

**LAND SELECTION IN UVA FOR
REPLANTING TEA**

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INTRODUCTION

Tea is a crop with wide adaptability. It is grown in a range of climates and soils in various parts of the world from Georgia(42° N) to Argentina (27°S). It is cultivated from sea level up to elevations of 2200 m amsl. Even in Sri Lanka tea is grown from almost sea level in the Southern Province to 1800 m amsl, in the up-country.

The wide adaptability of the tea crop does not mean that it could be grown anywhere without proper land selection. It is important to select the most suitable land for any agricultural land use in order to optimise production per unit of land under cultivation. When considering the expenditure to be incurred one has to bear in mind that uprooting of uneconomical tea lands and replanting them with clonal tea is a very costly agricultural operation. In Uva, uprooting of old tea, rehabilitation of soil, planting of new clonal tea and

and bringing them into bearing would cost over Rs 500.000 per hectare. It also takes about five or more years before tea comes into bearing. However, what is distressing is that more and more marginal tea fields are being annually added into the "uneconomical" category. Maintenance of these fields has to be done with the income derived from the other profit generating fields. Thus the expenditure that has to be incurred on replanting the existing uneconomical areas with clonal tea is an essential operation for the long term development of the industry. Tea fields should not be maintained as a liability but they should be converted to an asset. With the high investment to be incurred the aim should be to ensure high sustainable returns for a longer period of time. Hence proper land selection assumes immense importance in every replanting programme, This is of greater significance in the Uva province where there are many constraints to overcome.

The proper selection of lands for agricultural purposes is important because it is a precious resource in Sri Lanka. The arable land for an individual is about 40 x 40 m in extent (0.16 ha) in Sri Lanka. This too keeps shrinking with the increase in population and the continuous degradation of available land. Therefore, no one can ill-afford to misuse or abuse the land. An attempt has been made here to interpret and provide appropriate guide-lines to select lands suitable for planting with tea, with special emphasis on sustainable land use.

Current Practice

Often the existing 'C' category lands are earmarked for replanting. This is based on the assumption that the worst should be set aside for replanting with clonal tea to obtain higher yields. The failures observed in many V P fields could be largely attributed to faulty land selection. It is hardly possible to obtain high yields from V P fields if the land is unsuitable. When clonal selections are done more emphasis should be placed on their vigour, rapid growth and high yield among other desirable characters. Since clonal plants also make greater demand on soils for both water and nutrients than the old seedling tea the land selected for replanting should provide better soil conditions in order to realise the expected returns from the clonal plants.

The following broad classification can serve as an useful basis for selection of land for replanting with tea from the present seedling tea areas (Manipura, 1972).

A - Land to be replanted : This would be land with an average stand of tea and where slopes are not too steep or severely eroded. This would be areas where yields are low because the tea is of poor jat, has severe wood-rot and pest and disease damage, but not because soil conditions are poor.

B - Land not for immediate replanting:

These would have a good stand of tea, with medium to high yields. This category will have the bulk of the crop until the replanted

tea comes into full production. These areas should be given adequate fertilizer and vacancies should be supplied to obtain maximum production.

C - Very poor land, steep and severely eroded: This land may be used in agricultural diversification either immediately or in the future.

The present practice adopted by the plantations is to select land or seedling fields which are marginal in production and considered uneconomical, but which fulfils the following land requirements

- a) Slope less than 70% (35°)
- b) Soil depth more than 50 cm.
- c) Rockiness (out-crops) less than 20%.
- d) Less than 50% gravel in the top 90 cm soil depth.
- e) Well drained soil.

Even though the above parameters are given as a broad guide-line they should be interpreted with care, taking into account the merits of each case especially considering the effect of interactions of the parameters. It must be borne in mind that the exercise is to select land to establish a perennial crop from which sustainable high returns can be expected over a period of 25 years or more, from an investment of more than Rs 500,000 per hectare. Let us look at each of these parameters in detail.

Slope: Traditionally tea has been cultivated on hill slopes. One of the major problems in cultivation in hilly lands is soil erosion. When the soil is left bare during land preparation for replanting, the soil loss could be tremendous. Some instances of darker land surfaces becoming lighter and paler in colour have been observed between the time of uprooting and land preparation for rehabilitation. This is due to a complete wash off of fertile top soil during the land preparation operation.

From the results of an experiment carried out at TRI, Talawakele, it was revealed that on a slope of 26% (14°) the soil loss from a clearing with new clonal plants without thatch or other form of soil cover was 52 tonnes/ha/year.

Erosion of top soil is an extremely serious problem in most parts of Uva. Most tea lands in Uva are on mountainous terrain where the length of a single slope could extend over a few kilometres. With longer slopes the velocity of the run-off water is high and so is the damage done by erosion by way of soil loss. Therefore, when the degree of the slope is measured one has to consider the length of the slope of the particular track of land. If there is a longer slope it is best to select lands with gentler slopes even though the permissible slope limit is 70%. This is essential to save the most valuable top soil from erosion losses during land preparation and the early stages of replanting. It is also important to note that the upper areas of steep slopy lands generally have shallow soil depth.

Soil depth: THE present requiremnt is a soil depth of more than 50 cm. If the land could be dug to more than 50 cm without striking any obstacles like boulders or slab rocks it is considered as a soil with good depth suitable for the growth of tea. However, this is an incorrect assumption. The visible depth or the depth to which the land could be dug is not the proper yardstick. It is important to ensure that the effective rooting depth or the depth of the A and upper B horizons of the soil profile should be more than 50 cm. The presence of these soil layers or the top soil is very important. Much of the lands in Uva are devoid of the top soil.

The soil is rich and fertile because of its organic matter content and highly weathered soil minerals. Plants and animals die, decay, disintegrate and are incorporated in the soil making the soil fertile and capable of supporting the growth of plants. Decomposition of soil minerals through physical, chemical and biological activities taking place in the top soil layers make the minerals available to the plants as soil nutrients. The physical and chemical properties of the top soil are geared towards promoting the growth of healthy plants. The top soil stores plant nutrients, air and moisture. It is a hive of intense biological activity. Fungi and bacteria in this layer make the soil richer by their activities. Nutrients in the top soil are crucial for crop production as they provide the food for the plants. The loss of top soil and the exposure of less productive subsoil to the surface has serious consequences for plant growth.

Subsoils are infertile, often have poor structure and usually more erodible than the surface layers, when cultivated. Once the top soil is lost it is difficult to be replaced. Slopy lands never recover from this loss. These lands will degrade leading to unproductive areas of very little agricultural value.

Therefore, when selecting a land with a soil depth of more than 50 cm we have to ensure that the minimum requirement of the rooting depth is met.

Rockiness: A considerable extent of old seedling tea in Uva is planted on rocky lands where rock out-crops are more than 20% of the given unit. Rock out-crops reduce the cultivable land areas. It is often observed that lands with abundant out-crops have underlying bed rocks with only a shallow soil layer above them. It is necessary to do a proper survey of the land to be selected, marking out the rock out-crops and the shallow soil areas with underlying bed rocks, as these areas should be eliminated from the area to be planted.

The mere presence of rock out-crops are not the only reason for the reduction in cultivable land area. The heat radiated from the rock surface on hot sunny days could have adverse effects on young tea plants, planted closer to the rocks thereby further reducing the cultivable area.

However, a favourable point in respect of lands with large percentage of rock out-crops

is that these out-cropped rocks act as a natural soil conservation barrier. Soil carried down the slope with run-off water is blocked by the rocks and forms pockets of fertile soil. The extents of such soil pockets might not be adequate to plant tea economically but when diversification is done these fertile soil pockets could be selected to plant crops like Banana or Cardomon under forest cover.

Gravel: Technically, particles above 2 mm in size and up to 2 cm are considered as gravel. The presence of gravel within the soil should be considered in relation to the root penetration and the amount of soil available for the supply of nutrients. In some soils gravel is present as a hard layer where the soil above and below is free of gravel. This gravel layer is normally considered as a separate horizon in the soil profile. Though this layer could be dug, it sometimes acts as a barrier for root penetration, thus reducing the effective rooting soil depth.

Drainage: Tea requires a well drained soil for healthy growth. Tea roots are very susceptible to poor drainage. Casualties caused to tea by root damage due to ill drained conditions are often observed in areas where such conditions occur only occasionally during heavy wet weather. One has to act with caution when selecting land near ravines, adjoining water resources, etc. The land may appear well drained at the time of land inspection. It is necessary to inspect the soil profile carefully for signs of occasional

ill drained conditions. The presence of soils mottled with paler particles, grey or black soil horizons indicate possible periodical ill drained conditions.

Other factors: The Uva Province is situated in the North-east monsoonal zone of Sri Lanka. Tea growing areas in this province falls within the up-country and mid-country intermediate climatic regions which is considered as a semi dry area.

In an year of normal weather pattern in Uva a dry period of over three months would be expected from June to September. Although the annual expected rainfall is between 2000 - 2250 mm the soil and the plants that grow during the dry season tend to suffer from moisture stress. The amount of annual rainfall is not a limiting factor in Uva for the growth of tea , but most of the rain water received during the NE monsoon from October to January is lost in run-off. Apart from being a wastage of a precious resource it also causes erosion. It is observed that tea fields situated immediately below forest areas suffer less during drought. This could be due to fact that forests possess an environment with efficient management of rain water, benefits of which are felt throughout the immediate vicinity. In view of this feature , it is useful to give priority in selecting lands where hill crests above them are covered with forests, preferably natural forests.

In Uva, tea is grown over a wide range of elevations from about 400 m up to 2000 m amsl. It is observed that based on the performance

of tea in Uva the tea area could be divided into two elevational categories, i.e. land below 1000 m and those above 1000 m. Replanted or newly planted tea lands where the elevation is above 1000 m, are generally more successful than lands in the lower elevations. This observation could be interpreted to imply that the up-country intermediate zone is a most suitable climatic region for tea cultivation than the mid-country intermediate zone. This may be an important factor to consider in selection of lands for replanting in Uva.

Due to the peculiar geographical situation in Uva considerable land extents are subjected to very strong drying winds. These winds often coincide with the normal seasonal dry periods between June and September. In addition to the direct harmful effect of strong winds, they cause desiccation of the soil surfaces. Land areas prone to such winds could be vulnerable if planted with tea without the establishment of proper shelter belts and wind breaks. This would mean prior planning involving adequate financial provisions.

It is said that the success of already established clonal fields in the adjoining areas would get a good indication of the suitability of the land. In this connection it is important to look into the mode of planting done in the already established fields. It is our observation that some of the well established clonal tea fields on steep lands are performing well due to the hardwork and investments in the initial land preparation by

adopting correct soil conservation measures such as solid contour terracing, additional supply of organic matter, etc. Further, the adjoining seed tea areas could be on lands already degraded beyond repair due to exposure to natural hazards over a long period.

After initial selection of land for replanting is done and rehabilitation grass is established, further inspections should be carried out on the patches where performance of grass is unsatisfactory. Such weak grass patches should be examined carefully and if found unsuitable for planting tea, they should be left under grass as a thatch bank irrespective of their size.

Independent of who owns or who manages tea plantations in Sri Lanka, they should be regarded as a national asset and all our action towards this asset should have the long term interest of maintaining and developing them with proper programmes of replanting. Incorrect use of land or abuse of land could lead to disaster. Once lost our fertile soil is lost forever. Lands improperly handled could be degraded beyond repair. Therefore correct and careful land selection for planting with tea is vital and this has to be considered not from the view of merely increasing the extent under VP tea, but with more concern to preserve the land and ensure its sustainable use.

BIBLIOGRAPHY

- MANIPURA, W. B. (1972) - Conservation of soil and water on tea land. "Towards increased productivity on tea land in Ceylon" *Proc. Symp. Tea Res. Inst. Ceylon*, 34 - 36.