

## 論文の内容の要旨

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論文題目 **Possibilities to conversion of degraded Marginal Small Tea farm Holders (MSTH) plantations to fuelwood plantations in Sri Lanka: Case studies in Badulla and Matara Districts**(スリランカの劣化した限界小規模茶園保有者による茶園から燃材林への転換可能性：バトゥーラ県とマータラ県の事例研究)

### Summary

Tea plays pivotal role in Sri Lanka economy since it was introduced during the British colonial era. Thereafter with the independence in 1948 followed by introduction of new land reform act in 1970s tea cultivation was expanded into central and south western parts of the country. Especially with the establishment of Tea Small Holder Development Authority (TSHDA) area of small holder tea plantations were further increased. Hence small farmers try their best to maximum utilization of their land with tea. Some farmers expand their tea cultivation in encroached or donated land for them under various development schemes introduced by the government, without considering overall land suitability to cultivate tea. With these reasons, farmers face problems such as soil erosion, poor productivity from their plantations and they were identified as marginal small holder tea plantations. These marginal tea land yielded comparatively low and as a result of that land holder faces many problems for continuation of their livelihood condition. This has led these farmers to find other external alternative income source. Furthermore it will lead to either totally or partly negligence on the part of farmers on the plantation. As a result, this will create environmental problems, not only for tea plantations but also to surrounding environment as well. The other possibility of long term sustainability of MSTH is conversion of unproductive areas inside these plantations with sustainable income generating plants such as timber or fuelwood trees. There is a lack of comprehensive studies on MSTH farmer's problems as well as suggesting practical solutions for socio economic and environmental problems they have faced. To fill the gap this study focus on identification of unproductive areas inside these tea plantations and explore possibilities to convert it in to fuelwood plantations in Matara and Badulla Districts in Sri lanka with six specific objectives. Starting from 1.To identify marginal tea plantations that socially, economically and bio-physically

can be used for afforestation, 2. To identify marginal Small holder farmer's potential, willingness, benefits and attitude of tea farm/part of the farm conversion to fuelwood supply units. 3. To identify field level officers attitude/ suggestions on small marginal tea plantations, futurity and possibility of conversion to fuelwood farming. 4. To identifying the Problems/ issues faced by marginal tea farmers for land conversion to fuelwood supply units. 5. To identify fuelwood supply and demand of the area. 6. To Policy recommend for improving fuel- wood supply from marginal tea plantations

To achieve these objectives, we used sustainable livelihood approach (SLA) to understand the current condition of the MSTH by using five livelihood capitals, identified as, Natural, Social, Human, Financial, and Physical used in SLA. To get a wider and clear understanding, literature survey was conducted with special reference to the importance of biophysical condition, farmers land property rights, role of renewable energy and its possibilities to supply fuelwood from MSHT to small to medium scale industries to fulfil their energy requirement. Furthermore we refer to the present land property rights in Sri Lanka, and its legal conditions on timber /fuelwood planting as well as possibility of getting harvesting and transporting permits. Before introduction of such land conversion program at a wider scale it is better to understand similar type of cases conducted elsewhere especially how local poor farmers overcome the problems and adopt to a better livelihood conditions in the tropical countries. Therefore, we highlighted the problems which are commonly faced by marginal farmers and summarized their experiences which can be applied for our research sites. On the other hand, the countries without or limited natural energy sources can achieve better results with the introduction of proposed land use conversion.

With these understanding we conducted a case study, designed with two embedded units of analysis were selected, based on livelihood conditions of small tea farmers of marginal tea growing areas in the country. These two embedded units of analysis represent low and high elevation areas in two selected Districts of the country. The two study sites were selected on the basis of preliminary discussion with staffs from Tea Small Holding Development Authority (TSHDA) and 81 farmers were randomly selected and 30 officers working in multiple disciplines were investigated for the detailed study in both districts. Sampled farmers and responsible TSHDA officers for these two Districts were interviewed to get their perception on present tea farming and possibility of conversion of uncultivated areas to fuelwood planting. In addition, fuelwood users (tea factories and medium scale cottage industries) and suppliers were also interviewed. Detailed qualitative and quantitative surveys were also conducted from tea farmers, THSDA officers, fuelwood users, fuelwood suppliers (private and State Timber Corporation STC). Data were also collected from government official in village, sub district, district, province and national level, NGO, and Universities. The data was

analyzed by using descriptive statistics, and SPSS ver. 17 to find out averages as well as statistical significance.

The findings on the farmer's five livelihood capitals, land is identified as the most important capital for tea farmers. Therefore, based on land size, farmers were divided into four main classes ranging from very small land holders (VSLH) to large land holders (LLH). The result showed inconsistent relationships between the land size of the MSTH and other capitals such as the number of trees planted and the income from tea production. The district with the smaller average land size (Matara) and the very small and small land holders within the district were found to generate more income from tea production. Improving human capital through education was also found to contribute negatively toward labour contribution for tea production. Between districts, weather and elevation, two forms of natural capital that are mostly neglected in rural studies using the SL approach, were found to play important roles in determining the outcome from tea-based livelihoods. Formal property right document is important asset for farmers to apply loans from the banks, and getting legal permission to conduct their activities smoothly. With the comparison of farmer's different property right documents, Deeds were identified as the strongest document with legal power compared to permits issued by government authorities. Therefore, farmers with deeds were very keen on converting their land into fuelwood/ tree planting, aiming at future benefits of harvesting these trees and generate additional income.

Before introduction of any new technology or practice for any field, especially for the stakeholders, it is very important to understand their perception. To achieve research objectives, we investigate perception of tea farming in marginal land and the potential of conversion into fuelwood. The interview were conducted with TSHDA field level officers (20) and MSTH (30). The result shows that the perception in both districts respondents in most of the issues were similar. For physical constraints, interviewees from both district, agreed that soil erosion and heavy wind are vital problems while they disagreed on significance of the rockiness of the area for their farming. Landslide was perceived to be important factor by farmers in Badulla only. In both districts, they agreed the government playing vital role in alleviating their problems than NGOs and private sectors. All the interviewees from both districts, with the exception of Badulla farmers disagreed on the high cost of labor for tea farming, agreed on the problem associated with continuing tea farming such as labor shortage, high management cost and high labor cost. Stake holders from both district mentioned their dissatisfaction in the existing property right system which is vital for the implementation of long term investment such as fuelwood plantation.

Results reveal that fuelwood price has continually increased during the recent past. Rubber is identified as most demanded fuelwood among the end users in both districts. The selection of species are highly dependent on the fuelwood qualities such as, calorific, availability, and easy to collect and easy to handle

while transportation (no legal barriers). Fuelwood species such as *Albizia*, *Gliricidia*, which are grown in tea plantations, are popular with moderate price. Home gardens located more than 20 km away from marginal tea growing areas were identified as main suppliers with mixed type of fuelwood collected from different tree species, followed by large tea plantations, and State Timber Cooperation, contribution for the fuelwood supplier in the area is minimal in both districts,

However observing fuelwood supply and demand pattern, with possible increment in the future, MSTH was found to be ideal candidate for supplying fuelwood for the future demand while sustainably managing the plantations and safeguarding surrounding environment.

Furthermore proper land utilization is important for long-term sustainability of small holder tea industry as well as safeguard their livelihood conditions, where MSTH farmers gain lower income and leads further deterioration of the plantation. This needs identification of the real problems consulted with the stakeholders and turn it in to sustainable additional income generating units. In order to implement new proposed land use conversion, it is very important to understand demand and supply pattern, futurity of additional income generating and the way it helps balance three key sections as farmer, tea industry , and environment. Conversion of degraded MSTH plantations to fuelwood plantation can be applied with the stakeholders and government support. Therefore we conclude efficient utilization of marginal tea farms are important for their long term sustainability, protect tea plantations from soil erosion, landslides and furthers deterioration of the plantations. For doing this government support with strong supporting policy for land use conversion is much needed.