

**PLANTING RUBBER IN EASTERN PROVINCE OF SRI LANKA:
POTENTIAL FOR CARBON TRADING UNDER CLEAN DEVELOPMENT
MECHANISM**

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ABSTRACT

At present rubber based industries in Sri Lanka are booming up demanding more rubber. To meet this increasing demand, the extent under rubber cultivation has to be increased. However, further expansion of rubber in traditionally growing wet areas is limited largely due to urbanization and industrialization. Therefore, in the expansion process of rubber industry, the Government of Sri Lanka (GoSL) targeted the Intermediate zone of the country under the current development agenda. In particular, attention has been paid to cultivate rubber in suitable areas in Eastern province. Being a new crop to the area, high level of initial investment is required for adaptive research and technology transfer. Clean Development Mechanism (CDM) provides an opportunity to meet this cost through carbon trading. Therefore, the present study was aimed of assessing the potential of trading CO₂ from the rubber cultivation in the intermediate zone of Eastern province. In spite of overall availability of 10,000 ha for rubber cultivation, only 5,000 ha were considered for the development of CDM project with an annual planting rate of 1,000 ha. In a CDM project of 20 years, there will be a potential to market 932,000 MT of CO₂ with that an earning of *ca.* US\$ 14 million could be obtained at a rate of US\$ 15 per MT of CO₂. This would provide an income of *ca.* Rs.77 million per year sufficient to cover the expenses on research and development activities on rubber in Eastern province. At household level, a monthly income of Rs.19,000/= could be obtained at the current price of rubber (Rs.200/= per kg). Other socio economic benefits related to this CDM project are discussed.

INTRODUCTION

The demand for natural rubber in Sri Lanka is likely to increase, particularly with increasing local consumption of rubber. In order to increase the rubber production it is necessary to expand the area of planting rubber. However, there is virtually no potential for further expansion of the rubber cultivation in its traditional growing area, *i.e.* Wet zone, since no sufficient lands is available due to urbanization and industrialization. Therefore, the Government of Sri Lanka (GoSL) has targeted the Intermediate zone in south east of the island for future rubber expansion. At present, rubber cultivation in south east is restricted mainly to two districts; Monaragala and Hambantota comprising less than 6,000 hectares. Under the current development agenda of GoSL, attention has been paid to cultivate rubber in suitable

areas in the Eastern province. In general, land capita is higher in this region than in more developed western region of Sri Lanka. It comprises large extent of sparsely populated land indicating the potential for establishing plantation crops like rubber.

Clean Development Mechanism (CDM) of Kyoto protocol permits developing countries to trade the carbon fixed or emission reduction, with developed countries under certain guidelines. Tree planting projects could be considered under CDM if the land has not been forested since 1990. Obviously, lands to be utilized for rubber cultivation in Eastern province had been cleared long ago for shifting cultivation and then been cultivated with seasonal crops continuously under rain fed conditions. In addition to the increase in rubber production in the country, introduction of rubber to Eastern province aims to improve the livelihood of the resource poor farmers by providing rather steady income source which is not the case with rain-fed seasonal crops.

The majority of people in this area are farmers in the rural sector specially those who are either below or hovering on the poverty line. Therefore, income distribution has to be strengthened empowering the rural poor. Rubber cultivation will undoubtedly be an environmentally friendly programme increasing the tree cover of the country; targeted lands are what left after continuous shifting cultivation and so, benefits of land reclamation and carbon sequestration are guaranteed.

At present, rubber has been cultivated on a trial basis since 2003 in an area of over 100 ha with participation of smallholder farmers in Eastern province. The area that looks suitable for initial cultivation of rubber is the Intermediate zone, which covers two administrative regions of Ampara District, *i.e.* area under Padiyatalawa and Mahaoya divisional secretariats (Rodrigo *et al.*, 2007). Records on growth performance to date confirm the suitability of rubber in the area concerned. For instance, the mean survival of rubber plants for all sites established was 75% together with an annual mean plant girth expansion rate of 7.44 cm (Iqbal, 2009). A SWOT analysis carried out in the area confirmed the availability of sufficient lands for rubber and more importantly, farmers have very high interest in rubber cultivation (Rodrigo & Iqbal, 2006).

The land extent that could be planted with rubber is as high as 10,000 ha (Rodrigo and Iqbal, 2009). In spite of community and national benefits of rubber cultivation in Eastern province, initial investment to do so is quite high due to the inputs required for adaptive research and technology transfer. Therefore, the return on investment at national level on short/medium term appears to be not as high as what a farmer gets. This justifies the need for a rubber based CDM project in this area, and the GoSL could market some of environmental benefits of rubber, *i.e.* carbon fixed in the trees, to cover its initial investment.

Therefore aiming at a 20 year CDM project, this paper aims to quantify the potential amount of certified emission reduction (CER) to be marketed. Also, community benefits which increase the market value of CER are expected to be highlight.

MATERIALS AND METHODS

Information gathered in previous studies was used to highlight areas suitable for rubber cultivation (Rodrigo *et al.*, 2007) and community benefits (Rodrigo *et al.*, 2008). Quantification of the potential CER for a 20 year CDM project was made with following steps.

Considering the practical limitations (*e.g.* raising quality planting material, sufficient level of technology transfer *etc.*), planting of rubber is to be undertaken in 1,000 ha per year. Despite the potential of cultivating 10,000 ha in the region, only an extent of 5,000 ha is expected to qualify for CDM. Carbon to be fixed in a tree of rubber was estimated using the growth models available for ontogenetic changes in tree diameter and total height and, their relationship with the carbon fixed in the tree (Munasinghe *et al.*, 2008). Potential CER on hectare basis was estimated as a function of carbon fixed in the tree and tree per hectare (Munasinghe *et al.*, 2008).

Under the above planting programme, the number of families benefited and their livelihood upliftment with the income from rubber were also estimated using the information gathered in previous studies (Rodrigo *et al.*, 2009).

RESULTS

With the proposed planting programme of 1,000 ha per annum, annual rate of CO₂ to be fixed in rubber plants were in an increasing trend from 6,792 MT year⁻¹ to 73,026 MT year⁻¹ during first 13 years (Fig. 1). Thereafter, it tended to decline at a rate of 4432 MT year⁻¹. Total potential for CER for 20 year project is 932,000 CO₂ MT.

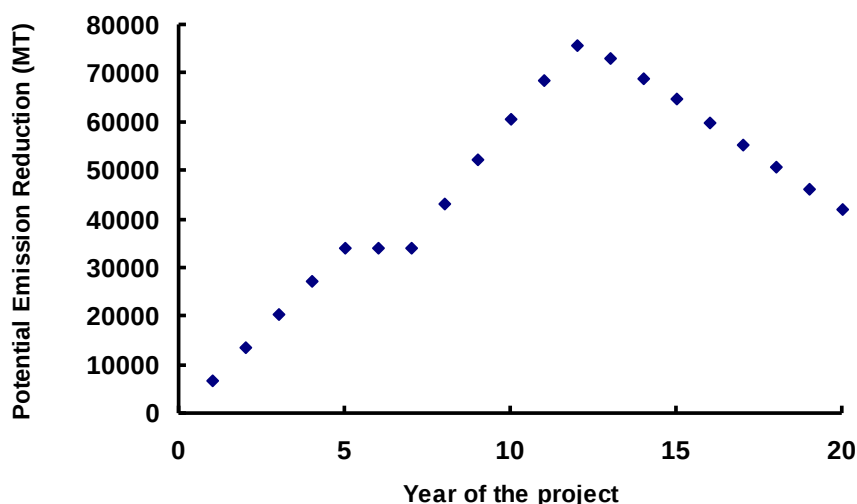


Fig. 1. Distribution of potential emission reduction throughout the proposed CDM project

With an average land size of 1 ha per family, *ca.* 5,000 families will be benefited directly from the proposed CDM project. At a latex price of Rs.200/kg, each family will receive a gross income of Rs.19,000/= per month (Fig. 2). In the circumstances where the price of latex is at Rs.250/=: monthly income will increase by 25%. It would increase further by 25% when the price of latex goes up to Rs.300/= per kg making a monthly income of Rs.28,500/= (Fig. 2).

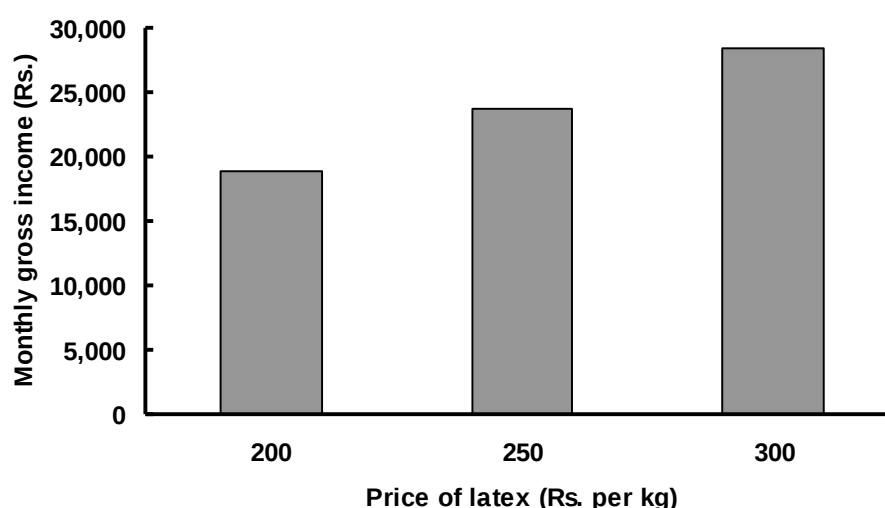


Fig. 2. Expected monthly income of a household in Eastern province from rubber cultivation

DISCUSSION

Two Pradeshiya Sabhas, *i.e.* Padiyatalawa and Maha Oya in Ampara district, suitable for rubber cultivation, have 75 villages in 20 Gramasevaka (GS) divisions with a population of 16,970 in 3,970 families, whilst *ca.* 30,000 people are living in 90 villages of 17 GS divisions in Maha Oya. Livelihood of the majority depends mostly on farming and only families less than 15% are engaged in off-farm activities. Seasonal crops such as cowpea, maize, pumpkin, upland paddy, chilies, banana are generally grown under rain-fed condition. Major perennial crops grown were lime, orange, mango, teak and coconut. On average, each family owned *ca.* 3-4 acres of land (Rodrigo *et al.*, 2007).

Should a CDM project be formed for 20 years, there will be a potential to market 932,000 MT of CO₂ with that an earning of *ca.* US\$ 14 million could be obtained at a rate of US\$ 15 per MT of CO₂. Allowing a reasonable cost to develop the project (*ca.* Rs.6 million), this would provide an income of *ca.* Rs.77 million per

year to the GoSL. Obviously, that will suffice to cover the expenses on research and development activities on rubber in Eastern province.

At household level, a monthly income of Rs.19,000/= could be obtained at current prices of rubber (Rs.200/= per kg). With the stabilization of the market, latex price is expected to go up to Rs.300/= per kg and so, family income per month would also increase up to Rs.28,500/=. This is substantial enough to enhance the livelihood of peasant community in Eastern province as their present income level is *ca.* Rs.2,500 in most months of the year (Rodrigo *et al.*, 2008).

Being new plantings on lands cleared before 1990, rubber cultivation in Eastern province will fulfill the term additionally, a principal criterion in CDM projects. Additional funds required for initial research and development activities in this zone further justify the need for a CDM project for rubber cultivation. Social benefits such as rural livelihood upliftments provide a cosmetic effect increasing the facial value of carbon fixed. However, what is most important is the initiative to be taken to build up the CDM project and follow up actions. Obviously, RRISL can support such actions by developing the Project Idea Note (PIN) (*i.e.* very first document to be prepared) and participating in monitoring. Identification of suitable lands and subsequent ground work will be the responsibilities of the Rubber Development Department (RDD). Development of the Project Design Document (PDD), the most important document, is rather tedious hence private sector participation would also be required. However, a dedicated team should work toward that. Therefore, a working committee comprising RRISL, RDD, MPI and other relevant parties is to be formed to make the dream of CDM on rubber a reality.

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