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APPROPRIATE TECHNOLOGY FOR SMALL TEA GROWERS - TOWARDS AN INTEGRATED FARMING CONCEPT

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INTRODUCTION

A tea small-holding should ideally be an independent and a self-sustaining integrated farm in which tea would be a major income generating cash crop. The small tea grower should be an agriculturist who understands the art of proper farming and is not a mere allottee or colonist to whom a piece of land is parceled out to establish the tea crop as a possible major income generator. Whatever financial assistance or technical support service that is provided to this sector should all be geared towards an integrated package that would help evolve this basic concept of a self-sustaining farm unit.

It is through a system of integrated farming of tea by a multitude of village holdings that China became the sole supplier of tea to the entire world until the middle of the nineteenth century. It is on record that in 1855, China exported as much as 90 million kg of tea to the world trade and by the year 1888, tea exports from China rose to as much as 136 million kg, the bulk of which originated from village level small holdings!

The cultivation of tea and its harvesting is a labour intensive system that lends itself suitably for management as small farm units. The evolving of the plantation style cultivation of tea is only a subsequent development, initiated by pioneering Europeans. It was these pioneers who cleared vast areas of jungle land in India, Ceylon (Sri Lanka) and Indonesia and subsequently in Central and East Africa and established large commercial plantations. Today, such large plantations are managed with modern high-input technology, aimed at high productivity and profitability levels. Alongside such plantation style cultivation, the small tea grower continues to subsist as an important integral part of tea growing in some major producing countries, including Sri Lanka.

Tea Small Holdings in Sri Lanka

The tea small holdings in Sri Lanka emerged as peasant farmed units amongst the mid-elevation tea plantation areas, following the introduction of tea as a plantation crop by the British pioneers. These evolved as mixed farm units in the periphery of the larger plantations, with tea developing into a major cash crop with time. With the establishment of the potential for income generation, the rural farming communities and rubber small-holders in the Sabaragamuwa and Southern Districts too took onto small-scale tea cultivation. Whenever tea enjoyed a price boom, the number of such small units increased.

With the implementation of the highland colonization schemes, small tea holdings grew rapidly, as mono-cultured units. The emergence of such pure small tea areas was not in accordance with any set pattern or plan and a significant number of these holdings sprang up at random, sometimes even irrespective of the availability of a processing facility at close proximity.

Approximately 38% of the total cultivated tea extent in this country is in small-holdings, with over 150,000 units of an average size of 0.50 ha and accounting for a total extent of about 75,000 ha, the majority of which are not managed as integrated farms. ***Nonetheless, this extent of tea gives one an indication as to how important this sector is to the national economy of this country.***

The total produce from such small growers can contribute substantially towards large organized agribusiness enterprises that can help to collect, process and market the commodity to the mutual benefit of both themselves as well as the growers. This would emulate the contract farming schemes practiced in some parts of the developed as well as the developing world. The growers are provided with the necessary inputs on easy terms and a reasonable return is often assured for the produce.

Regretfully, the majority of small tea growers in Sri Lanka are allowed to subsist on their own, most often at the mercy of middlemen. The problems faced by them are in no way different to those that ail the

domestic agricultural sector. The biggest constraint facing a large number of them is the lack of adequate funds and the non-availability of easy credit facilities for essential inputs. There are also several problems connected with the marketing of the produce. There is inadequate transport and manufacturing facility for a significant number of holdings located in remote and inaccessible areas.

Due to the inadequacy of a properly organized leaf collection system that guarantees full benefits, the peasant tea growers are often exploited by middlemen, including the village shop owners who provide the day to day needs on credit in exchange for the assured supply of the harvested green leaf, at prices dictated by him and not on the basis of prevailing market demand. This category of peasant tea farmers who continue to subsist on meagre earnings neglect their holdings, leading to soil erosion problems and land degradation. The situation gets accentuated during periods of price depression with small growers receiving a return below cost. Instances of refusal of leaf by the processing units have also been reported which have placed them at a further disability.

It is against the backdrop of such socio-economic scenario that an appropriate agricultural technology needs to be furnished to these growers, provided the financial support is available in the form of readily obtainable credit facilities, along with a properly organized leaf collection system that guarantees them direct benefit. Those who have direct access to processing facilities and derive the full benefits of the existing

market trend often turn out to be ***progressive tea growers*** and seek technological advice for further advancement. The number of farmers in this category are unfortunately very few but the steps taken recently by the state to alleviate the problem has been a welcome move.

Towards Optimizing Land Utilization

The concept of mixed farming or integrated farming is one that blends with the environment, causing minimal ecological disruptions. Relying on optimal resource utilization, this movement towards conservation farming is a pragmatic proposition for a small farm unit than it is for the larger commercial plantations. The small tea grower should, therefore, take full advantage of this strategy, since such mixed integrated farms, besides being self sustaining and environmentally friendly, assure a steady income most year round.

It is a matter for serious concern that in a large number of tea small holdings in Sri Lanka, more particularly in the mid-country, the plant density is very poor, with hardly about 50% of the expected stand per unit area. Such a situation not only lowers crop productivity and exposes the under-utilized land to large-scale soil erosion and fertility degradation, but also poses a serious environmental problem, leading to siltation of streams and other larger water bodies and declining water quality.

Need for a Modified Replanting Strategy

The small tea farmer who subsists mainly

on the income generated by the sale of green leaf cannot be expected to totally forego it by the wholesale uprooting of the existing tea plants, for purposes of *replanting* the land with young tea, as is practiced in selected fields of commercial plantations. ***This would no doubt be an unacceptable strategy. The small tea grower needs to follow a different approach.***

Whilst continuing to harvest the existing tea, the grower will have to be encouraged to infill all available vacant areas. Initially, all such vacant areas has to be planted under rehabilitation grass, such as Guatemala or Mana, for a period of about two years, with the periodical lopping incorporated into rehabilitated areas to help build up soil fertility. At the end of the two-year period, these rehabilitated vacant areas should be planted with well grown appropriate planting material (proven hardy clones or bi-clonal seedlings).

Once the newly planted tea in the previous vacant patches comes into bearing, the remaining old tea could be culled and planted with grass and subsequently with the appropriate material, *as the second phase. **This phased-out programme would prove to be the appropriate "replanting strategy" for the small grower, with the ultimate goal of maximizing the plant population to about 12,500 plants per hectare.*** **Towards this end, the State should offer** assistance by way of the equivalent replanting subsidy for an appropriate minimum aggregate extent of, say, 500 sq m, or 0.05 ha (ca 24 perches), for such a ***phased-out replanting.***

Appropriate Planting Material

It is unfortunate that the small tea grower has blindly followed the high-input technological strategy of commercial plantations by wrongly utilizing some of the very high-yielding varieties that are essentially fertilizer-dependent and very sensitive to the environment. This has resulted in large-scale failures and financial losses, leading to vacancies and soil exposure that have resulted in massive irreparable soil degradation problems. This has a close parallel to the *"green revolution"* experienced in many parts of the less developed world that were once flourishing under their own systems of ecologically acceptable cultivation concepts, with sensible low-input technology.

The appropriate strategy for small growers is to utilize specifically selected planting materials that are not necessarily the high yielders (that are invariably heavy fertilizer-demanders), but modest yielders with low fertilizer demands and capable of better withstanding environmental stresses. Tolerance to the environment should be more specifically in respect of moisture stress and high ambient temperatures (drought tolerance), as well as to pests and diseases that are prevalent in a given location.

High yielding clonal tea of uniform genetic make-up would certainly not be appropriate for small growers. The planting of seedling tea has the obvious advantage of genetic diversity to withstand environmental stresses and those sensitive ones that succumb

could be replaced within the first few years of establishment. Seeds should be procured from certified bi-clonal or poly-clonal seed gardens. As an alternative strategy, a combination of some of the hardier clones that have proven ability to withstand moisture stress and tolerance to pests and diseases may be used. These include clones such as TRI 2016, TRI 2027, KEN 16/3, DG 39, CY 9, DN and TRI 62/1.

Evolving an Integrated Farm

The small tea grower should not depend solely on the earnings generated by the sale of green leaf to sustain his family as well as the maintenance of the pure stand of tea. The emphasis should be on a mixed integrated farm that is agriculturally self- sustainable and also provides sufficient additional income to meet with all the needs of the family unit. This involves mixed cropping as well as livestock rearing. The ideal situation will be to have sufficient number of dairy cattle, buffaloes or goats, that will not only help meet with the dairy needs of the family but also generate additional income from the sale of dairy products and generate sufficient quantities of animal waste as biomass for use in composting.

Regular applications of compost made of plant and animal waste would drastically cut down on artificial fertilizer needs, as a consequence of the increased soil fertility. Poultry rearing, including ducks and the rearing of fresh water fish, would supplement the protein needs of the family and help to further supplement the family income. A part of the animal waste can be utilized to

generate biogas for cooking and lighting, thus cutting down on fuel needs.

Soil Fertility and Nutrient Needs

Small farmers should be encouraged to generate their own requirements of biomass by growing different species of green manure crops, including *Gliricidia, Indigofera, Crotolaria, Titonia* (wild sunflower) and *Calliandra*, in a system of hedge-rows that will also conserve soil, especially on sloping terrain. The incorporation of such large amounts of green matter will not only provide the much needed organic matter to help improve soil fertility and cut down on the amount of artificial fertilizer, but will also smother weed growth to a significant extent, thus saving on weeding efforts. A certain amount of artificial fertilizer will have to be provided at regular intervals and, as such, a proper fertilizer distribution scheme should be worked out, with appropriate credit facilities and supplies offered through easily accessible distribution points or even through a network of mobile units.

Biological Soil Conservation

The concept of biological soil conservation, evolved with the establishment of leguminous hedge-rows - Sloping Agricultural Land Technology (SALT) - will, with time, do away with the need for the establishment and maintenance of the expensive drainage systems, a practice followed in commercial plantations.

Harvesting

The harvesting of the green leaf, which is a labour intensive operation carried out at regular intervals, is often mistakenly

taken for granted as a simple act of 'plucking' requiring no specific skills. This is no doubt a skilled operation that calls for a good deal of training. The quality of the harvested unit is very important to make the correct acceptable standard of tea that would fetch the desired price to the processing plant as well as the grower. Every effort should, therefore, be made to maintain a good standard of plucking. The leaf so harvested should be quickly transported to the processing factory, with minimal bruising.

Delayed rounds and hard plucking are practices that should be avoided. If the family members are inadequate, skilled hired hands are needed at great expense. The cost of additional labour may be curtailed by using simple hand operated shears, similar to garden shears, making sure that the quality of the harvested leaf is not affected.

Pruning

Pruning of the tea bush is another skilled operation that needs to be carried out periodically, at the correct height, with minimal damage to the healthy branches. Pruning should be followed by the adoption of proper sanitary practices of removing dead and moribund branches. The terminal branches should be chopped and buried as an useful mulch in shallow trenches, in alternate rows. This practice not only helps to add organic matter, but also to conserve soil moisture that is critically needed, especially during dry periods.

CONCLUSION

Irrespective of whether tea cultivation is neutral to size, small growers have certain inherent disabilities, the foremost being the

lower absorption of technological findings and poor credit worthiness, apart from the fact that their efforts only culminate in the production of a raw material (green leaf), not the end-product (made tea) itself. That many of them rely on family employment instead of hired labour and do not grow tea as a mono crop also influence the pattern of their field operations. To that extent, their economy is vastly different from that of the larger estate sector and thus calls for the dissemination of an appropriate package of practices besides an element of state assistance by way of subsidies, incentives and price support, which are already in force but requiring constant review and monitoring.

With the above in mind, the Tea Research Institute of Sri Lanka, through its network of Extension Centres located in the different agro-ecological regions, is actively engaged along with the Tea Small-holdings Development Authority (TSHDA), in providing the necessary advice to these small tea farmers by holding demonstrations, organizing field days, seminars and discussions and also providing planting material, either as cuttings for vegetative propagation or as full grown nursery plants. Our aim is to provide the appropriate technology support to the small growers who, despite the present poor market condition, have the benefit of state support through financial assistance and input subsidies and should be in a position to make their holdings viable, thereby helping to strengthen the national economy.