period to be taken in to account at the estimation of the compensation depends on the current age of tea bushes.

4. **Investment on replanting (Capital cost)**

Capital cost included cost of land preparation, rehabilitation with grasses, planting and after care operation up to harvesting.

5. **Cost of production**

Tea production involves cost at two stages: one is at the growers' level and may be termed as cost of cultivation; and the other is at the factory level and known as cost of processing. These two stages together are included in 'cost of production' of made tea.

6. **Market price**

Highest net sale average achieved at the current year was taken as market price.

7. **Interest rate**

Interest rates have been variously set either by national government or central bank. Interest rates yielded by any investment take into account inflationary expectations, level of risk in the investment & costs of the transaction. Current banking interest rate should be taken at the valuation.

8. **Discount rate**

The rate used to discount future cash flows to the present value is a key variable of this process. Due to perennial nature of tea crop, expected net income over the productive lifespan of tea bush should be discounted. To determine the present value of money, a discount rate must be applied to adjust for inflation. To convert value of future incomes to present values, different discount rates (varies from 10 - 20%), were used as the opportunity cost of capital in agricultural investments varies depending on the risk and the total amount of invested. Discount Process (Factor) = 1/(1+Discount Rate)^Year

9. **Bush density**

After estimating the compensation for tea fields, value of a bush can be estimated by knowing plant density.

Valuation Approaches:

Two approaches that can be used to estimate the value of a perennial crop like tea are

i. Cost Approach
ii. Income capitalization approach.

i) **Cost approach**

This approach is used to estimate the amount of money a producer has invested in the current crop and most commonly used for immature plantings that have not reached maturity. The cost approach places a value on crop by determining the improvements that have been added to the land. These improvements generally include the costs associated with preparing the land and planting the crop. and any cultivation, or other production expenses incurred after planting.

At the time of estimate the compensation, tea producer should be reimbursed for the amount of money invested in the crop plus some measures of an expected rate of return on the money invested. An average rate of return was calculated as the ratio of the present value of total expected net returns from the entire productive lifespan to the present value of total planting and production costs invested in the crop over the entire productive lifespan. This rate of return was then used to estimate the return on money invested in the crop up to the time of estimate the compensation.

The value of tea using the cost approach may be given in equation form as follows:

$VC_t = (1+ROR)*[\Sigma PLTC(1+i)_j + \Sigma PRDC(1+i)_t]$

where

VC_t = estimated value of tea per ha in time t

ROR = estimated rate of return on money invested in growing tea

$PLTC_j$ = unrecovered planting costs as of time j

$PRDC_t$ = unrecovered production costs incurred through time t

i = Annual interest rate

This highlights the application of existing valuation methods in estimating the value of compensation that should be paid to the producer.

ii). **Income capitalization approach**

This approach is more appropriate to use when the tea crop has reached a mature or sustained stage of production, but can be used at any point in time. The basic calculation used in this analysis requires current year production costs, the appropriate allocated and unallocated planting costs, as well as the net present value of any future net returns. Estimated value of tea bushes through income capitalization approach would be equal to the present value of all unrecovered planting and production costs invested in the crop at a point in time plus the net present value of expected net returns from current and future crop over productive lifespan of tea bushes. The value of tea using the income capitalization approach may be stated generally in equation form as follows:

$VIt=[\Sigma PLTCj(1+i)_j + \Sigma PRDCj(1+i)_t + \Sigma FNRk/(1+r)_{n-t}]$

where

VIt = estimated value of tea per ha in time t

$PLTC_j$ = unrecovered planting costs as of time j

$PRDC_t$ = unrecovered production costs incurred through time t

$FNRk_{(n-t)}$ = estimated net returns from future harvests (over the productive lifespan)

i = Annual interest rate
r = Annual discount rate

Unrecovered planting and production costs are carried forward in time and charged an interest cost using an annual interest rate, i. The present value of expected future net returns is discounted using a discount rate, r. The resulting total estimated crop value represents unrecovered costs invested in the crop at a point in time as well as expected future returns.

The major difference in these two approaches to crop value determination is that the income approach adds expected future net returns to unrecovered costs while the cost approach adds a measure of return on the unrecovered costs themselves.

References:

Samansiri, B A D, Rajasinghe, J C K, Mahindapa, K G J P (2011). Agronomic Profile of the Corporate Sector Tea Plantations in Sri Lanka, A Diagnostic Study in the Corporate Sector Tea Plantations. Tea Research Institute of Sri Lanka.

Proceedings of the 198th Experiment & Extension Forum. Tea Research Institute of Sri Lanka.

Proceedings of the 195th Experiment & Extension Forum. Tea Research Institute of Sri Lanka.