

**MACROECONOMIC POLICY FRAMEWORK FOR REDUCING  
DEFORESTATION**

Master of Arts in Law and Diplomacy Thesis

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# 1 Introduction

In recent years various means have been explored for leveraging funding to help developing countries reduce tropical deforestation, which is linked to biodiversity loss, climate change and land degradation. However, additional financial resources will not likely lead to reduced deforestation rates unless appropriate economy-wide policies (both macroeconomic and sectoral policies) are in place that provide incentives for rural peoples to preserve forests. This thesis will explore how economy-wide policies in Sri Lanka have contributed to deforestation. Results will be compared to the literature from Bolivia and Cameroon. Findings will be used to determine the macroeconomic policy framework conducive to limiting deforestation.

This paper first presents the case study of deforestation in Sri Lanka. Sri Lanka is particularly interesting as a case study given the considerable variety in forest type (tropical wet, dry scrub, montane and mangrove forests) and deforestation pressures. This variety in forest type and deforestation pressures coupled with factors facilitating the ease of collection (such as the country's small geographic size, good transportation infrastructure, high literacy and relatively advanced record-keeping systems) makes Sri Lanka an ideal country for a case study.

Following an explanation of the method employed for the Sri Lankan case study, the paper presents the history of deforestation and its economic context. The case study then explores the relationship of specific macroeconomic and sectoral policies related to current proximate causes of deforestation: chena (slash-and-burn agriculture), irrigation and settlement schemes, illicit felling, smallholder tea, cardamom cultivation and prawn farming. Policies examined are agriculture subsidies (including price support schemes

for crops, fertilizer subsidies and extension services), trade (import tariffs, export duties and licensing requirements on rice, other food crops, timber and tea) and government sponsored irrigation projects and settlement schemes. Only direct effects of macroeconomic and sectoral policies on deforestation were explored. While indirect effects resulting from intersectoral linkages may be significant (see Persson and Munasinghe<sup>3</sup>), study of these linkages using computable general equilibrium (CGE) models was outside the scope of this paper.

The Sri Lankan case study is followed by a presentation of the literature on the environmental, social and economic contexts of deforestation in Bolivia and Cameroon. Information on deforestation in Bolivia and Cameroon is readily available. These countries were chosen to compare with Sri Lanka so that lessons drawn could be broadly applicable to developing countries in any of the three continents (Latin America, Africa and Asia), where economic policies and deforestation pressures may differ widely. The history of deforestation in Sri Lanka, Bolivia and Cameroon is then used to draw lessons on a macroeconomic framework most conducive to forest conservation. Key lessons focus on incorporation of environmental considerations in policy-making, long-term development, accounting for temporal and regional considerations, diversification, private market restrictions and supportive international interventions.

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<sup>3</sup> Annika Persson and Mohan Munasinghe, "Economywide Policies and Deforestation: The Case of Costa Rica," in *Environmental Impacts of Macroeconomic and Sectoral Policies*, ed. Mohan Munasinghe. (Washington, D.C.: The World Bank, 1996), 309-336.

## 2 Sri Lanka

### 2.1 Method

The Sri Lanka case study was conducted during a three-month internship (May to August, 2004) with the Munasinghe Institute for Development (MIND). Information was gathered from the Department of Forestry Library, Department of Census & Statistics Library, University of Jayawardenapura Library, National Library, the MIND library, the Marga Institute and the Asian Development Bank Library. Cultivated extent of rice since 1979 was obtained from data available from the Ministry of Agriculture website. Cultivated extent of rice prior to 1979 and cultivated extent of highland crops for all years were calculated from disaggregated data available in government statistical abstracts. Forest cover data for 1993 and 2001 was obtained from Department of Forestry administration reports of the Conservator General of Forests. Forest cover data for 1983 was calculated based on graphs of forest cover in the document: *District-wise forest area variation in Sri Lanka from 1992 to 2001 for supporting the National Physical Planning Policy*.<sup>4</sup> Forest cover data for the year 1956 was calculated using ArcMap based on a forest cover map available from the Department of Forestry. More comprehensive data on land use change documenting annual changes in forest cover or explicit accounting of forest conversion to other land uses was not available. Only very recent data on prices, costs and producer margins for tea smallholders was available. The author was unable to collect substantial data on tariffs or licensing of imports/exports due

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<sup>4</sup> Jagath Ratnayake, Mahinda Abeykoon, and Yann Chemin, *District-wise forest area variation in Sri Lanka from 1992 to 2001 for supporting the National Physical Planning Policy*. (Colombo, Sri Lanka: National Physical Planning Department, Government of Sri Lanka, 2003).

to difficulties in accessing suitably aggregated information under the limited term of internship.

In Colombo, interviews were conducted with government officials at the Ministry of Agriculture, Ministry of Environment and Natural Resources (including the Department of Forestry), Department of Wildlife Conservation, Ministry of Finance and Planning (including the National Planning Policy Division, Land Use Policy & Planning Division, Department of Census & Statistics), Import & Tariff Division of Sri Lankan Customs, Mahaweli Development Authority of Sri Lanka, Canadian High Commission, Tea Small Holder Development Authority and State Timber Corporation. Interviews were also conducted with the Agrarian Research and Training Institute, World Conservation Union (IUCN) and professors from the University of Jayawardenapura. In this study, interviewees are not cited to protect their identity.

Based on information gathered in Colombo, the author decided to make site visits to areas representative of deforestation in the past twenty years. Site visits involving interviews with farmers and local forest department staff were arranged to further explore deforestation in Hambantota (slash-and-burn), Polonnaruwa (rice irrigation projects), Puttalam (slash-and-burn, illicit felling and prawn farming), Ratnapura (tea-small holder encroachments), Matara (tea-small holder encroachments) and Kandy Districts (cardamom cultivation).

## ***2.2 History of Deforestation***

Deforestation in Sri Lanka has varied considerably in rate, geographic location and cause throughout its history (see Figures 1 to 5). During the colonial period, extensive deforestation occurred in the high and mid elevations of the Wet Zone for

establishment of coffee, tea and rubber plantations, and in the coastal areas for coconut and cinnamon plantations.<sup>5</sup> Since independence in 1948, most of the deforestation has taken place in the Dry Zone for chena (slash-and-burn agriculture), irrigation and land settlement schemes. During the period 1983 to 1992, deforestation from irrigation and land settlement schemes was especially severe. Indeed, about 37 percent of the deforestation that occurred during this period was due to the Mahaweli, Kirindi Oya and Inginimitiya irrigation projects, and the establishment of the Sevenagala and Pelawatte settler estates in the southeast for sugar cane cultivation.<sup>6,7</sup> The main reason for current forest loss is due to chena and encroachment. In the Dry Zone, illicit felling of timber is also a significant cause of forest loss. Smallholder tea cultivation in the Wet Zone, cardamom cultivation in the Montane Zone and prawn farming in Coastal Mangrove areas are also sources of deforestation.<sup>8,9,10</sup> While accounting for only a small fraction of the total forest loss, deforestation from these sources is of considerable concern due to impacts on threatened ecosystems of high biodiversity.<sup>11</sup>

Since 1983, the deforestation rate has been approximately 54,000 ha per year.<sup>12</sup> Based on current trends, closed canopy forest is expected to decline from 24 percent to 17 percent by 2020 in the absence of remedial action. Current dense forest cover is

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<sup>5</sup> Ministry of the Environment and Natural Resources, Government of Sri Lanka, *State of the Environment in Sri Lanka* (Colombo, Sri Lanka: Government of Sri Lanka, 2002).

<sup>6</sup> *ibid.*

<sup>7</sup> Ministry of Forestry and Environment, Government of Sri Lanka and World Bank, *Economic and Environment Linkages in Land Use for Irrigated Versus Rainfed Farming in the Dry Zone* (Colombo, Sri Lanka: Government of Sri Lanka, 1999).

<sup>8</sup> Neela de Zoysa and Laurence Simon, *Sustenance of Biodiversity in the Sinharaja World Heritage Site, Sri Lanka through Ecodevelopment of the Buffer Zone* (Boston: Brandeis University, 1999), 1-4.

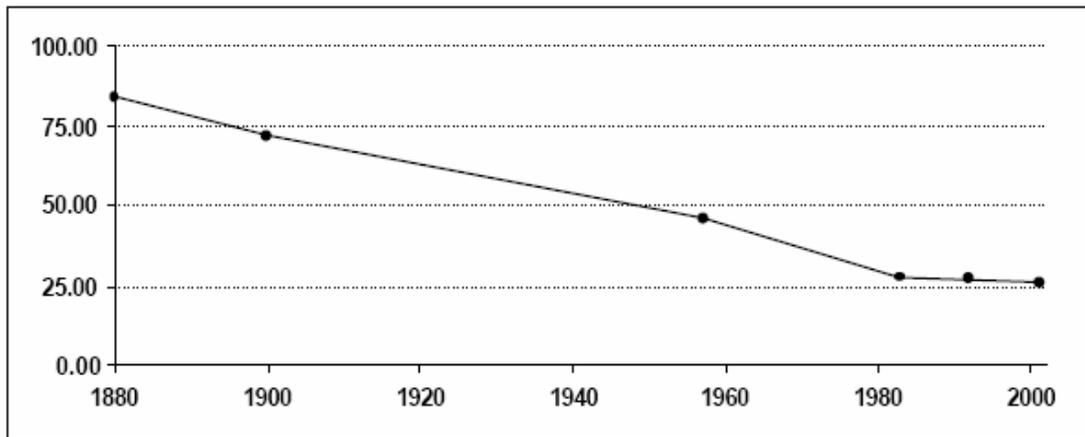
<sup>9</sup> Sri Lankan Government Official. Interview by author. Colombo, Sri Lanka, 2 June 2004.

<sup>10</sup> Sarath P. Ekanayake, *A review of IUCN involvements in conserving the Knuckles region of Sri Lanka during 1987-2003*. (Colombo, Sri Lanka: IUCN, 2003), 1-13.

<sup>11</sup> World Conservation Union (IUCN) official. Interview by author. Colombo, Sri Lanka, 28 June 2004.

<sup>12</sup> Ministry of the Environment and Natural Resources, Government of Sri Lanka, *State of the Environment in Sri Lanka*.

concentrated in the North, where political instability has prevented development of forested areas in recent decades, and in areas originally set aside by the British as game reserves and later incorporated into the system of national parks and forest reserves.<sup>13</sup> National parks containing significant extents of close canopy forest include Yala National Park in the Southeast and Wilpattu National Park in the Northwest.<sup>14</sup>

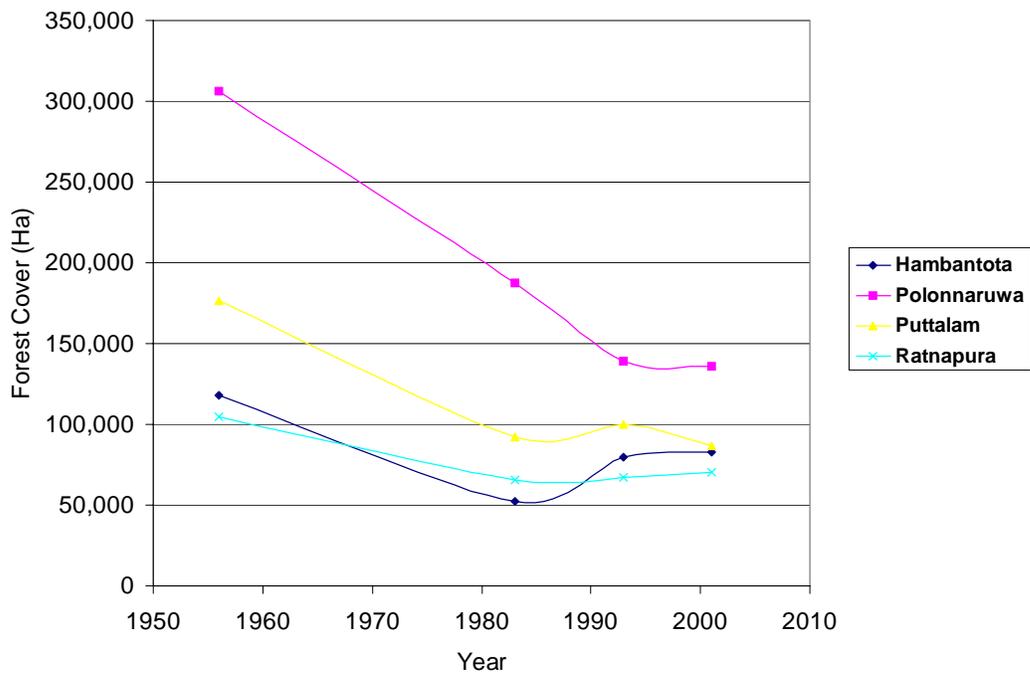


**Figure 1: Closed Canopy Forest Cover as a Percentage of Total Surface Area in Sri Lanka (1880-2001)<sup>15</sup>**

<sup>13</sup> Forestry Planning Unit, Ministry of Agriculture, Lands and Forestry, *Sri Lankan Forestry Sector Master Plan* (Battaramulla, Sri Lanka: Government of Sri Lanka, 1995).

<sup>14</sup> Richard Plunkett and Brigitte Ellemor eds., *Lonely Planet Sri Lanka*, 9th ed. (Oakland: Lonely Planet Publications, 2003).

<sup>15</sup> Ratnayake, Abeykoon, and Chemin, *District-wise forest area variation in Sri Lanka from 1992 to 2001 for supporting the National Physical Planning Policy*.



**Figure 2: Closed Canopy Forest Cover for Selected Districts in Sri Lanka (1956-2001)**<sup>16,17,18,19</sup>

<sup>16</sup> J. R. T. Andrews, *A Forest Inventory of Ceylon, A Canada-Colombo Plan Project* (Toronto: Hunting Survey Corp Ltd, 1961).

<sup>17</sup> Ratnayake, Abeykoon, and Chemin, *District-wise forest area variation in Sri Lanka from 1992 to 2001 for supporting the National Physical Planning Policy*.

<sup>18</sup> H. M. Bandarattillake, *Administration Report of the Conservator General of Forests Sri Lanka for the year 2001*, (Colombo, Sri Lanka: Forest Department, Ministry of Forestry and Environment Government of Sri Lanka, 2002).

<sup>19</sup> H. M. Bandarattillake, *Administration Report of the Conservator General of Forests Sri Lanka for the year 1993* (Colombo, Sri Lanka: Forest Department, Ministry of Forestry and Environment, Government of Sri Lanka, 1994).

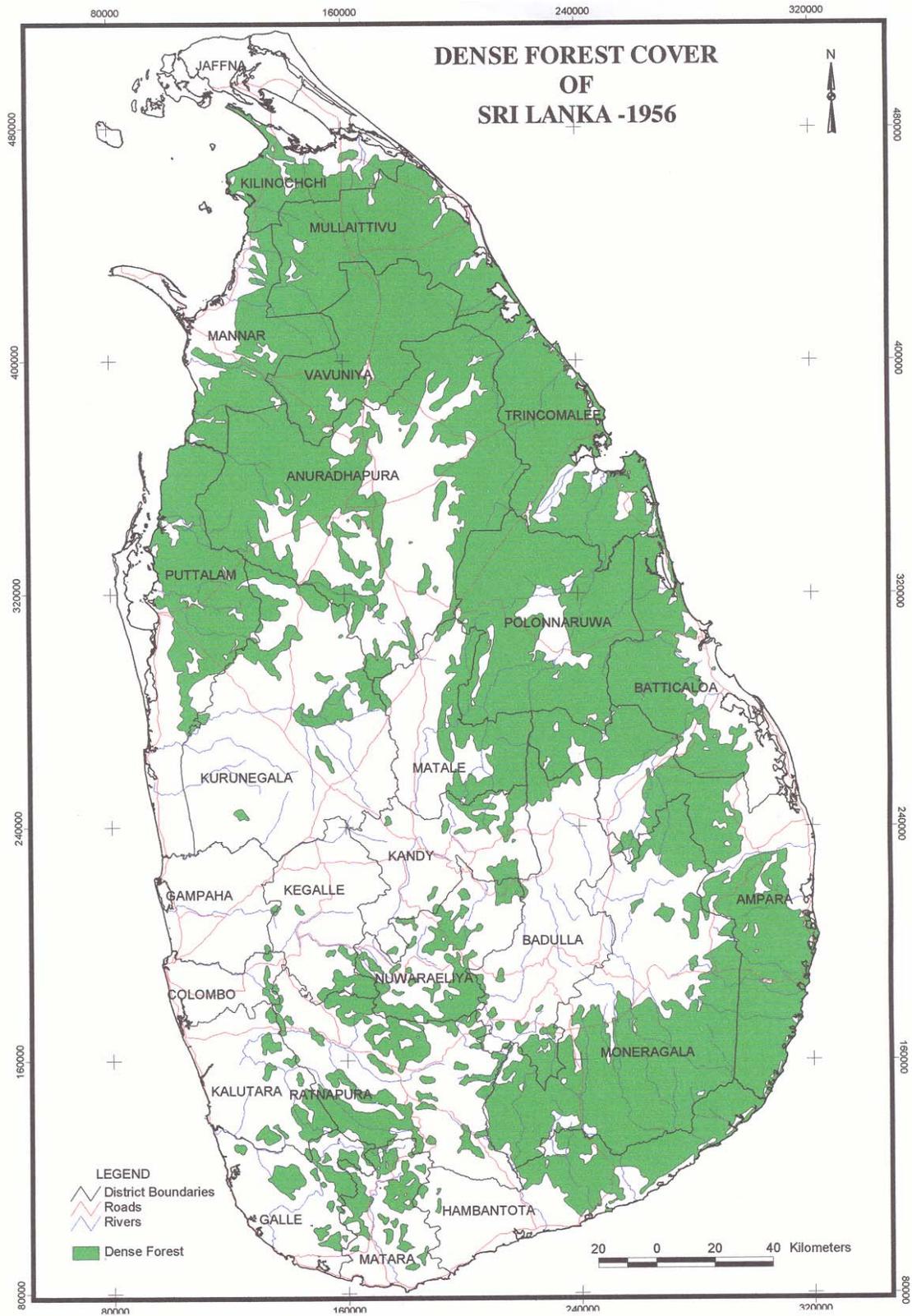
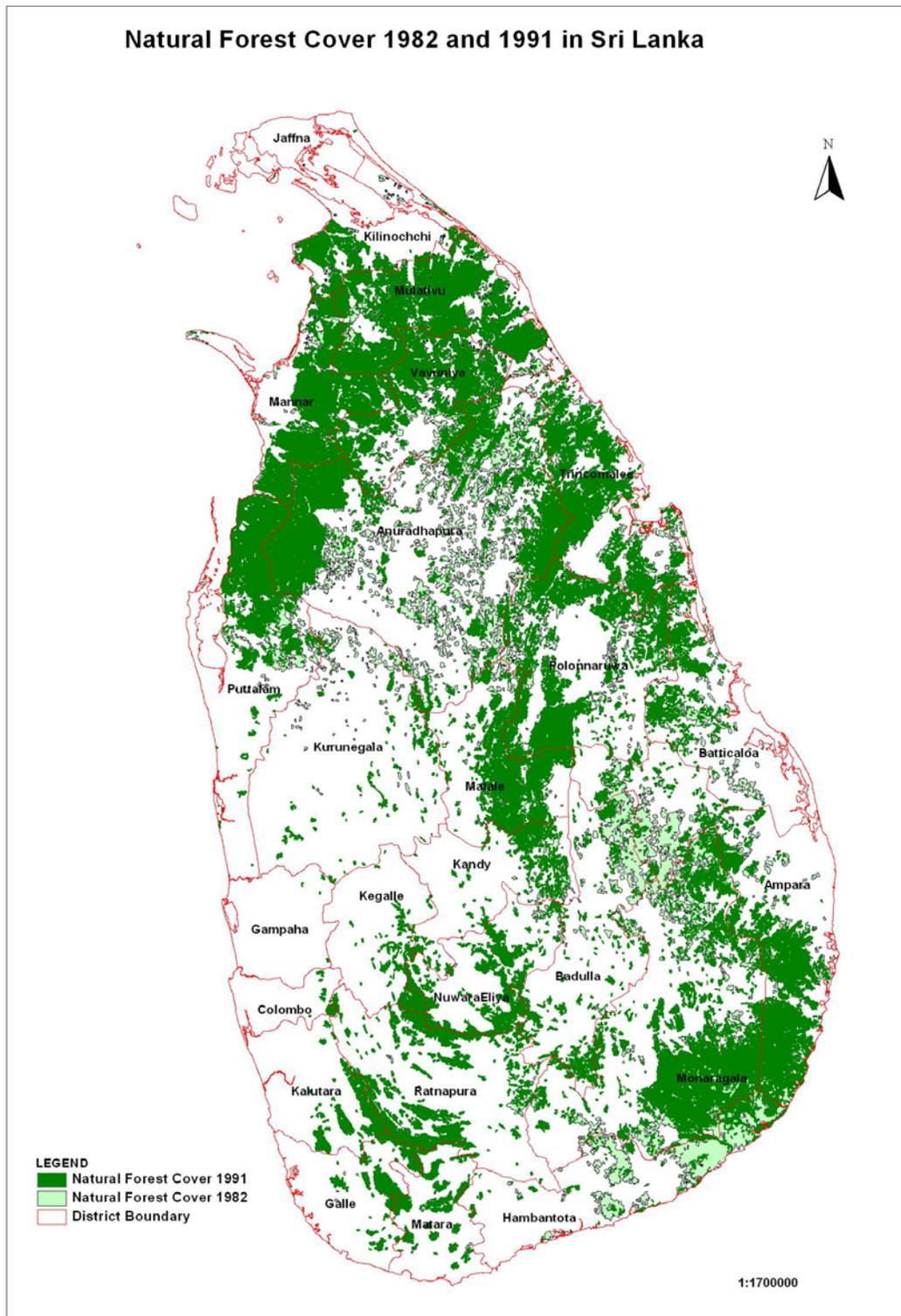


Figure 3: Closed Canopy Forest Cover in Sri Lanka (1956)<sup>20</sup>

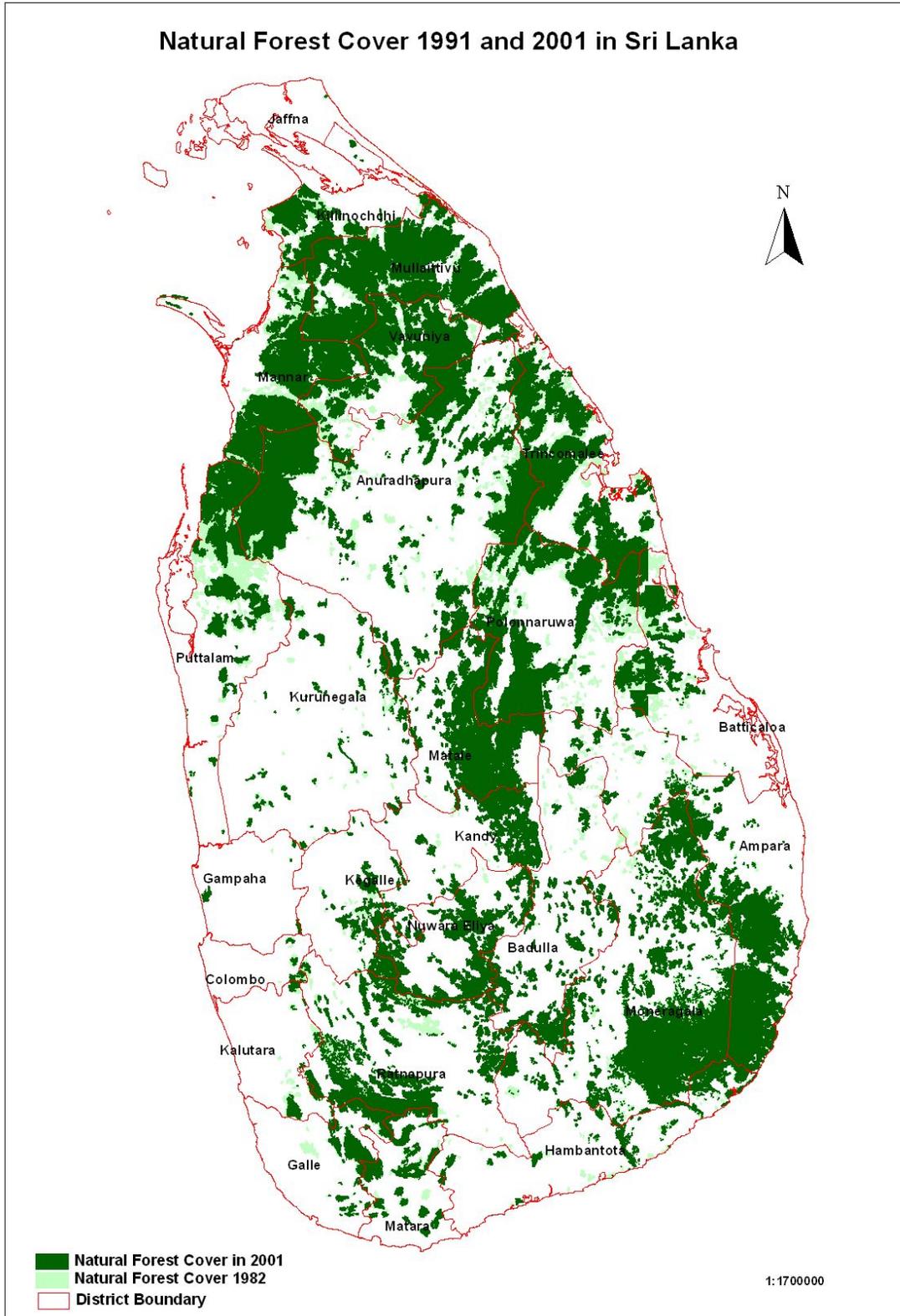
<sup>20</sup> Andrews, *A Forest Inventory of Ceylon, A Canada-Colombo Plan Project*.



**Figure 4: Closed Canopy Natural Forest Cover in Sri Lanka\*(1982 & 1991)<sup>21</sup>**

\*Note: Light green shows areas of deforestation since forest cover for both time periods are overlain.

<sup>21</sup> Ratnayake, Abeykoon, and Chemin, *District-wise forest area variation in Sri Lanka from 1992 to 2001 for supporting the National Physical Planning Policy*.



**Figure 5: Closed Canopy Natural Forest Cover in Sri Lanka\* (1991 & 2001)<sup>22</sup>**  
 \*Note: Light green shows areas of deforestation since forest cover for both time periods are overlain.

<sup>22</sup> *ibid.*

## 2.3 Economic Context of Deforestation

Since independence, the interplay between the structure of the economy and external factors has played a large role shaping the prevailing macroeconomic paradigm and the suite of macroeconomic policies that have affected deforestation.

At independence, tea, rubber and coconut accounted for 90 percent of total export earnings.<sup>23</sup> Favorable world prices enabled Sri Lanka to pursue a free trade policy until the late 1950s.<sup>24</sup> Most of Sri Lanka's food requirements were met through imports, including rice and wheat, financed by export earnings.<sup>25</sup> The trade balance benefited from high rubber prices during the Korean War boom of 1951/52 and the tea boom of 1954/55.<sup>26</sup> However, these booms only temporarily reversed declining world natural rubber prices since the commencement of synthetic rubber manufacturing during World War II and declining world tea prices due to increased competition from Kenya.<sup>27</sup>

Beginning in 1956, trade deficits began to emerge, putting severe pressure on the balance of payments and reducing external reserves, sparking the move to diversify the economy and pursue a development strategy based on import substitution.<sup>28,29</sup> During the 1950s and 1960s, as part of this policy, the government focused on increasing small-holding peasant production of rice and protecting the industrial sector through licensing, exchange regulations and high tariffs.<sup>30,31</sup> Food supply shortages on the world market in

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<sup>23</sup> Central Bank of Sri Lanka, *Economic Progress of Independent Sri Lanka 1948-1998* (Colombo, Sri Lanka: Central Bank of Sri Lanka, 1998), 295.

<sup>24</sup> *ibid.*

<sup>25</sup> Godfrey Gunatilleke, *Development and Liberalization in Sri Lanka: Trends and Prospects* (Colombo, Sri Lanka: Marga Institute, 1993).

<sup>26</sup> Central Bank of Sri Lanka, *Economic Progress of Independent Sri Lanka 1948-1998*, 295.

<sup>27</sup> *ibid.*

<sup>28</sup> *ibid.*

<sup>29</sup> Gunatilleke, *Development and Liberalization in Sri Lanka: Trends and Prospects*.

<sup>30</sup> Central Bank of Sri Lanka, *Economic Progress of Independent Sri Lanka 1948-1998*, 295.

1973/4 and a severe foreign exchange scarcity due to doubled oil prices (from the oil crisis of 1973) constrained the country's ability to make up shortfalls in rice production with imports, providing further impetus for increasing domestic food production.<sup>32,33</sup> To further improve the trade balance, the government introduced the 5 Year Plan in 1972 to promote exports other than traditional commodities.<sup>34</sup> The state established an Export Development Board to coordinate policies and create incentives for export promotion, especially the garment industry.<sup>35</sup> The garment industry would eventually displace tea as the leading export earner (The textile and garment industry now accounts for 63 percent of export earnings).<sup>36</sup>

Pursuit of an import substitution model of development led to stagnation of the economy.<sup>37</sup> Upon the change of government in 1977, Sri Lanka began promoting export-led growth to achieve rapid economic development. In 1977, the exchange rate was devalued by 46 percent and exchange controls were relaxed on the current account.<sup>38</sup> Additional economic reforms liberalized imports, removed controls on foreign exchange and foreign investment and introduced measures for export promotion. Changes in tariff structures throughout the 1980s and 1990s were based on analyses of comparative advantage, infant industries and security, without regard to environmental

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<sup>31</sup> Gunatilleke, *Development and Liberalization in Sri Lanka: Trends and Prospects*.

<sup>32</sup> *ibid.*

<sup>33</sup> Ministry of Forestry and Environment, Government of Sri Lanka and World Bank, *Economic and Environment Linkages in Land Use for Irrigated Versus Rainfed Farming in the Dry Zone*.

<sup>34</sup> Gunatilleke, *Development and Liberalization in Sri Lanka: Trends and Prospects*.

<sup>35</sup> *ibid.*

<sup>36</sup> Central Bank of Sri Lanka, *Economic Progress of Independent Sri Lanka 1948-1998*, 295.

<sup>37</sup> Sarath Rajapatirana, "Foreign Trade and Economic Development: Sri Lanka's Experience," *World Development* 16, no. 10 (1988): 1143-1157.

<sup>38</sup> Saman Kelegama, Ratnayake, and Indira Unamboowe, *Trade and Environmental Linkages in Sri Lanka: Issues and Evidence* (Colombo, Sri Lanka: Institute of Policy Studies for the Ministry of Forestry and Environment, Government of Sri Lanka, 1999).

considerations.<sup>39</sup> Export duties on tea, rubber and coconut were removed in 1992.<sup>40</sup> Export industries were supported by tax breaks, duty free imports of raw materials and investment goods, credit facilities offering low interest rates and the establishment of export development boards and development banks.<sup>41</sup> Furthermore, Export Processing Zones (EPZs) and export-oriented rural Industrial Estates were established in certain districts to promote export-oriented industries with foreign direct investment.

Changes in the models of development in Sri Lanka allow analysis of the effects of different macroeconomic and sectoral policies on deforestation. Policies of particular importance include agriculture subsidies (including price support schemes for crops, fertilizer subsidies and extension services), trade (import tariffs, export duties and licensing requirements on rice, other food crops, timber and tea) and government sponsored irrigation projects and settlement schemes. The impacts of these policies since the late 1960's and early 1970's were examined for the major proximate causes of deforestation, in particular chena (slash-and-burn) agriculture, irrigation projects/settlement schemes, illicit felling of timber, smallholder tea encroachments, cardamom cultivation and prawn-farming.

## ***2.4 Proximate Causes of Deforestation***

### **2.4.1 Chena**

Slash-and-burn agriculture is a common practice in many developing countries where subsistence level farmers lack the means to apply fertilizers on tropical and sub-tropical soils of low organic content. Slash-and-burn agriculture involves the clearing

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<sup>39</sup> *ibid.*

<sup>40</sup> *ibid.*

and burning of forested land to permit cultivation. The poor soils only permit cultivation for a few years. When productivity begins to decline, farmers clear additional forest for farming, while allowing forest to regenerate on previously cultivated land. Since forest regeneration allows soil fertility to increase, slash-and-burn agriculture is sustainable indefinitely provided that the rotation period is long enough. However, in many developing countries under increasing population pressures, the rotation period has been shortened to the point where soils are not adequately regenerated.

In Sri Lanka, approximately 83% of the population living in the Dry Zones of the Southeast and North is dependent on rain-fed farming, often practiced as slash-and-burn agriculture, traditionally known as chena.<sup>42</sup> Chena cultivation is banned in most districts, but Forest Department officials do not enforce bans in many areas, including much of Puttalam and Hambantota districts, where alternative livelihoods are lacking and extreme social pressures prevent meaningful enforcement.<sup>43</sup>

The majority of chena farmers have limited access to rural extension and technology.<sup>44</sup> Cultivation is by hand, fertilizers are generally not applied and pesticide application is often without proper advice. Preliminary evidence suggests that lack of technological inputs have contributed to declining yields and a shift from cereal production to legumes, which can tolerate more degraded soils.

Expansion of irrigation into traditionally rain-fed farmed areas and legal restrictions on land access have resulted in land scarcity and forced farmers onto

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<sup>41</sup> *ibid.*

<sup>42</sup> Ministry of Forestry and Environment, Government of Sri Lanka and World Bank, *Economic and Environment Linkages in Land Use for Irrigated Versus Rainfed Farming in the Dry Zone.*

<sup>43</sup> Sri Lankan Government Official. Interview by author. Sri Lanka, July 2004.

<sup>44</sup> *ibid.*

marginal lands.<sup>45</sup> In the recent past, the government has sought to regularize title on land occupied by encroachers on upland Crown land.<sup>46</sup> However, this regularization process has stretched out over as many as 8 years. Restrictions on the clearing of new forest for chena have resulted in shortened fallow periods, thus limiting soil rejuvenation.

In many areas, where soil fertility is relatively poor, forested land is cleared and farmed for 2-3 years before farmers shift to other forested sites. In some areas, chena is being practiced in areas primarily of sparse and immature secondary scrub forest, where local communities blame increasing population for decreases in forest cover.

The impact of price support schemes, agriculture subsidies and trade measures on chena-related forest loss has varied considerably temporally and spatially, depending on the totality of prevailing economic circumstances.

Over the last several decades, the government has supported a floor pricing scheme for producers of many field crops under the Paddy Marketing Board (PMB) and, beginning in 1997, under the Cooperative Wholesale Establishment (CWE) to provide a degree of price protection for selected field crops.<sup>47</sup> However, many farmers have not been able to benefit due to their remote location with respect to purchasing locations, or limitations in quantity and quality of crops purchased by the CWE. Indeed, in many years the only significant purchases were for soybeans and maize.<sup>48,49,50</sup> Furthermore,

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<sup>45</sup> *ibid.*

<sup>46</sup> *ibid.*

<sup>47</sup> Central Bank of Sri Lanka, *Economic Progress of Independent Sri Lanka 1948-1998*, 295.

<sup>48</sup> Central Bank of Ceylon, *Central Bank Annual Report 1983* (Colombo, Ceylon: Central Bank of Ceylon, Government of Ceylon, 1984).

<sup>49</sup> Central Bank of Sri Lanka, *Central Bank Annual Report 1987* (Colombo, Sri Lanka: Central Bank of Sri Lanka, Government of Sri Lanka, 1988).

<sup>50</sup> Central Bank of Sri Lanka, *Central Bank Annual Report 1998* (Colombo, Sri Lanka: Central Bank of Sri Lanka, Government of Sri Lanka, 1999).

beginning in 1995, prices offered by private traders sometimes exceeded the floor price.<sup>51</sup> Market prices for chena food crops generally little affect the quantity of land cultivated in many areas since alternative sources of income do not exist in many rural areas, and subsistence farmers seek to maximize their income by cultivating as much as physically possible. Moreover, in regions where farmers find it difficult to take advantage of price support schemes, wide inter-annual fluctuations in market prices discourage farmers from basing cropping decisions on preceding years' prices.

In many areas poor prices offered by middlemen prevent farmers from obtaining better returns and discourage farmers from trying to increase land productivity. In some areas fertilizer subsidies have had little impact on the chena rotation cycle since poor farmers prefer to avoid paying the cost of even subsidized fertilizers required to maintain productivity.

Most agricultural production from chena is for domestic household consumption. Exports of other field crops (OFCs), such as maize, manioc, chilies, green gram, cow pea and kurakkan, typically grown under chena conditions, are negligible. With the exception of some short-term export duties on a few selected OFCs, export controls have been minimal.

In contrast to minimal export controls, OFCs have had some degree of import protection. Although, during the 1950s and 1960s, many OFCs had minimal import controls, local production of chilies, onions, potatoes and green gram were encouraged through import controls (including both tariffs and quotas) from 1970 to 1977.<sup>52,53</sup>

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<sup>51</sup> Central Bank of Sri Lanka, *Central Bank Annual Report 1995* (Colombo, Sri Lanka: Central Bank of Sri Lanka, Government of Sri Lanka, 1996).

<sup>52</sup> Central Bank of Sri Lanka, *Economic Progress of Independent Sri Lanka 1948-1998*, 295.

<sup>53</sup> Kelegama, Ratnayake, and Unamboowe, *Trade and Environmental Linkages in Sri Lanka: Issues and Evidence*.

Indeed, the early to mid 1970s exhibited an increase in cultivated extent of highland crops (Figure 6). These increases in cultivation correspond to declines in forest cover (Figure 2). In the three years following the currency devaluation and trade liberalization in 1977, total production of OFCs (from both highland and irrigated areas) in Sri Lanka declined as a result of increased competition from cheaper Indian and Pakistani imports.<sup>54</sup>

Similarly, the removal of all licensing requirements and the reduction or waiving of the 35% import duty on all OFCs in 1996 led to further declines.<sup>55,56</sup> However, over the 1977 to 1980 and 1995 to 1998 time periods, total land extent under chena cultivation in highland areas did not exhibit a consistent pattern of change for districts analyzed (Figure 6), indicating that liberalization affected districts differentially.

The differential temporal and spatial effects of liberalization on cultivated extents during 1970-1976, 1977-1980 and 1995-1998 could be due to the interaction of other factors not present during other time periods or regions. During their 7-year tenure, the leftist leaning United Front government of 1970-1977 instituted agricultural reform aimed at reducing inequalities of agricultural land ownership, promoting cooperative and communal modes of agricultural production, facilitating popular decision-making in agriculture and stimulating production by protecting local markets.<sup>57</sup> Stimulation of local production was an effort in part to alleviate a severe foreign exchange scarcity arising from dependence on food imports in combination with the oil crisis of 1973 and food

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<sup>54</sup> Central Bank of Sri Lanka, *Economic Progress of Independent Sri Lanka 1948-1998*, 295.

<sup>55</sup> *ibid.*

<sup>56</sup> Central Bank of Sri Lanka, *Central Bank Annual Report 1997* (Colombo, Sri Lanka: Central Bank of Sri Lanka, Government of Sri Lanka, 1998).

<sup>57</sup> G. H. Peiris, "Agrarian Change and Agricultural Development in Sri Lanka," in *Economic Development and Social Change in Sri Lanka: A Spatial and Policy Analysis*, ed. Paul Groves. (New Delhi, India: Manohar, 1996).

supply shortages on the world market between 1973 and 1974.<sup>58</sup> Government policies sought to replace food imports through increased cultivation of manioc, corn, sorghum, green gram, cowpea and chili.<sup>59</sup>

The lack of consistent declines in cultivated extents across all districts in the 1977-1980 and 1995-1998 periods could be due to regional specific factors, such as the highland crop mix and the availability of alternative livelihoods for farmers. In some areas, lowered market prices resulting from increased foreign competition had little impact on cultivated extents because many farmers lacked the means and training to pursue alternative sustainable livelihoods.<sup>60</sup> Thus the major impact of liberalization was a decline in the welfare of farmers, not reduced pressure on forests.<sup>61</sup> It is possible that the response of cultivated extents to trade protection is more rapid than the response to trade liberalization.

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<sup>58</sup> Gunatilleke, *Development and Liberalization in Sri Lanka: Trends and Prospects*.

<sup>59</sup> Ministry of Forestry and Environment, Government of Sri Lanka and World Bank, *Economic and Environment Linkages in Land Use for Irrigated Versus Rainfed Farming in the Dry Zone*.

<sup>60</sup> Local farmers in Puttalam district. Interview by author. Puttalam district, Sri Lanka, July 2004.

<sup>61</sup> Local farmers in Puttalam district. Interview by author. Puttalam district, Sri Lanka, July 2004.

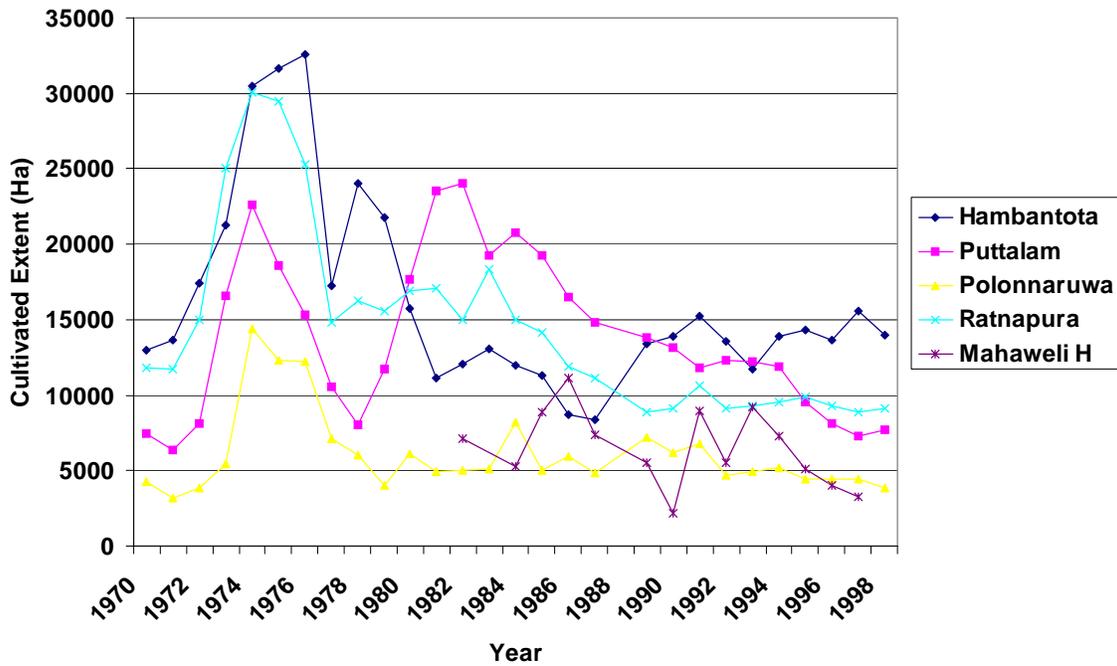


Figure 6: Cultivated Extent of Highland Crops for Selected Districts (1970-1998)<sup>62,63,64,65,66</sup>

67,68,69,70,71,72,73

<sup>62</sup> Department of Census and Statistics, Government of Ceylon, *Statistical Abstract of Ceylon 1970-71* (Colombo, Ceylon: Department of Census and Statistics, Government of Ceylon, 1972).

<sup>63</sup> Department of Census and Statistics, Government of Sri Lanka, *1973 Statistical Abstract of the Democratic Socialist Republic of Sri Lanka* (Colombo, Sri Lanka: Department of Census and Statistics, Government of Sri Lanka, 1974).

<sup>64</sup> Department of Census and Statistics, Government of Sri Lanka, *1978 Statistical Abstract of the Democratic Socialist Republic of Sri Lanka* (Colombo, Sri Lanka: Department of Census and Statistics, Government of Sri Lanka, 1978).

<sup>65</sup> Department of Census and Statistics, Government of Sri Lanka, *1979 Statistical Abstract of the Democratic Socialist Republic of Sri Lanka* (Colombo, Sri Lanka: Department of Census and Statistics, Government of Sri Lanka, 1979).

<sup>66</sup> Department of Census and Statistics, Government of Sri Lanka, *1982 Statistical Abstract of the Democratic Socialist Republic of Sri Lanka* (Colombo, Sri Lanka: Department of Census and Statistics, Government of Sri Lanka, 1982).

<sup>67</sup> Department of Census and Statistics, Government of Sri Lanka, *1985 Statistical Abstract of the Democratic Socialist Republic of Sri Lanka* (Colombo, Sri Lanka: Department of Census and Statistics, Government of Sri Lanka, 1985).

<sup>68</sup> Department of Census and Statistics, Government of Sri Lanka, *1989 Statistical Abstract of the Democratic Socialist Republic of Sri Lanka* (Colombo, Sri Lanka: Department of Census and Statistics, Government of Sri Lanka, 1989).

<sup>69</sup> Department of Census and Statistics, Government of Sri Lanka, *1991 Statistical Abstract of the Democratic Socialist Republic of Sri Lanka* (Colombo, Sri Lanka: Department of Census and Statistics, Government of Sri Lanka, 1991).

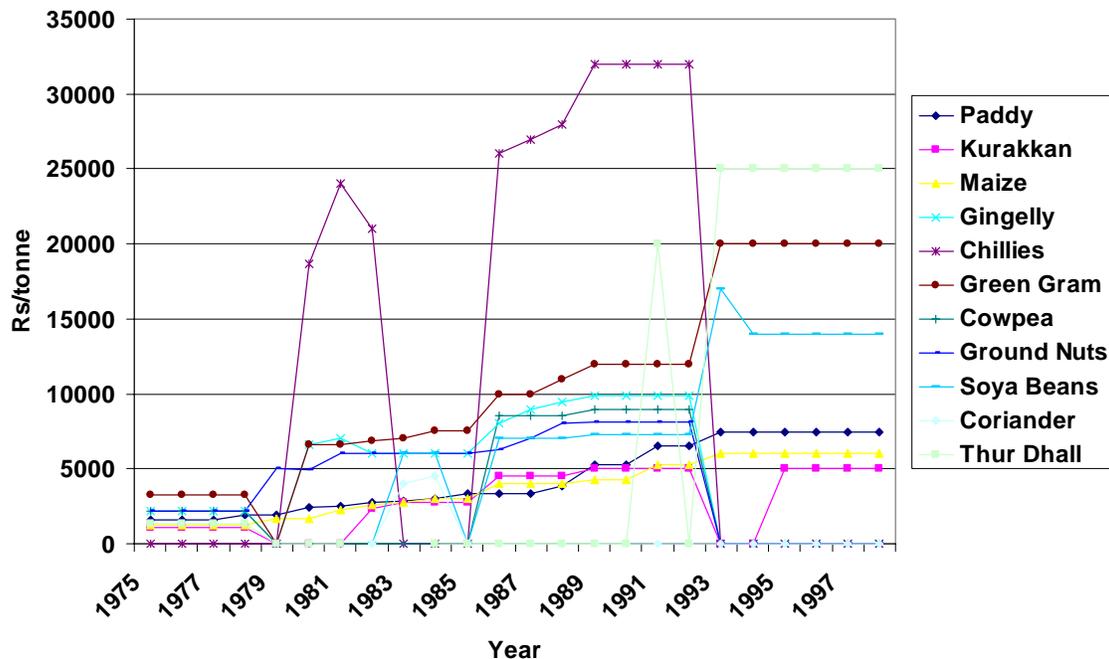


Figure 7: Guaranteed Commodity Prices (Rs/tonne) 1975-1998<sup>74,75,76 77,78,79,80,81,82,83</sup>

<sup>70</sup> Department of Census and Statistics, Government of Sri Lanka, *1994 Statistical Abstract of the Democratic Socialist Republic of Sri Lanka* (Colombo, Sri Lanka: Department of Census and Statistics, Government of Sri Lanka, 1994).

<sup>71</sup> Department of Census and Statistics, Government of Sri Lanka, *1997 Statistical Abstract of the Democratic Socialist Republic of Sri Lanka* (Colombo, Sri Lanka: Department of Census and Statistics, Government of Sri Lanka, 1997).

<sup>72</sup> Department of Census and Statistics, Government of Sri Lanka, *1999 Statistical Abstract of the Democratic Socialist Republic of Sri Lanka* (Colombo, Sri Lanka: Department of Census and Statistics, Government of Sri Lanka, 1999).

<sup>73</sup> Department of Census and Statistics, Government of Sri Lanka, *2000 Statistical Abstract of the Democratic Socialist Republic of Sri Lanka* (Colombo, Sri Lanka: Department of Census and Statistics, Government of Sri Lanka, 2000).

<sup>74</sup> Department of Census and Statistics, Government of Sri Lanka, *1978 Statistical Abstract of the Democratic Socialist Republic of Sri Lanka*.

<sup>75</sup> Department of Census and Statistics, Government of Sri Lanka, *1979 Statistical Abstract of the Democratic Socialist Republic of Sri Lanka*.

<sup>76</sup> Department of Census and Statistics, Government of Sri Lanka, *1982 Statistical Abstract of the Democratic Socialist Republic of Sri Lanka*.

<sup>77</sup> Department of Census and Statistics, Government of Sri Lanka, *1985 Statistical Abstract of the Democratic Socialist Republic of Sri Lanka*.

<sup>78</sup> Department of Census and Statistics, Government of Sri Lanka, *1989 Statistical Abstract of the Democratic Socialist Republic of Sri Lanka*.

<sup>79</sup> Department of Census and Statistics, Government of Sri Lanka, *1991 Statistical Abstract of the Democratic Socialist Republic of Sri Lanka*.

<sup>80</sup> Department of Census and Statistics, Government of Sri Lanka, *1994 Statistical Abstract of the Democratic Socialist Republic of Sri Lanka*.

<sup>81</sup> Department of Census and Statistics, Government of Sri Lanka, *1997 Statistical Abstract of the Democratic Socialist Republic of Sri Lanka*.

<sup>82</sup> Department of Census and Statistics, Government of Sri Lanka, *1999 Statistical Abstract of the Democratic Socialist Republic of Sri Lanka*.

The major regionally consistent decline in cultivated extents during 1975-1977 appears not to be due to price supports, which remained constant through this period (see Figure 6 and Figure 7). The decline during this period was likely due to government policies that discriminated against highland farming in favor of irrigated farming. Since irrigation projects failed to meet the desired target of two crops per year, the government pursued crop diversification under the 1972 Five Year Plan of intensification of cropping in irrigation projects.<sup>84</sup> Rain-fed farmers had to compete with farmers on irrigated lands, which benefited from full government funding for irrigation water and land and infrastructure development (including rehabilitation of irrigation tanks).<sup>85</sup>

Since independence, more efficient use of chena lands has been hampered by a lack of investment in rain-fed farming. Although government expenditures on agriculture represented more than 50% of public investment as recently as 1984, expenditures have been highly skewed in favor of irrigation rather than rain-fed chena agriculture.<sup>86</sup> Financial resources have been dedicated to research on irrigated, but not rain-fed crops. Of agricultural expenditures, 90% of it was devoted to irrigation projects up until the 1950s and 60% in 1990. In the 1960s, initiatives to encourage upland rain-fed farming as a means to settle unemployed youth suffered from a lack of suitable technology.<sup>87</sup> With the exception of the period 1994-1996, upland rain-fed farmers have not been provided

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<sup>83</sup> Department of Census and Statistics, Government of Sri Lanka, *2000 Statistical Abstract of the Democratic Socialist Republic of Sri Lanka*.

<sup>84</sup> Ministry of Forestry and Environment, Government of Sri Lanka and World Bank, *Economic and Environment Linkages in Land Use for Irrigated Versus Rainfed Farming in the Dry Zone*.

<sup>85</sup> *ibid.*

<sup>86</sup> *ibid.*

<sup>87</sup> *ibid.*

with advanced agricultural technology and techniques.<sup>88</sup> Had more spending been allocated to rain-fed farming, it may have been possible to lengthen the chena cycle and hence minimize deforestation.

## 2.4.2 Irrigation & Settlement Schemes

At various times, the Sri Lankan government has undertaken irrigation and settlement projects in the Dry Zone in order to increase national food production (and decrease reliance on food imports, which had been a drain on foreign reserves), and address unemployment and landlessness.<sup>89,90,91,92</sup> Irrigation and settlement schemes have been a considerable source of deforestation in certain districts, particularly in the period immediately following the change of government in 1977.<sup>93,94</sup> During this period, there was a massive infusion of capital into development of irrigated agriculture in the Dry Zone in an effort to achieve self-sufficiency in national rice production.<sup>95,96,97,98</sup> As a result of irrigation projects, the extent of land under paddy approximately doubled between 1952 and 1994, increasing from 479,000 ha to 930,000 ha. By the late 1990s, paddy cultivation accounted for approximately 42 percent of cultivated land.<sup>99</sup>

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<sup>88</sup> *ibid.*

<sup>89</sup> Peiris, *Agrarian Change and Agricultural Development in Sri Lanka*.

<sup>90</sup> Ministry of Forestry and Environment, Government of Sri Lanka and World Bank, *Economic and Environment Linkages in Land Use for Irrigated Versus Rainfed Farming in the Dry Zone*.

<sup>91</sup> Russell R. Ross and Andrea Matles Savada eds., *Sri Lanka - A Country Study* (Washington, D.C.: Federal Research Division, Library of Congress, 1988).

<sup>92</sup> Gunatilleke, *Development and Liberalization in Sri Lanka: Trends and Prospects*.

<sup>93</sup> Ministry of the Environment and Natural Resources, Government of Sri Lanka, *State of the Environment in Sri Lanka*.

<sup>94</sup> Peiris, *Agrarian Change and Agricultural Development in Sri Lanka*.

<sup>95</sup> Ministry of the Environment and Natural Resources, Government of Sri Lanka, *State of the Environment in Sri Lanka*.

<sup>96</sup> Peiris, *Agrarian Change and Agricultural Development in Sri Lanka*.

<sup>97</sup> Sri Lankan Government Official. Interview by author. Colombo, Sri Lanka, 2 June 2004.

<sup>98</sup> Ministry of Forestry and Environment, Government of Sri Lanka and World Bank, *Economic and Environment Linkages in Land Use for Irrigated Versus Rainfed Farming in the Dry Zone*.

<sup>99</sup> Central Bank of Sri Lanka, *Economic Progress of Independent Sri Lanka 1948-1998*, 295.

While irrigation schemes have been the largest source of deforestation during certain decades, some government officials feel that under increasing population pressures, intensive irrigated agriculture schemes have actually reduced deforestation in the long run by reducing the need for chena.<sup>100</sup> More research, particularly CGE modeling, is necessary to determine the extent to which irrigation schemes reduced subsequent deforestation pressures from chena.

Most irrigation and settlement schemes of the Dry Zone have involved the restoration of ancient storage reservoirs and channel systems, particularly in Polonnaruwa and Anuradhapura districts, where the largest extents of land were developed.<sup>101</sup> By the early 1980s, there were about 100 colonization schemes throughout the Dry Zone, involving over 100,000 peasant families. However, the government has also financed large colonization schemes, including the development projects in the eastern lowland Gal-Oya and southeast Walawe river basins, the Kirindi Oya and Inginimitiya Development Projects and the Mahaweli Development Project (1977-1983).<sup>102,103</sup>

The Mahaweli Development Project has been the most ambitious project to date. This project sought to harness water in the Mahaweli Ganga River basin for both power generation and irrigation. The project included construction of dams that resulted in the formation of the Kotmale, Randenigala and Victoria reservoirs in the Central Province, and a network of pipes and canals to redistribute water for existing and newly developed paddy lands.<sup>104,105</sup> Lowland basins, including former chena land, were cleared of forest

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<sup>100</sup> Sri Lankan Government Official. Interview by author. Colombo, Sri Lanka, August 2004.

<sup>101</sup> Peiris, *Agrarian Change and Agricultural Development in Sri Lanka*.

<sup>102</sup> *ibid.*

<sup>103</sup> Ministry of the Environment and Natural Resources, Government of Sri Lanka, *State of the Environment in Sri Lanka*.

<sup>104</sup> Mahaweli Authority of Sri Lanka, Planning and Monitoring Unit, *Mahaweli Statistical Handbook 2000* (Colombo, Sri Lanka: Government of Sri Lanka, 2001).

and leveled for rice cultivation.<sup>106</sup> Between 1983 and 1992, the Mahaweli Development Project alone accounted for 37% of country-wide deforestation.<sup>107</sup> Considerable amounts of deforestation occurred in Anuradhapura and Polonnaruwa districts. In the early 1980s, civil conflict in the Northern Province led to the indefinite suspension of additional Mahaweli phases, which would have led to further deforestation in Vavuniya and Mannar districts.<sup>108</sup> While most chena farmers occupying Mahaweli lands prior to project implementation switched to rice cultivation under the scheme, some farmers were displaced to other highland sites.<sup>109</sup>

The Mahaweli Development Project and the majority of colonization schemes have involved government funding for the establishment of irrigation facilities, development of land for agriculture, and the establishment of economic and social institutions.<sup>110</sup> Furthermore, colonists were provided government subsidies for house construction, purchase of agriculture implements and living expenses for several months after initial settlement.<sup>111</sup> In the recent past, colonists were allotted 2.5 acres of irrigable land and 0.5 acres of non-irrigable land.<sup>112</sup> Land parcels can be transferred to other family members, but not sold.<sup>113</sup> Rice production was protected by heavy import restrictions.<sup>114</sup> Furthermore, the Guaranteed Price Scheme (GPS) (established in 1948) enabled farmers to sell directly to the Paddy Marketing Board (PMB) and provided

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<sup>105</sup> Sri Lankan Government Official. Interview by author. Colombo, Sri Lanka, 2 June 2004.

<sup>106</sup> *ibid.*

<sup>107</sup> Ministry of the Environment and Natural Resources, Government of Sri Lanka, *State of the Environment in Sri Lanka*.

<sup>108</sup> Sri Lankan Government Official. Interview by author. Colombo, Sri Lanka, August 2004.

<sup>109</sup> Local farmers in Polonnaruwa district. Interview by author. Polonnaruwa district, Sri Lanka, 3 August 2004.

<sup>110</sup> Peiris, *Agrarian Change and Agricultural Development in Sri Lanka*.

<sup>111</sup> *ibid.*

<sup>112</sup> *ibid.*

<sup>113</sup> Sri Lankan Government Official. Interview by author. Colombo, Sri Lanka, 2 June 2004.

<sup>114</sup> *ibid.*

farmers an effective floor price on rice.<sup>115</sup> The government also provided subsidized fertilizers and improved seed varieties to farmers.<sup>116</sup> Improved seed varieties, better crop husbandry techniques and the application of fertilizers enabled productivity of paddy to more than double between 1950 and the 1990s, increasing from 1,500 kg paddy per ha to more than 3,500 kg paddy per ha.<sup>117</sup>

During the socialist-leaning governments of 1956-65 and 1970-77, the state was involved in the purchasing, milling, warehousing, trading and transporting of rice because marketing infrastructure in the rural sector was poor and a large scale private market in rice was yet to develop.<sup>118</sup> Government involvement in the rice industry prevented development of the private sector.

By the mid-1980s, as a result of a glut of rice and depressed world prices, the government reduced incentives for increased rice output.<sup>119</sup> Rice import restrictions were progressively relaxed over time, leading ultimately to the removal of rice tariffs in 1996.<sup>120</sup> Restrictions on farming OFCs on paddy fields were abolished in 1991.<sup>121</sup> Other policies favoring rice producers have been maintained to some degree, possibly to maintain a certain level of welfare for peasants. Fertilizer subsidies were cut in 1989, but subsequently re-instated in 1994, albeit at a lower real rate.<sup>122</sup> Following liberalization of the economy in 1977, market prices frequently exceeded the GPS price (Figure 7) and the role of the PMB diminished to a price stabilizer in glut situations.<sup>123</sup> The IMF and World

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<sup>115</sup> Central Bank of Sri Lanka, *Economic Progress of Independent Sri Lanka 1948-1998*, 295.

<sup>116</sup> Sri Lankan Government Official, op cit.

<sup>117</sup> *ibid.*

<sup>118</sup> Gunatilleke, *Development and Liberalization in Sri Lanka: Trends and Prospects*.

<sup>119</sup> Sri Lankan Government Official. Interview by author. Colombo, Sri Lanka, 2 June 2004.

<sup>120</sup> *ibid.*

<sup>121</sup> Ministry of Forestry and Environment, Government of Sri Lanka and World Bank, *Economic and Environment Linkages in Land Use for Irrigated Versus Rainfed Farming in the Dry Zone*.

<sup>122</sup> Sri Lankan Government Official, op cit.

<sup>123</sup> Central Bank of Sri Lanka, *Economic Progress of Independent Sri Lanka 1948-1998*, 295.

Bank are encouraging further reforms, including elimination of the fertilizer subsidy and the transfer of seed production to the private sector.<sup>124</sup>

With the exception of Polonnaruwa district, other analyzed districts exhibited little net change in cultivated extent of rice between 1966 and 2003 (Figure 8). Increases in cultivated extent of rice in Polonnaruwa correspond to decreases in forest cover (Figure 2). Increases in cultivated extent of rice in Polonnaruwa resulted from the significant number of colonization schemes, which contributed to a 65% country-wide increase in additional rice output between 1974 -1982.<sup>125</sup> These colonization schemes benefited from more stable water supplies and better organized systems of input supplies.<sup>126</sup> In districts analyzed, many of the short-term fluctuations have been caused by changes in growing conditions and security. For example, in 1996, severe drought conditions and the unsettled security situation adversely affected cultivated extent of rice, especially in Northern districts, such as Polonnaruwa and Puttalam (Figure 8).<sup>127</sup> Paddy extent increases recorded in 2003 in the North and East were due to the Peace Process initiated in 2002.<sup>128</sup>

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<sup>124</sup> Sri Lankan Government Official, op cit.

<sup>125</sup> Peiris, *Agrarian Change and Agricultural Development in Sri Lanka*.

<sup>126</sup> *ibid*.

<sup>127</sup> Central Bank of Sri Lanka, *Central Bank Annual Report 1996* (Colombo, Sri Lanka: Central Bank of Sri Lanka, Government of Sri Lanka, 1997).

<sup>128</sup> Central Bank of Sri Lanka, *Central Bank Annual Report 2003* (Colombo, Sri Lanka: Central Bank of Sri Lanka, Government of Sri Lanka, 2004).

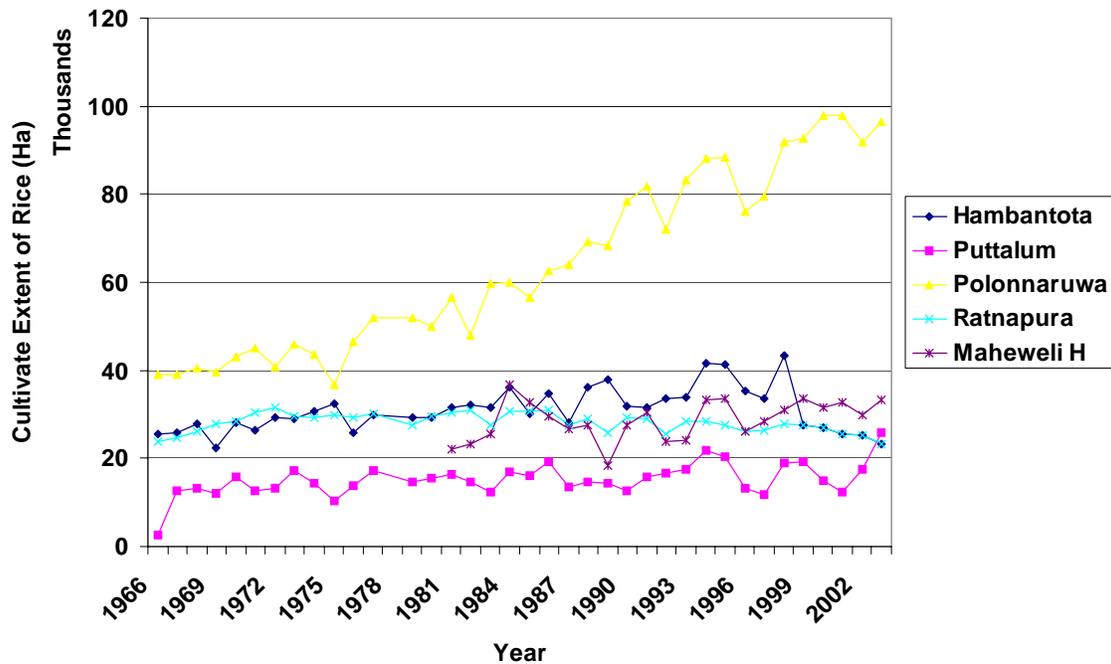


Figure 8: Cultivated Extent of Rice for Selected Districts (1966-2003)<sup>129,130,131,132</sup>

Although government-sponsored irrigation development has been a significant direct source of deforestation, interviews with farmers would suggest that trade and agriculture policies have had little impact on forest cover lost to rice cultivation. Due to land scarcity, asweddumized rice paddy land is generally allotted to farmers as a parcel of fixed size. Farmers typically cultivate their entire 2-acre allotment, regardless of market price, since rice cultivation is much more profitable than chena cultivation, even in the absence of import protection, floor prices and agriculture subsidies.<sup>133</sup> Furthermore, many farmers do not benefit from the CWE price support scheme, which involves

<sup>129</sup> Department of Census and Statistics, Government of Ceylon, *Statistical Abstract of Ceylon 1970-71*.

<sup>130</sup> Department of Census and Statistics, Government of Sri Lanka, *1973 Statistical Abstract of the Democratic Socialist Republic of Sri Lanka*.

<sup>131</sup> Department of Census and Statistics, Government of Sri Lanka, *1978 Statistical Abstract of the Democratic Socialist Republic of Sri Lanka*.

<sup>132</sup> "Paddy Sown Extent and Harvested 1979-2003," in Department of Census and Statistics, Government of Sri Lanka [database online]. Colombo, Sri Lanka December 30, 2005 [cited January 6, 2006]. Available from <http://www.statistics.gov.lk/agriculture/index.htm>.

purchases of only high quality paddy in limited quantities.<sup>134</sup> Whatever benefits have accrued to rice farmers from the existence of favorable trade and agriculture policies have likely served more to increase the welfare of peasants rather than stimulate increased deforestation.

While having a negligible impact on existing irrigation and settlement projects, trade and agriculture policies may adversely affect the conception of future projects. Some have criticized previous 2-acre parcels as insufficient to provide a decent standard of living for settlers. Indeed, case studies of settlement colonies examining physical quality of life indicators, percentage of households below the poverty line and nutritional status among children have revealed widespread poverty in the colonization settlements.<sup>135</sup> Future governments may seek to address these criticisms by increasing allotments in future irrigation schemes, without consideration for how the government's approach to liberalization and privatization have adversely affected farmers' incomes.

*Ad hoc* duty reductions and the associated uncertainty of sudden influxes of imported rice have made paddy millers and stockists reluctant to purchase and stock paddy on a large scale, resulting in declines in paddy prices.<sup>136</sup> Vigorous development of the private sector has been hampered by uncertainty over future agriculture policies in the event of changes to more socialist governments, which were heavily involved in marketing of rice prior to 1977.<sup>137</sup> There has also been a lack of policies to address abuses associated with privatization of marketing and provision of credit. Outsider

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<sup>133</sup> Local farmers in Polonnaruwa district. Interview by author. Polonnaruwa district, Sri Lanka, 3 August 2004.

<sup>134</sup> *ibid.*

<sup>135</sup> Peiris, *Agrarian Change and Agricultural Development in Sri Lanka*.

<sup>136</sup> Central Bank of Sri Lanka, *Central Bank Annual Report 2000* (Colombo, Sri Lanka: Central Bank of Sri Lanka, Government of Sri Lanka, 2001).

<sup>137</sup> Gunatilleke, *Development and Liberalization in Sri Lanka: Trends and Prospects*.

“intermediary” groups involved in the marketing of agricultural produce, the retail trade of farm inputs and imported subsistence goods, and the supply of credit, have manipulated the market to extract the maximum possible surplus from peasants.<sup>138</sup> For example, in some areas, farm gate paddy prices are depressed, due to thugs preventing competition from competing lorries. In addition, the difficulty many poor farmers have had in obtaining credit has resulted in the poor losing much of their profits by progressively mortgaging out their entire land to a few rich owners.

### 2.4.3 Illicit Felling

Illicit felling of timber within state forests has been a significant source of forest degradation and forest loss in different districts at various times. Puttalam, Anuradhapura and Hambantota have experienced significant amounts of illicit felling in recent decades.<sup>139,140,141</sup> During the 1980s and 1990s, illicit felling contributed to forest loss within and surrounding the park boundaries of Yala National Park<sup>142,143</sup> and Wilpattu National Park.<sup>144,145,146</sup> Currently illicit felling around the borders of Sinharaja Forest Reserve (which lies in Ratnapura, Matara and Galle districts), which is one of the last remaining significant areas of lowland rainforest in Sri Lanka, is minimal although still of concern to conservationists due to the reserve’s high degree of species endemism.<sup>147</sup>

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<sup>138</sup> Peiris, *Agrarian Change and Agricultural Development in Sri Lanka*.

<sup>139</sup> Bandarattillake, *Administration Report of the Conservator General of Forests Sri Lanka for the year 2001*.

<sup>140</sup> Bandarattillake, *Administration Report of the Conservator General of Forests Sri Lanka for the year 1993*.

<sup>141</sup> Sri Lankan Government Official. Interview by author. Sri Lanka, June 2004.

<sup>142</sup> *ibid.*

<sup>143</sup> Colombo residents. Interview by author. Colombo, Sri Lanka, June 2004.

<sup>144</sup> Sri Lankan Government Official, *op cit.*

<sup>145</sup> Colombo residents, *op cit.*

<sup>146</sup> Sri Lankan Government Official. Interview by author. Sri Lanka, July, 2004.

<sup>147</sup> IUCN official. Interview by author. Colombo, Sri Lanka, 28 June 2004.

Before the December 2001 ceasefire between the Liberation Tigers of Tamil Ealam (LTTE) and the Sri Lankan government, illicit felling was much more problematic in Puttalam district than it is currently.<sup>148</sup> Enforcement of forestry laws was difficult since there was widespread involvement of Sri Lankan government officials, LTTE and police in illicit felling.<sup>149</sup> More stable conditions have led to considerable reductions in the amount of illicit felling. Indeed, most felling is conducted at a small scale at night using chainsaws, bicycles and occasional unlicensed lorries.<sup>150</sup> Due to the presence of numerous checkpoints (requiring permits for the transport of timber) along roads, most illicitly felled timber is converted to furniture as soon as possible, typically in small hidden shops in the city of Puttalam.<sup>151</sup> Forest Department spot-checks of local furniture shops discourage larger owners from using illegal wood.<sup>152</sup> Thus most owners favor legal supplies of plantation teak or mahogany purchased from the state-operated Timber Corporation.<sup>153</sup> However, because slow-growing indigenous wood species are highly valued in furniture, illicit felling persists. Enforcement is complicated in Puttalam district by limited personnel and recurring cases of political corruption and interference in legal proceedings initiated by the Forest Department.<sup>154</sup>

Outside of land developed for the Mahaweli Development Project, legal logging has generally not been a large source of deforestation in recent decades. Although Sinharaja Forest Reserve had had restrictions on felling timber since becoming Crown land under British rule in 1840, the government allowed selective logging in 1971 until

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<sup>148</sup> Villagers near Wilpattu National Park. Interview by author. Puttalam district, Sri Lanka, July 2004.

<sup>149</sup> *ibid.*

<sup>150</sup> *ibid.*

<sup>151</sup> Sri Lankan Government Official. Interview by author. Sri Lanka, July, 2004.

<sup>152</sup> *ibid.*

<sup>153</sup> *ibid.*

<sup>154</sup> *ibid.*

hard lobbying by conservationists led to a government ban in 1977.<sup>155,156</sup> Concern over degradation of the few remaining natural forests resulted in a ban on large-scale commercial logging in natural forests in the early 1980s.<sup>157</sup> Selective logging in all forests was completely banned following a 1989 study involving assistance from the IUCN and World Bank.<sup>158</sup> Sinharaja Forest Reserve became a World Heritage Site under UNESCO in 1988.<sup>159</sup>

Deforestation pressures from logging and illicit felling in the remaining natural forests have been minimized by alternative wood supplies. Considerable quantities of domestic timber are supplied from coconut, rubber, tea and timber plantations, and homegardens. The coconut and rubber plantations provide sustainable sources of low quality timber from the periodic replacement of aging less productive trees. Better quality woods are currently supplied by forest plantations, tea plantations and homegardens. Homegardens, consisting of planted spices, fruit trees and valuable timber species, are widespread around rural dwellings throughout Sri Lanka. In recent years, the Forest Department has implemented seedling programs in some districts to help combat trends of declining tree cover around dwellings resulting from increased reliance on timber from homegardens. However, the limited scale of the seedling program has failed to appreciably reverse current trends.

Deforestation in Sri Lanka has likely been more affected by domestic supply than trade barriers to imports of foreign timber and wood products. In the past there were

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<sup>155</sup> Plunkett and Ellemor, *Lonely Planet Sri Lanka*.

<sup>156</sup> "Legend and Fact - The History of Sinharaja," March 6, 2001 [cited 2006]. Available from [http://www.sinharaja.lk.com/pages/recent\\_past.htm](http://www.sinharaja.lk.com/pages/recent_past.htm).

<sup>157</sup> Asian Development Bank, *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Democratic Socialist Republic of Sri Lanka for the Forest Resources Management Sector Project* (Colombo, Sri Lanka: Asian Development Bank, 2000).

<sup>158</sup> *ibid.*

more import restrictions than at present. However, since domestic timber has been historically far cheaper than imported timber even in the absence of quotas and tariffs, it is unlikely that sizable imports from other countries, such as Malaysia would have occurred. In the recent past, most timber and wood products have been subject to a minimal import duty of 10%, which at times has been waived.<sup>160,161</sup> The builders joinery and carpentry of wood construction category (which includes wood used as windows/frames, doors, parquet panels, and shuttering for concrete and shingles), which is subject to a 35% tariff band, remains the only significant wood classification category where there is potential for increasing foreign competition.<sup>162</sup>

In the last decade, export licensing has been maintained on timber and wood products with the objective of environmental protection.<sup>163,164,165</sup> However, insufficient data was collected to evaluate the impact of licensing on deforestation.

#### **2.4.4 Smallholder Tea**

Clearing forested land for the cultivation of tea has been a source of deforestation since colonial times. However, in contrast to the colonial period, clearing of forests since independence has primarily occurred on a small scale for smallholder tea farms (typically < 2 acres in extent) in lowland rainforests rather than on a large scale for plantations in

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<sup>159</sup> *ibid.*

<sup>160</sup> Kelegama, Ratnayake, and Unamboowe, *Trade and Environmental Linkages in Sri Lanka: Issues and Evidence*.

<sup>161</sup> Central Bank of Sri Lanka, *Central Bank Annual Report 1995*.

<sup>162</sup> Kelegama, Ratnayake, and Unamboowe, *Trade and Environmental Linkages in Sri Lanka: Issues and Evidence*.

<sup>163</sup> *ibid.*

<sup>164</sup> Central Bank of Sri Lanka, *Central Bank Annual Report 1994* (Colombo, Sri Lanka: Central Bank of Sri Lanka, Government of Sri Lanka, 1995).

<sup>165</sup> Central Bank of Sri Lanka, *Central Bank Annual Report 1997*.

the central highlands.<sup>166,167</sup> Smallholder tea farms are particularly common in Ratnapura, Matara and Galle districts.<sup>168</sup>

During the 1970s, in an effort to support small farmers and find a solution to stagnating production from the plantation sector, the government started promoting cultivation of tea on a small scale.<sup>169</sup> The government established the TSHDA (Tea-Small Holder Development Authority) in 1978 for the purposes of increasing the productivity of smallholders. Over the years, the TSHDA has provided planting and re-planting subsidies, fertilizer credit schemes, extension services and access to credit facilities to farmers.<sup>170,171</sup>

Since subsidies and credit schemes are available only to farmers with land permits,<sup>172</sup> it is unlikely that TSHDA support to farmers has directly increased deforestation of state lands in the short-term. In the short-term, even private forested lands have likely been impacted little by TSHDA assistance, since smallholders' predominant use of only household laborers limits the extent to which farms can be expanded. Indeed most farms are less than 2 acres in extent. Thus, the main effect of TSHDA assistance has been to increase the productivity of legal tea holdings and hence the welfare of their owners.

The long-term effect of TSHDA assistance is more ambiguous. Through increased productivity, TSHDA assistance may have reduced long-term deforestation pressures by increasing the population that can be supported on a given unit of land.

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<sup>166</sup> Sri Lankan Government Official. Interview by author. Colombo, Sri Lanka, 2 June 2004.

<sup>167</sup> Tea Small Holder Development Authority, *TSHDA 2002 Annual Report* (Colombo, Sri Lanka: TSHDA, 2003).

<sup>168</sup> Tea Commissioners Division of Sri Lanka, Tea Board, *Tea Land Survey of the Tea Small-Holding and State-Owned Estates in Sri Lanka 1994/1995* (Colombo, Sri Lanka: Tea Board, 1996).

<sup>169</sup> Tea Small Holder Development Authority, *TSHDA 2002 Annual Report*.

<sup>170</sup> *ibid.*

Conversely, by increasing the profitability of tea farming, TSHDA operations may have encouraged in-migration and facilitated expansion of the small-holding sector in the lowland rainforests. However, many interviews indicated that most farmers were native to the region, suggesting that in-migration had been limited by other factors.

The impact of trade policies on the profitability and cultivated extent of tea under small-holdings is difficult to determine since export taxes apply only to processed tea and not the green leaf that growers send to factories. Moreover, since being abolished in 1992, export taxes have ceased to indirectly affect prices received for green leaf. In contrast to the export tax, a tea cess has been maintained on tea exports. The Cess Fund is used to advance research of the Tea Research Institute (TRI), promote soil conservation measures and replanting schemes, provide subsidies for tea factory machinery and fertilizer, and provide assistance to small tea holders who lack ready access to credit.<sup>173</sup> Thus the cess serves to promote long-term sustainability of the smallholder tea industry.

Market forces likely play a larger role than TSHDA subsidies and trade policies in determining the presence of smallholder tea farms. Even illegal farmers who have no access to subsidies find tea cultivation much more profitable than the next available alternative of chena. Over time, expansion of the small-holding sector has facilitated encroachments onto more remote forested state land since expansion has been accompanied by easier access to fertilizers and wider availability of vehicles transporting green leaf to markets. Under conditions of limited in-migration, tea cultivation in the lowland rainforest area has most likely reduced deforestation in the long-term by

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<sup>171</sup> Central Bank of Sri Lanka, *Central Bank Annual Report 2000*.

<sup>172</sup> Sri Lankan Government Official. Interview by author. Colombo, Sri Lanka, 11 August 2004.

providing a more intensive and profitable alternative to chena under increasing population pressures.

Although market forces and increasing population pressures are likely the major drivers for smallholder tea expansion, the nature and extent of that expansion was dependent on weak enforcement of forestry laws. Enforcement has been particularly problematic for State lands not controlled by the Forest Department. However, even the Forest Department has struggled to enforce restrictions on clearing forested State lands. Several families that had encroached within the southern boundaries of Sinharaja Forest Reserve in the early 1970s claimed ignorance of being within park boundaries until informed by forest officers.<sup>174</sup> Repeated eviction attempts by forest officers failed in court, and in 1992 many families were given a special non-transferable permit to allow cultivation by family members. Some families believe they will ultimately be given a land deed that makes them eligible for tea subsidies and gives them full rights to sale and ownership.

To help make future encroachments clearer, concrete posts are being erected to delineate the park boundaries. However, it is doubtful whether such a project will be effective unless there are proper funds for maintenance. Indeed, many of the previous park boundary posts erected in 1992 are now obscured by undergrowth. Furthermore, since the new demarcation project will exclude encroached lands, a precedent may be set that future encroachments will also be tolerated, particularly if special permits are replaced with fully fungible land deeds. Generally, state lands not controlled by the Forest Department have exhibited the weakest enforcement.

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<sup>173</sup> Kelegama, Ratnayake, and Unamboowe, *Trade and Environmental Linkages in Sri Lanka: Issues and Evidence*.

<sup>174</sup> Sri Lankan Government Official. Interview by author. Sri Lanka, 13 August 2004.

### 2.4.5 Cardamom

In 1965, the government began encouraging the cultivation of the lucrative spice cardamom, as a means to gain foreign exchange.<sup>175</sup> Through cash and food incentives, farmers from other parts of the country were encouraged to relocate to the temperate montane forests of the Knuckles Range in Kandy and Matale districts, where cardamom cultivation was suited. Although cardamom was cultivated under a forest canopy, soil maintenance and weeding inhibited forest regeneration.

Recognition of the increasing threat posed by cardamom cultivation on the viability of the ecologically important Knuckles ecosystem led to the Forest Department implementing cultivation restrictions in 1990.<sup>176</sup> Although, the Ministry of Agriculture continues to provide subsidies and extension services for cardamom cultivation, receipt is dependent on a land deed, so government assistance programs likely have had little impact on new state forest land lost to cardamom.

Since the implementation of restrictions, forest loss from cardamom cultivation has been limited.<sup>177</sup> Most of the land under cultivation is legal and situated on large plantations, whose owners employ laborers. Most encroachments onto state land are by poor farmers and small in extent. In recognition of the need for alternative sustainable livelihoods and increasing land scarcity, the Ministry of Agriculture has tried encouraging the cultivation of alternative crops and spices, such as maize and pepper on less ecologically sensitive land. However, farmers have been reluctant to shift away from the considerably more lucrative cardamom cultivation.

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<sup>175</sup> Sri Lankan Government Official. Interview by author. Sri Lanka, 16 August 2004.

<sup>176</sup> Sri Lankan Government Official. Interview by author. Sri Lanka, 16 August 2004.

<sup>177</sup> Sri Lankan Government Official. Interview by author. Sri Lanka, 16 August 2004.

## 2.4.6 Prawn Farming

Prawn farming is an extremely lucrative business in the coastal districts of Puttalam, Batticaloa and Trincomalee.<sup>178,179</sup> Although it accounts for a small proportion of the total deforestation in Sri Lanka, prawn farming is a significant cause of deforestation of coastal mangroves, particularly in Puttalam district.<sup>180</sup> These threatened mangroves are highly valued for their role in providing habitat for certain fish species, and protecting coastal areas from tropical storms. Under conditions of improved stability, other districts with significant amounts of mangrove forests, including Batticaloa, Trincomalee and Mannar districts could experience similar forest loss from prawn farming unless policies are changed.

Farmed prawns are sold nearly exclusively on the international, rather than domestic market. Export taxes on prawns have little influence on prawn farming activity since taxes are insignificant compared to prawn farming profits, which far exceed other crops.<sup>181</sup>

Many prawn farms illegally occupy formerly forested State lands.<sup>182</sup> Mangroves continue to be cleared to establish new farms. Low fines fail to act as a deterrent to encroachments onto State lands. More importantly, legal loopholes and rampant corruption have hampered eviction attempts by Forest Department officers. Since existing laws prevent the destruction of any kind of harvest, illegal farmers sometimes continue to stock ponds in subsequent seasons to avoid eviction. Politicians, many of

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<sup>178</sup> Sri Lankan Government Official. Interview by author. Sri Lanka, July 2004.

<sup>179</sup> "National aquaculture sector overview - Sri Lanka. National Aquaculture Sector Overview Fact Sheets." in FAO - FIGIS [database online]. 12/12/05 [cited 2006]. Available from [http://www.fao.org:80/figis/servlet/static?dom=countrysector&xml=naso\\_sri-lanka.xml](http://www.fao.org:80/figis/servlet/static?dom=countrysector&xml=naso_sri-lanka.xml).

<sup>180</sup> Sri Lankan Government Official. Interview by author. Sri Lanka, July 2004.

<sup>181</sup> Sri Lankan Government Official. Interview by author. Sri Lanka, July 2004.

<sup>182</sup> Sri Lankan Government Official. Interview by author. Sri Lanka, July 2004.

whom receive large kickbacks from the prawn trade, have produced falsified land deeds for farmers encroaching on State forest land, and have exerted political pressure on Forest Department officials not to bring infractions to court. Furthermore, some Forest Department officials have also received death threats from farmers to discourage further investigations. The currently proposed solution to mangrove loss is to clearly demarcate State forest lands with concrete posts and turn over all State lands to the Forest Department, which has been shown to be much more effective at enforcing forestry laws than other government administrations. However, until corruption is addressed, it is unlikely that deforestation will cease.

Ironically, prawn farming does not even benefit the poor in the long term. Land scarcity, limited means to purchase land for chena and the large short-term profits of prawn farming entice peasants to illegally clear mangroves and take out huge loans to pay backhoes to dig prawn ponds.<sup>183</sup> Since poor prawn farmers cannot afford the necessary equipment and chemicals to avoid disease, farms become unproductive after only a few seasons. Bankrupt farmers are forced to sell their land to large businessmen capable of prawn farm rehabilitation. Thus allowing prawn farming ultimately leads to indebtedness of peasants and land concentration in the hands of a few wealthy businessmen, typically supported by politicians.

## ***2.5 Summary: Relationship of Deforestation & Macroeconomic Policies***

Recent deforestation in Sri Lanka has been caused predominantly by chena and rice cultivation. Smaller amounts of deforestation have been caused by illicit felling,

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<sup>183</sup> Sri Lankan Government Official. Interview by author. Sri Lanka, July 2004.

smallholder tea encroachment, cardamom cultivation and prawn farming. The macroeconomic and sectoral policies examined (agriculture subsidies, trade and government sponsored irrigation/settlement schemes) were found to affect the different causes of deforestation in complex ways.

Provision of agriculture subsidies had minimal effect on forest loss due to chena (slash-and-burn) agriculture since many farmers lacked access to subsidies and labor constraints limited expansion of any given household's landholdings in response to greater income. Furthermore, the level of agricultural subsidies was not sufficient to induce shifts away from alternative lifestyles, such as irrigated rice, smallholder tea or garment factories. Expansion of chena agriculture was attributed to population growth rather than agricultural subsidies. Expansion of chena occurred in the absence of research funding that could otherwise have lengthened the slash-and-burn cycle and reduced deforestation pressures.

Agricultural subsidies did not affect the cultivated extent of rice, since irrigated plots assigned to farmers were of fixed size. Forest loss due to tea and cardamom cultivation was also unaffected by agriculture subsidies since they were granted only to land deed holders.

The effect of trade-related policies on deforestation was difficult to analyze given the limited data collected. Due to their very limited use, highland crop export controls did not contribute significantly to chena-related deforestation. Collected information would suggest that import controls have favored increased cultivation of highland crops in some regions in certain time periods, possibly depending on the availability of alternative lifestyles. However, changing government agricultural policies concerning land ownership, communal versus private modes of agricultural production, and support

for rice irrigation schemes, make it difficult to ascribe chena-related forest loss to import protection. Further study of the inter-related linkages of various government policies through the use of CGE modeling is required to isolate the impact of import protection on deforestation. While rice import protection did not affect deforestation from rice cultivation in irrigation schemes, *ad hoc* duty reductions did create market uncertainties that affected farmer welfare.

Lack of high import tariffs on lumber have not provided substantial incentives for illicit felling since foreign lumber is more expensive than domestic lumber. Tree plantations, replacement of aging coconut and rubber plantation stands and homegardens have provided a relatively abundant supply of cheap domestic timber. Roadway checkpoints and Forestry Department inspection of furniture shops have helped reduce incentives for illicit felling. Insufficient data was collected to evaluate the effects of export restrictions of wood products on deforestation. International recognition of Sri Lankan biodiversity helped facilitate a logging ban that prevented the currency devaluation from leading to increased deforestation.

The effects of export duties on tea in reducing deforestation from smallholder tea was difficult to analyze since duties only applied to processed tea and not the green leaf produced by smallholders. Export duties on prawn-farming had little impact on this activity since taxes were insignificant compared to profit margins. Corruption played a key role in facilitating the clearing of mangroves for prawn-farming.

Explicit government promotion of irrigation schemes was the main government policy that could be directly linked to deforestation. However, by enabling more intensive land-use, irrigation may have reduced future deforestation in light of growing demand for agricultural land. CGE analysis, exploring the linkages between irrigation

schemes and chena, is necessary to determine the net impact of irrigation schemes on long-term deforestation rates.

### 3 Comparison with Literature

#### 3.1 *Bolivia*

##### 3.1.1 Environmental and Social Context of Deforestation

Almost half of Bolivia is currently under forest.<sup>184</sup> Compared to other tropical countries, Bolivia has experienced a relatively moderate amount of deforestation. Deforestation has been caused by colonization projects, clearing for large commercial agriculture operations (including soybean cultivation and cattle ranching), slash-and-burn agriculture, fuel wood extraction and charcoal production.<sup>185,186</sup> In addition, although timber and non-timber forest products only account for 6% of total national export goods, considerable quantities of timber are illegally extracted.<sup>187</sup> Nevertheless, timber extraction has been rather limited due to lack of access to forests and poor technology, both of which reduce international competitiveness. However, deforestation rates are increasing as changing government policies increase pressures to clear land.

In Bolivia, highlands and valleys are dominated by communal peasant farms.<sup>188</sup> Lowlands are a mix of communal indigenous lands, settler colonies, large cattle ranches

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<sup>184</sup> Pablo Pacheco, *Country Profile for the Forum on The Role of Forestry in Poverty Alleviation: Bolivia* (2001), 1-55.

<sup>185</sup> F. Merry et al., "An Analysis of Land Conversion from Sustainable Forestry to Pasture: A Case Study in the Bolivian Lowlands," *Land Use Policy* 19, no. 3 (2002): 207-216.

<sup>186</sup> Pacheco, *Country Profile for the Forum on The Role of Forestry in Poverty Alleviation: Bolivia*, 1-55.

<sup>187</sup> *ibid.*

<sup>188</sup> *ibid.*

and independent commercial agriculture operations.<sup>189</sup> Rural poverty in Bolivia is severe.<sup>190</sup> Of the 1.5 million forest users, the large majority of forest users are engaged in subsistence agriculture, frequently relying on slash-and-burn techniques. Few practice agroforestry. Many depend on the forest for charcoal, firewood, and non-timber forest products, such as rubber and Brazil nuts. Only a small fraction of forest users is engaged in forest extraction. 5600 are very poor seasonal wage earners of forest companies engaged in timber extraction and processing. An additional 500 are small-scale timber producers.

### 3.1.2 Economic Context of Deforestation

Over time, macroeconomic policies influencing land distribution and the socioeconomic well-being of rural populations have impacted deforestation. Between 1952 and 1985, Bolivia pursued a capital accumulation model of development.<sup>191</sup> Bolivia also sought to diversify its economy, which relied primarily on the mining sector, particularly tin and natural gas.<sup>192,193</sup> Foreign loans were taken out to finance petroleum development, construct roads and open up the agricultural frontier for the production of crops that could substitute for imported commodities. Credit systems were put in place and price controls set. By the late 1980s increased foreign demand for cocoa and domestic demand for corn and rice encouraged further clearing of land.

To increase the domestic food supply and to reduce the threat of social uprisings associated with growing populations of the landless unemployed urban poor, the Bolivian

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<sup>189</sup> *ibid.*

<sup>190</sup> P. Pacheco, "Deforestation and forest degradation in lowland Bolivia," in *Deforestation and land use in the Amazon*, eds. C. Wood and R. Porro. (Gainesville: University of Florida Press, 2002)

<sup>191</sup> *ibid.*

<sup>192</sup> *ibid.*

government sponsored large-scale colonization projects in forested regions from the 1950s to the early 1980s.<sup>194,195,196, 197,198</sup> Government incentives, including offers of free land in forested regions opened up through the construction of IMF and World Bank financed roads for logging, mining and energy production, encouraged migrations into colonial settlements of forested regions.<sup>199</sup> In some colonization schemes, the lack of technical assistance for highland farmers unfamiliar with cultivation methods in the tropical lowlands, poor coordination between government agencies, land titling delays and inadequate road maintenance led to considerable numbers of colonists abandoning their plots and moving on.<sup>200</sup>

By the early 1980s, large borrowing, increasing interest rates on foreign debt, depressed natural gas and traditional mining exports, political instability and drought led to a severe economic crisis in Bolivia.<sup>201</sup> Despite the abrupt end to planned colonization schemes, the poor economy and mine closures in the highlands encouraged on-going migration from the cities of the Altiplano to the Bolivian lowlands along newly constructed roads.<sup>202,203</sup> Although legal timber sales declined, the illegal timber trade

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<sup>193</sup> M. K. Steininger et al., "Deforestation and Forest Fragmentation of Tropical Dry Forest in the Tierras Bajas Region of Santa Cruz, Bolivia," *Conservation Biology* 15, no. 4 (2001): 856-866.

<sup>194</sup> Rex A. Hudson and Dennis M. Hanratty eds., *Bolivia: A Country Study* (Washington, D.C.: Federal Research Division, US Library of Congress, 1989).

<sup>195</sup> "The Direct and Underlying Causes of Forest Loss," [cited April 29, 2004]. Available from <http://www.wrm.org.uy/publications/briefings/underlying.html>.

<sup>196</sup> H. Bikie, Jean-Gael Collomb, and et al., *An Overview of Logging in Cameroon* (Washington, D.C.: World Resources Institute, 2000).

<sup>197</sup> Susanna B. Hecht, "Soybeans, Development and Conservation on the Amazon Frontier," *Development and Change* 36, no. 2 (2005): 375-404.

<sup>198</sup> Steininger et al., *Deforestation and Forest Fragmentation of Tropical Dry Forest in the Tierras Bajas Region of Santa Cruz, Bolivia*, 856-866.

<sup>199</sup> Pacheco, *Deforestation and forest degradation in lowland Bolivia*.

<sup>200</sup> Hudson and Hanratty, *Bolivia: A Country Study*.

<sup>201</sup> Pacheco, *Deforestation and forest degradation in lowland Bolivia*.

<sup>202</sup> M. K. Steininger et al., "Tropical deforestation in the Bolivia Amazon," *Environmental Conservation* 28, no. 2 (2001): 127-134.

<sup>203</sup> Steininger et al., *Deforestation and Forest Fragmentation of Tropical Dry Forest in the Tierras Bajas Region of Santa Cruz, Bolivia*, 856-866.

increased due to the large discrepancy between the official and unofficial exchange rates.<sup>204</sup>

In 1985, the government was forced to undertake a structural adjustment program (SAP), which included liberalizing trade and markets, changing to a floating exchange rate, devaluing the currency, decreasing overall government spending, and reducing transportation costs to encourage export production.<sup>205</sup> The World Bank helped fund the construction of roads in the lowlands for facilitating expansion of industrial-scale soybean production, primarily for foreigners (Mennonite, Japanese and Brazilian colonists), into previously forested lands.<sup>206,207,208</sup> The currency devaluation, road construction, land grants, removal of price controls, preferential tariff advantages in the Andean Common market, export promotion policies, reduced taxes benefiting farmers, high world soybean prices and improved soybean varieties resulted in considerable increases in soybean acreage and rapid deforestation.<sup>209,210</sup> Road construction and structural adjustment also facilitated the expansion of industrial scale production of sunflower, wheat and sorghum.<sup>211</sup> Ensuing soil degradation from intensive soybean cultivation practices has necessitated conversion of formerly productive soybean lands to cattle ranching and clearing of additional forest for soybean cultivation.<sup>212</sup> Unlike rice

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<sup>204</sup> Pacheco, *Deforestation and forest degradation in lowland Bolivia*.

<sup>205</sup> *ibid.*

<sup>206</sup> *ibid.*

<sup>207</sup> Hecht, *Soybeans, Development and Conservation on the Amazon Frontier*, 375-404.

<sup>208</sup> D. Kaimowitz and J. Smith, "Soybean Technology and the Loss of Natural Vegetation in Brazil and Bolivia," in *Agricultural Technologies and Tropical Deforestation*, eds. A. Angelsen and D. Kaimowitz. (New York: CABI Publishing, 2001), 195-211.

<sup>209</sup> Pacheco, *Deforestation and forest degradation in lowland Bolivia*.

<sup>210</sup> Kaimowitz and Smith, *Soybean Technology and the Loss of Natural Vegetation in Brazil and Bolivia*, 195-211.

<sup>211</sup> Hecht, *Soybeans, Development and Conservation on the Amazon Frontier*, 375-404.

<sup>212</sup> *ibid.*

and corn producing peasant farms, industrial-scale farms have exhibited large variations in cultivated extent in response to volatile world commodity prices.<sup>213</sup>

Prior to the financial crisis and during the first 10 years of structural adjustment, the government policies of free land distribution contributed to consolidation of relatively large commercial land-holdings and accumulation of rural land merely for speculative purposes.<sup>214</sup> Low exchange rates, promotion of foreign commercial investments and road building that further promote mechanized agriculture for the production of export commodities have provided additional incentives for investors to acquire large land-holdings. Consolidation of these large-commercial land-holdings has effectively excluded small farmers from access to frontier lands. Due to land scarcity, increasing pressure is being put on forest reserves by small farmers. Although Bolivia's poverty reduction strategy program recognizes the importance of providing micro-credit, diversifying non-agricultural rural employment and improving roads, little concrete actions have been pursued. Increasing rural poverty has prevented rural populations from having the means necessary to pursue agricultural practices, including intensive agriculture and agroforestry that reduce pressures on forests.

The SAP also directly affected the forestry sector. SAP measures, including a devalued exchange rate, subsidized rail rates, road construction and anti-inflationary policies, resulted in a tripling of log exports between 1986 and 1996. Increases in production came from unmanaged forests.<sup>215</sup> Due to a lack of processing, increased timber exports likely did not substantially increase the relatively few nationals employed

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<sup>213</sup> *ibid.*

<sup>214</sup> Pacheco, *Country Profile for the Forum on The Role of Forestry in Poverty Alleviation: Bolivia*, 1-55.

<sup>215</sup> Pacheco, *Deforestation and forest degradation in lowland Bolivia*.

in forestry operations.<sup>216</sup> Persistent poverty of wage earners in the forestry industry in Bolivia also suggests that any increases in revenues likely accrued only to management.

Bolivia's macroeconomic policy directives are negotiated by the Consultative Group on Bolivia convened by the World Bank, involving the participation of donor countries and some international organizations.<sup>217</sup> Between the 1960s and 1990s external aid from donors generally did not provide specific means for ensuring the sustainable development of resources.<sup>218</sup> Moreover, the World Bank concedes that Bank financed projects related to natural resources have been based on poor quality information and have neglected accounting for the limited institutional capacity required to safeguard the environment.<sup>219</sup>

In conjunction with World Bank support, the private sector has promoted the switch of property rights from forest concessions to private property.<sup>220</sup> The government has responded by adopting policies that define long-term rights over resource use that facilitate more private investment, particularly foreign investment. Because of their role in income generation, the mining and hydrocarbon sectors have been given priority over conservation objectives. Forest privileges granted to the private forestry sector essentially give management of forests to the private sector. A forestry strategy drawn up by the Bolivian Chamber of Forestry promotes timber exports and favors large commercial scale operators rather than smaller community forest operations. Moves to implement land tenure reform that recognize the rights of local communities will not

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<sup>216</sup> Pacheco, *Country Profile for the Forum on The Role of Forestry in Poverty Alleviation: Bolivia*, 1-55.

<sup>217</sup> *ibid.*

<sup>218</sup> World Bank Operations Evaluation Department, *Natural Resource Management in Bolivia: 30 Years of Experience. Report No. 11891* (Washington, D.C.: World Bank, 1993).

<sup>219</sup> *ibid.*

<sup>220</sup> Pacheco, *Country Profile for the Forum on The Role of Forestry in Poverty Alleviation: Bolivia*, 1-55.

likely be effective in advancing responsible management of forest.<sup>221</sup> The ability of local communities to sustainably manage forests will likely be hindered by large companies extracting timber illegally and exerting pressure on communities to sell timber by bribing key community figures for lumbering rights.

### **3.1.3 Summary: Relationship of Deforestation & Macroeconomic Policies**

The primary macroeconomic policy driver for deforestation in Bolivia has been government sponsored settlement schemes for soybean cultivation. Free land distribution, World Bank funded road construction, exchange rate devaluations and preferential tariff treatment under the Andean Common Market have been important supplementary components to settlement schemes that have facilitated expansion of mechanized agriculture onto forested lands. Land shortages resulting from consolidation of large landholdings for soybean farming have necessitated small farmers clearing additional forest land. Significant deforestation from increased logging activities has also resulted from the exchange rate devaluation in the absence of environmental planning and sufficient private market restrictions. The failure to implement effective poverty reduction programs and account for the unsustainability of soybean farming practices have hindered current development from reducing long-term deforestation pressures.

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<sup>221</sup> *ibid.*

## 3.2 Cameroon

### 3.2.1 Environmental and Social Context of Deforestation

Cameroon has one of Africa's largest humid forests. Deforestation in Cameroon is 2% per annum, representing the removal of 100,000 hectares of forest.<sup>222</sup> While slash-and-burn agriculture is the largest source of deforestation, logging is the largest cause of forest degradation.<sup>223</sup>

Although the potential for slash-and-burn agriculture to provide sufficient food and incomes for an adequate standard of living in Cameroon is low, the capacity of farmers to change to other techniques is limited by low incomes, limited education, lack of access to financial markets, poor technology and lack of extension services.<sup>224</sup>

Cameroon's forests, which are rich in biodiversity, are among the most heavily logged in Africa.<sup>225</sup> Forest exports are an important part of the economy, representing one quarter of Cameroon's non-petroleum export earnings. Estimated total direct and indirect employment in the logging sector is 55,000.<sup>226</sup> Deforestation is increasing as logging roads open up previously unavailable land.

### 3.2.2 Economic Context of Deforestation

Deforestation rates have fluctuated over time, depending on prevailing macroeconomic conditions and government policies. During the period 1967-1976,

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<sup>222</sup> Bikie, Collomb, and et al., *An Overview of Logging in Cameroon*.

<sup>223</sup> J. Brunner and F. Ekoko, "Cameroon," in *The Right Conditions: The World Bank, Structural Adjustment and Forest Policy Reform*, eds. S. Seymour and N. Dubash. (Washington, D.C.: World Resources Institute, 2000).

<sup>224</sup> Eric C. Schuck, William Nganje, and Debazou Yantio, "The role of land tenure and extension education in the adoption of slash and burn agriculture," *Ecological Economics* 43, no. 1 (2002): 61-70.

<sup>225</sup> Brunner and Ekoko, *Cameroon*.

<sup>226</sup> Bikie, Collomb, and et al., *An Overview of Logging in Cameroon*.

deforestation was minimal and largely driven by subsistence agriculture.<sup>227</sup> Although two thirds of export earnings came from cocoa and coffee, export taxes discouraged farmers from clearing additional land for plantations. During this time period, government investment in agriculture for food production was limited.

During the period 1976-1984, high coffee and cocoa prices coupled with lowered taxes stimulated moderate deforestation for increased production.<sup>228</sup> The oil boom of 1976-1984 resulted in an influx in foreign loans, urban migration and increased incomes, which increased urban demand for food. However, government policies favoring food imports and subsidies for corn and rice production in other parts of the country minimized pressure to clear additional land for food production in the humid forest zone. Increased government revenues from the oil boom led to increased government expenditures. The government expanded the public sector, increased social service and infrastructure spending, and substantially increased fertilizer and pesticide subsidies. Increased fertilizer use increased coffee yields. Oil revenues were also used to support land clearing for large oil palm and rubber plantations. Although increased land was cleared for cocoa, aging stands and fungal and insect attacks prevented significant increases in production. During the end of the period, when world cocoa prices began to fall, the government used oil revenues to help subsidize cocoa farmers. A 1978 World Bank loan for an integrated rural development project stimulated migration into the forest, resulting in additional land clearing for coffee production.

When the oil boom ended in 1985, country revenues dropped substantially.<sup>229</sup> Failure to reduce government expenditures on programs initiated during the oil boom

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<sup>227</sup> Ndoye Ousseynou and David Kaimowitz, "Macro-economics, markets and the humid forests of Cameroon, 1967±1997," *Journal of Modern African Studies* 38, no. 2 (2000): 225-253.

<sup>228</sup> *ibid.*

resulted in the country going into massive debt. In 1989, the country was forced to undergo the IMF and World Bank terms of structural adjustment.<sup>230,231</sup> The government reduced its services, cut fertilizer and pesticide subsidies, reduced cocoa and coffee prices, closed the cocoa and coffee marketing board and the cocoa development agency, reduced agricultural research and reduced access to loans.<sup>232,233,234</sup> Abrupt liberalization of cocoa marketing in the context of a poorly developed private sector resulted in infrequent cocoa bean pick-ups by transporters, low cocoa bean prices, and lack of access to pesticides and fertilizers, particularly in remote areas with poor roads.<sup>235,236</sup> The reduced yields and profits resulting from market liberalization and reduced government support forced many farmers to shift from cocoa and coffee production back to food cultivation, resulting in the clearing of additional forests.<sup>237</sup> The search for alternative incomes resulted in increased extraction of non-timber forest products and commercial fuel-wood. In addition, the 1994 devaluation of the local currency, the French Central African Franc (CFA) stimulated increased timber production for export. Log exports

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<sup>229</sup> *ibid.*

<sup>230</sup> *ibid.*

<sup>231</sup> "Smallholder cocoa cultivation in agroforestry systems of West and Central Africa," in Smithsonian National Zoological Park and Friends of the National Zoo [database online]. Fairfax, VA [cited 2005]. Available from

<http://nationalzoo.si.edu/ConservationAndScience/MigratoryBirds/Research/Cacao/duguma.cfm>.

<sup>232</sup> Ousseynou and Kaimowitz, *Macro-economics, markets and the humid forests of Cameroon, 1967±1997*, 225-253.

<sup>233</sup> O. Coulibaly et al., "Responding to economic crisis in sub-Saharan Africa: New farmer-developed pest management strategies in cocoa-based plantations in Southern Cameroon," *Integrated Pest Management Reviews* 7 (2002): 165-172.

<sup>234</sup> Duguma, Gockowski, and Bakala, *Smallholder cocoa cultivation in agroforestry systems of West and Central Africa*.

<sup>235</sup> Georges Courade, *Le désarroi camerounais : l'épreuve de l'économie-monde*, (Paris: Karthala, 2000), 283.

<sup>236</sup> Véronique Alary, *Les cacaoculteurs camerounais face aux risques : essai de modélisation*, (Paris: L'Harmattan, 2000), 236.

<sup>237</sup> Ousseynou and Kaimowitz, *Macro-economics, markets and the humid forests of Cameroon, 1967±1997*, 225-253.

increased by 80% following depreciation.<sup>238</sup> The increase in log exports was not followed by a substantial increase in wood processing capacity, likely reflecting the lack of resources available for capital investment. The effect of the structural adjustment led to a decrease in GDP.<sup>239</sup>

As part of the 1989 terms of structural adjustment, the World Bank pressured Cameroon to implement forest policy reforms.<sup>240</sup> This pressure led to the 1994 Forest Law that gave provisions for significant changes for the management, allocation, and taxation of forest concessions. The reform process leading up to the drafting of the new law was largely World Bank-driven and lacked adequate participation from the Cameroonian government and NGOs. Implementation of the new legislation has suffered from flawed land auctions, subversion of the community allocation process and pervasive illegal logging. Implementation has been hampered by budget cuts and political pressure. IMF-induced budget cuts to government ministries, including the Ministry of Environment and Forests (MINEF), reduced the government's capacity to enforce forestry laws. In addition in Cameroon, political figures have hindered implementation of the new legislation in deference to the dominant French logging companies, which had benefited from previous discretionary logging practices.<sup>241</sup>

### **3.2.3 Summary: Relationship of Deforestation & Macroeconomic Policies**

One of the major macroeconomic policies affecting deforestation in Cameroon has been agricultural subsidies for coffee and cocoa production. Both the introduction and removal of these subsidies have had consequences for forest cover. Subsidies have

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<sup>238</sup> R. Eba'a Atyi, *Cameroon's Logging Industry: Structure, Economic Importance and Effects of Devaluation*, (Bogor, Indonesia: CIFOR, 1998)

<sup>239</sup> Brunner and Ekoko, *Cameroon*.

<sup>240</sup> *ibid.*

provided incentives to clear additional land for coffee and cocoa plantations. Abrupt removal of subsidies has also led to deforestation as farmers of unprofitable operations were forced to clear additional land for food production. Mitigation of forest loss due to slash-and-burn agriculture has been hampered by a lack of research funding for improving productivity of rain-fed agriculture. Lack of fiscal restraint and insufficient policies promoting economic diversification created conditions that necessitated abrupt removal of agricultural subsidies and liberalization of coffee and cocoa marketing. Additional deforestation resulted when devaluation of the currency encouraged illegal logging in light of reduced spending on forestry enforcement activities.

## **4 Macroeconomic Policy Framework for Reducing Deforestation**

### **4.1 Overview**

The results from the Sri Lankan case study and literature findings on Cameroon and Bolivia suggest that a suitable macroeconomic policy framework to provide incentives to conserve forests need to include explicit incorporation of environmental considerations in government-wide policy-making, be based on the long term, be focused on small-scale development targeted at disadvantaged groups, account for differing temporal and regional considerations, involve diversification, include private market restrictions and be supported by environmentally-friendly economic interventions by the international community.

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<sup>241</sup> Bikie, Collomb, and et al., *An Overview of Logging in Cameroon*.

## **4.2 Incorporation of Environmental Considerations into Policy**

Environmental considerations need to be explicitly taken into account when setting any macroeconomic policies. In Sri Lanka, revaluation of the tariff structures and removal of export duties on tea, rubber and coconut in the 1980s and 1990s were done without regard to environmental considerations.<sup>242</sup> In Bolivia, planning for road construction into the lowlands likely did not take into account the possibility of future mine closures and the risk of unemployed workers clearing forest land along newly paved roads. Incorporation of environmental considerations into policy is dependent on better data collection, improved coordination between government ministries and assigning clear responsibilities to departments best suited to forest protection.

Improved data collection systems are vital to incorporating environmental considerations into policy. In Sri Lanka, the current study was hampered by lack of centralized access to data on macroeconomic policies and statistics (related to agricultural forestry and trade), unsuitable levels of data disaggregation, restrictions on data dissemination, and the lack of regularly updated forestry inventories. Data analysis would be greatly facilitated by centralized data clearinghouses, backed up at multiple locations to safeguard against losses of valuable information, particularly in instable developing countries. Indeed, in Sri Lanka, many documents in the National Library were destroyed during a bomb blast during civil disturbances in the recent past.<sup>243</sup> Development of comprehensive databases (similar to the Sri Lankan Agriculture Department's multi-decadal spreadsheet data on rice production, which is available on

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<sup>242</sup> Kelegama, Ratnayake, and Unamboowe, *Trade and Environmental Linkages in Sri Lanka: Issues and Evidence*.

<sup>243</sup> Sri Lankan Government Official. Interview by author. Sri Lanka, 2004.

the internet<sup>244</sup>) containing present and historic information on agriculture, forestry and trade statistics would help facilitate data analyses to assess long term impacts of macroeconomic policies on deforestation. Public release of data would help leverage highly beneficial studies conducted by foreign researchers at no cost. Finally, increasingly available satellite data needs to be exploited on a regular basis to better correlate macroeconomic policies and shifts in land-use affecting forest cover.

In order that environmental considerations are taken into account during policy setting, increased coordination between Ministries of diverse interests (Agriculture, Forestry, Wildlife, Finance, Customs, etc.) needs to be fostered. In Sri Lanka, current Ministry of Agriculture programs for encouraging small cardamom farmers to switch to alternative crops are consistent with Forest Department efforts to conserve the montane forests of the Knuckles region. However, had greater coordination between the Forestry, Agriculture and Finance Ministries existed in 1965, more explicit accounting for forestry considerations in cardamom promotion would have avoided current difficulties in encouraging the relocation of large plantation owners. Adequate collaboration between Ministries requires adequate funding. For example, budget cuts to MINEF in Cameroon prevented meaningful implementation of forestry measures.

Incorporation of environmental considerations into policy also needs to involve assigning clear responsibilities to government departments best suited to control the causal agents of deforestation. For example, in Sri Lanka, better control of illicit felling on Wildlife Department lands might be achieved by merging the Wildlife and Forest Department. Merging of the departments would enable the government to maintain the

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<sup>244</sup> "Paddy Sown Extent and Harvested 1979-2003," in Department of Census and Statistics, Government of Sri Lanka [database online]. Colombo, Sri Lanka December 30, 2005 [cited January 6, 2006]. Available from <http://www.statistics.gov.lk/agriculture/index.htm>.

professional expertise required to both conserve wildlife and prevent illicit felling, while eliminating ambiguities over enforcement.

### **4.3 Long Term**

Macroeconomic policies that are effective in slowing deforestation need to be based on the long term and evaluated from a long-term perspective. Promotion of agroforestry is a key policy that has considerable potential to simultaneously increase agricultural productivity, while providing wood and reducing deforestation pressures in the long term. Forest plantations and alternative wood sources need to be promoted with a view to reducing future deforestation pressures. Indeed, in Sri Lanka, promotion of forest plantations, the use of coconut and rubber wood, and promotion of trees in homegardens and tea plantations have helped alleviate current pressures on remaining forest. In some cases, certain policies, such as tea subsidies in Sri Lanka, may have little short term effects on deforestation, but may either decrease or increase long-term deforestation depending on the degree to which complementary policies affect in-migration and livelihood changes from chena to tea. For example, in Sri Lanka, a lack of non-protected forest land discourages in-migration, while poor enforcement of forestry laws and granting land tenure to smallholder tea encroachments may set precedents for future forest clearing. In the case of land clearing for rice cultivation and small holding tea in Sri Lanka, increased short-term deforestation may decrease long-term deforestation pressures because of more intensive land use. A smaller parcel of land can support farmers cultivating rice or tea compared to highland chena crops. In the absence of conversion of forested land to rice or tea land, otherwise productive land may have been compromised had it been degraded by chena agriculture. Furthermore, consideration

should be given to whether long term revenues from deforested areas will provide increased financial resources to support better long term enforcement of remaining forested lands.

Agricultural subsidies and support also need to target the most sustainable type of agriculture that is most profitable in the long run. In Bolivia, alternative types of agriculture would provide a more sustainable and long term flow of income than the currently highly soil degrading commercial soybean production.<sup>245</sup> In Cameroon, although subsidies for cocoa resulted in additional land clearing for cocoa production, increased incidence of disease prevented cocoa production from increasing and thus minimized the stimulatory effect of subsidy-spending on government cocoa revenues.<sup>246</sup> Rather than subsidizing the best-known source of agricultural income, it would have been better to conduct studies into other crops better-suited to the climate and soils. For example, in Sri Lanka, coffee plantations in the early colonial period suffered because of disease, but tea plantations were found to be much more resilient and profitable. In addition, unlike alternative agricultural activities, such as potato farming, well-managed tea cultivation is associated with minimal erosion.<sup>247</sup> In the event that subsidies are used to assist farmers, geographic limits should be place on eligibility to ensure that limited government resources are not expended on encouraging expansion onto marginal lands or forest reserves. Sri Lanka has achieved some success in conditioning receipt of tea and cardamom subsidies on land titles to ensure subsidies do not encourage expansion into protected forests.

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<sup>245</sup> Pacheco, *Country Profile for the Forum on The Role of Forestry in Poverty Alleviation: Bolivia*, 1-55.

<sup>246</sup> Ousseynou and Kaimowitz, *Macro-economics, markets and the humid forests of Cameroon, 1967±1997*, 225-253.

<sup>247</sup> Ministry of the Environment and Natural Resources, Government of Sri Lanka, *State of the Environment in Sri Lanka* (Colombo, Sri Lanka: Government of Sri Lanka, 2001).

Susceptibility of agriculture to disease also illustrates the importance of implementing policies that are pro-active in ensuring the on-going viability of agricultural activities. Policies need to be implemented that permit on-going research to increase productivity and ensure sustainability in the long-term. For example, Sri Lanka's Tea Cess on tea exports is an important means of re-investing profits into research to maintain and increase productivity.

In many cases long time horizons are required for the effects of macroeconomic policies on forest cover to be observed and distinguished from short term anomalies caused by other factors. Implementation of alternative livelihoods requires long time horizons to see impacts. For example, the development of Sri Lanka's garment industry began in 1972 with the 5 Year Plan. By 1986, the garment and textile industry displaced tea as the leading export earner.<sup>248</sup> The garment and textile industry currently provides a much more profitable alternative to chena and other types of farming in many districts.

A long term approach to development would also include more investment in research and development of new technologies, particularly those that increase food production for small peasant farmers. In Sri Lanka and Cameroon, forest loss to slash-and-burn agriculture has occurred in the absence of significant government funding for the development of advanced technology that could extend the slash-and-burn cycle and reduce deforestation pressures.<sup>249,250</sup> Similarly, policies are needed to increase farmer access to financial markets in countries, such as Cameroon, where poor access to credit

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<sup>248</sup> Ross and Savada, *Sri Lanka - A Country Study*.

<sup>249</sup> Ministry of Forestry and Environment, Government of Sri Lanka and World Bank, *Economic and Environment Linkages in Land Use for Irrigated Versus Rainfed Farming in the Dry Zone*.

<sup>250</sup> Ousseynou and Kaimowitz, *Macro-economics, markets and the humid forests of Cameroon, 1967±1997*, 225-253.

may be a contributing cause to on-going reliance on slash-and-burn agriculture.<sup>251</sup>

Governments could either provide credit directly or back-up private financial institutions to encourage lending to high risk farmers. Promotion of education is a key to the take-up of emerging technologies required for sustainable agriculture. In Sri Lanka, the very low illiteracy rate is likely a major factor for the observed widespread adoption of many agricultural techniques (such as garden and paddy irrigation, terracing of land and tree planting), which are sometimes neglected in other developing countries.

Macroeconomic policies also need to be based on long-term economic forecasts of commodity prices, natural resources, revenues and expenditures. Failing to account for the short-term oil boom and limited domestic oil reserves resulted in excessive increases in Cameroonian government spending that ultimately led to the environmentally-detrimental SAP program.<sup>252</sup> To avoid the difficulty faced by Cameroon in needing to suddenly reduce the size of its bureaucracy when oil prices dropped, any expansion of the public sector needs to be consistent with long-term economic projections.

It is imperative that long term policies seek to increase the well-being of the rural poor to avoid future deforestation linked to abrupt colonization projects. In Bolivia and Sri Lanka minimal access to agricultural subsidies due either to insufficient agricultural funding or a lack of complementary policies (focused on improving transportation and development of private market systems), prevented farmers' welfare from increasing. Persistent rural poverty likely led to large-scale migration to urban centers with insufficient capacity to sustain long-term employment for migrants. For example, in

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<sup>251</sup> Schuck, Nganje, and Yantio, *The role of land tenure and extension education in the adoption of slash and burn agriculture*, 61-70.

Cameroon, the government bureaucracy, which had grown substantially during the oil boom, was forced to significantly downsize after implementation of the SAPs, resulting in large-scale urban unemployment. In countries such as Bolivia and Sri Lanka, this large unemployed urban class caused intense political pressure for large scale colonization projects that resulted in considerable deforestation.<sup>253,254,255</sup> Funding for large-scale projects necessitates foreign financing often linked to natural resource extraction. Thus, in Bolivia, rather than pursuing colonization in less ecologically sensitive areas, the government promoted colonization in the forest regions, which had been opened up through IMF and World Bank financed roads for logging, mining and energy production.<sup>256</sup>

#### **4.4 Small-Scale Targeted Development**

The case studies suggest that development needs to be both small-scale and explicitly targeted to disadvantaged groups to reduce deforestation pressures. In many cases, it was large-scale projects, such as colonization projects and the promotion of mechanized commercial soybean farming in Bolivia, or promotion of cardamom cultivation and the Mahaweli Development Project in Sri Lanka that directly or indirectly resulted in large-scale deforestation. Moreover, in many cases the large-scale projects either failed to implicate the poor or did not reduce those living under the poverty line. Many developing countries do not have the financial resources and institutional capacities required to ensure large-scale projects do not compromise forest resources. In

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<sup>252</sup> Ousseynou and Kaimowitz, *Macro-economics, markets and the humid forests of Cameroon, 1967±1997*, 225-253.

<sup>253</sup> World Rainforest Movement, *The Direct and Underlying Causes of Forest Loss*.

<sup>254</sup> Bikie, Collomb, and et al., *An Overview of Logging in Cameroon*.

<sup>255</sup> Gunatilleke, *Development and Liberalization in Sri Lanka: Trends and Prospects*.

<sup>256</sup> Pacheco, *Deforestation and forest degradation in lowland Bolivia*.

Bolivia, poorly maintained roads and insufficient government technical support for the large numbers of colonists unfamiliar with suitable cultivation practices in the tropical lowlands contributed to rapid abandonment of plots and provided incentives for additional forest clearing. Promotion of commercial soybean farming in Bolivia and cardamom cultivation in Sri Lanka did not provide peasants with new land and primarily served to benefit rich businessmen and immigrants. In Sri Lanka, the Mahaweli Development Project involved distribution of paddy land to peasants, but widespread poverty has been shown to persist on Mahaweli lands.

In contrast to the impacts of the Mahaweli Development Project, small rice paddy development projects involving restoration of ancient reservoir systems and rehabilitation of existing irrigation schemes have likely improved farmer welfare while having minimal impact on forest loss. Smaller scale projects involving more modest government spending are also less susceptible to economic shocks. Indeed, Cameroonian coffee and cocoa plantation workers were forced to switch livelihoods in the late 1980s as a result of a sudden drop in subsidies and closure of marketing boards.<sup>257</sup>

Highly profitable short-term development projects involving prawn farming in Sri Lanka, soybean farming in Bolivia and timber extraction in Cameroon have been related to high corruption and opportunism, and low public accountability and long-term sustainability. In contrast, corruption in the smallholding tea sector in Sri Lanka appears limited. Development projects of more modest returns and longer time horizons would minimize corruption and opportunism associated with large high-budget quick-fix development projects because of the relatively high risk and low returns associated with

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<sup>257</sup> Ousseynou and Kaimowitz, *Macro-economics, markets and the humid forests of Cameroon, 1967-1997*, 225-253.

attempting to profit over the long term from relatively modest year-over-year project budgets. As countries develop, and as accountability structures become better established, countries may be able to support development projects of increasing scale and shorter time horizons without excessive corruption and opportunism.

Due to their greater political leverage, the rich are usually able to benefit the most from large development projects. However, many smaller development projects involving large numbers of poor rather than fewer larger development projects involving the rich are also likely to be more sustainable and exert less deforestation pressures. In contrast to rich soybean plantation owners in Bolivia, poor chena cultivators and smallholder tea farmers in Sri Lanka did not respond to subsidies by clearing additional forest due to capital and labor constraints not present in the large organized private sector. Furthermore, compared to large plantation farmers, small scale farmers may be more resilient to economic shocks, and more productive and environmentally friendly in the long term. In Bolivia, in contrast to large industrial farms, small peasant farms have shown little variation in the cultivated extent in response to changes in global commodity prices or the economic well-being of Bolivia or its trading partners.<sup>258</sup> In Sri Lanka, productivity of smallholder tea exceeds that of tea plantations by greater than 30% and unlike productivity of the plantation sector which has stagnated, the productivity of smallholders has an overall upward trend.<sup>259</sup> The reason for the greater resilience, environmental-friendliness and productivity of smallholders compared to plantation owners may be due to smallholders' greater commitment to the land, incentive to produce, and constraints on shifting livelihoods. In the absence of government support

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<sup>258</sup> Hecht, *Soybeans, Development and Conservation on the Amazon Frontier*, 375-404.

<sup>259</sup> Tea Small Holder Development Authority, *TSHDA 2002 Annual Report*.

for tea smallholders in the lowlands there may have been pressure to expand tea plantations, which would have caused more deforestation than smallholder tea.

Policies also need to be targeted to disadvantaged groups who cannot take advantage of dominant development trends. For example, government investment in technology development for more productive highland farming in Sri Lanka could help reduce deforestation pressures from farmers who, due to locality or particular personal constraints, are unable to take advantage of rice paddy development. Similarly, promotion of light industry in rural areas would provide alternative sources of income to farmers who might not be able or willing to move to urban areas due to social or economic reasons. In Sri Lanka, rural garment factories, which were promoted by the government in the early 1970s, reduced deforestation pressures by providing alternative livelihoods to chena agriculture. Although the more cost competitive nature of urban-based factories have led to a gradual closing of many factories farther from the capital of Colombo, the government could provide additional tax incentives to rural factories and increased investment in transportation infrastructure to minimize the competitive disadvantage of rural factories.

In addition, policies aimed at providing alternative livelihoods should, where possible seek to minimize migrations. Provision of alternative urban livelihoods to urban dwellers would help reduce forest pressures induced by sudden influxes of settlers to the forest frontier during colonization projects, such as those in both Sri Lanka and Bolivia. Provision of alternative rural livelihoods to rural peasants would help reduce urban migration and the potential for large numbers of urban unemployed, who are the drivers for future colonization projects. In order to provide alternative lifestyles to rural peasants, the government needs to provide bounds on the operations of large

multinationals. Either the number of multinationals need to be limited or guidelines need to be developed for local environmental consultations and regional employment. In part the failure to diversify non-agricultural rural employment in Bolivia is linked to a forestry strategy that favors large commercial-scale operators over smaller community forest operations.

Development also needs to involve education of the poor concerning their livelihood options. In some cases peasants, whose advice would be readily accepted in rural settings, could be used for awareness raising campaigns. For example, educational programs employing bankrupt former prawn farmers, and highlighting the high risks and dubious long-term profitability of prawn farming in Sri Lanka, would help discourage illicit conversion of mangroves to prawn farms. However, educational programs need to be complemented by special alternative livelihood programs. In coastal regions of Sri Lanka, peasants lacking the means to purchase their own land for chena could be implicated in intensive vegetable gardening operations, managed fisheries or small-scale industrial developments.

#### ***4.5 Temporal and Regional Considerations***

In some cases the effects of macroeconomic policies may vary depending on the time period and level of overall country development. For example, in Sri Lanka, the benefits paddy farmers have received from price support schemes in the past have been limited by poor access to markets. The benefits accruing to poor paddy farmers may increase as roads and the private sector develop. Indeed, in wetter regions of Sri Lanka, better roads, expanded private sector transportation and economies of scale have helped smallholder tea farming to become more profitable. Deforestation pressures will

probably change as the welfare of farmers changes. The macroeconomic policy framework in the past that was effective in minimizing deforestation may need to change to respond to sudden changes in the economy. For example, in the absence of agricultural subsidies for increased forest production in the non-forest zone, increased demand for food during Cameroon's oil boom of 1976-1984 would have resulted in increased land clearing for food in the forest zone.<sup>260</sup> Extenuating circumstances, such as civil war that render policies (such as timber licensing in Sri Lanka) ineffective need to be accounted for in the evaluation of past policy frameworks.

The effect of macroeconomic policies also needs to take into account changes in the availability of alternative more profitable lifestyles and the ease of changing lifestyles. For example, in Puttalam district of Sri Lanka, the negligible benefit of removing agricultural subsidies on chena-related forest loss could increase dramatically if garment factories or other alternative industries were to be promoted in the district.

The changing nature of the impact of macroeconomic policies on deforestation highlights the need to base policy decisions, such as the scaling back of farmer price support systems, on projections rather than past economic conditions.

Macroeconomic policies need to account for differing regional impacts. Policies may affect regions differentially, depending on the prevailing economic and social conditions. For example, in Sri Lanka, trends in cultivated extent of chena crops during the period 1970-1998 differed substantially between regions. Regional differences in the highland crop mix and availability of alternative livelihoods may have resulted in different responses to macroeconomic shocks and changes in agriculture support

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<sup>260</sup> Ousseynou and Kaimowitz, *Macro-economics, markets and the humid forests of Cameroon, 1967±1997*, 225-253.

provided to farmers. The dependence of macroeconomic policy effects on prevailing conditions may also limit the degree to which lessons learnt in one country may be applied to other countries.

#### **4.6 Diversification**

Lack of economic diversification has contributed to volatile economies in both Cameroon and Bolivia. Heavy reliance on exports of logs, petroleum, minerals and cash crops, such as coffee, cocoa, tea, sugar, cotton and soybeans, have made the economies of these countries extremely susceptible to large fluctuations in commodity prices.

Economic volatility has played a key role in driving deforestation in Cameroon and Bolivia. Economic volatility has led to large foreign debts and subsequent structural adjustment programs (SAPs) that have increased rural poverty and reduced the capacity for forest conservation.

Diversification of the economy in general and the forest sector specifically need to be pursued to prevent sudden changes that cause deforestation. In Sri Lanka, a combination of timber plantations, periodic extraction of old coconut and rubber plantation trees, and homegardens, has helped provide a relatively diverse wood supply that minimizes adverse impacts of civil war or economic shocks on natural forests.

Policies also need to seek to diversify the economy from primary extraction industries to secondary manufacturing industries to reduce pressure on natural resources, provide more economic stability and create more jobs for a wider cross-section of the population. Increased output in the manufacturing sector would help reduce dependence on imports, provide better export returns and favor balanced budgets. An economy less focused on extractive resources, such petroleum and timber in Cameroon and soybeans in

Bolivia, would be less susceptible to volatile commodity prices and economic shocks. An economy focused more on manufacturing would also provide more jobs while reducing reliance on rapid natural resource extraction compared to an economy focused on primary extraction. The garment industry in Sri Lanka is reducing pressure from activities that indirectly affect deforestation by providing a more profitable alternative lifestyle to chena and rice farming. However, even in Sri Lanka there is more need to diversify into other manufacturing sectors to make the economy less susceptible to changes in the global market. Greater Asian competition resulting from expiration of the Multi-fibre Agreement at the end of 2004 has resulted in closures of many garment factories in Sri Lanka.<sup>261</sup>

#### **4.7 Private Market Restrictions**

In recent years, development models have shifted away from largely state controlled economies to open market systems. Shifts towards stronger private sector involvement in the economy need to be accompanied by private market restrictions to regulate both foreign and domestic abuses, which may lead to environmental harm.

Private market restrictions are required to limited abuses linked to foreign trade. Foreign investment can be an important driver of sustainable development if domestic conservation initiatives do not suffer as a result of political interference by multinationals or international trade. In Cameroon, French logging companies prevented the implementation of new forestry legislation to eliminate discretionary logging practices, and in Sri Lanka, businessmen linked to the lucrative international prawn trade, impeded

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<sup>261</sup> "Off the Peg: Tesco and the garment industry in Asia," in Corporate Watch [database online]. Oxford, UK June, 2005 [cited 2006]. Available from <http://www.corporatewatch.org.uk/?lid=1825>.

judicial action against illegal clearing of mangroves.<sup>262,263</sup> To combat foreign political interference, an international treaty could be signed to establish an international ecological ethics tribunal to investigate allegations of foreign corporations' interference in national conservation objectives. A fund, financed by a tax on all internationally traded commodities, could provide a resource to national NGOs seeking to bring claims before the tribunal. Reports on the political involvement of corporations could be published annually to make corporations accountable to shareholders and provide an incentive for ethical business practices.

Private market restrictions are required to ensure that development does not directly or indirectly provide incentives to clear land. Government restrictions on free land distribution and unregulated access to land by large corporations are needed to avoid land speculation and consolidation of large commercial farms that forces poor farmers to clear forested land, as was the case in Bolivia. If investment by large corporations is promoted, complementary policies need to be implemented to ensure that corporations' market power does not inadvertently affect rural peasants. For example, in Bolivia, the land shortage which arose from land speculation following free land distribution, road-building and tax incentives for soybean production,<sup>264</sup> could have been avoided by mandating soybean production within a specified time limit and regulating maximum parcel sizes held by any corporation.

Other laws need to be enacted to prevent the establishment of private monopolies that aggravate rural poverty and deforestation pressures, as was the case in Sri Lanka. Strong anti-competition legislation needs to be implemented and enforced to prevent

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<sup>262</sup> Bikie, Collomb, and et al., *An Overview of Logging in Cameroon*.

<sup>263</sup> Sri Lankan Government official. Interview by author. Sri Lanka, July 2004.

<sup>264</sup> Pacheco, *Country Profile for the Forum on The Role of Forestry in Poverty Alleviation: Bolivia*, 1-55.

monopolization of the retail trade of farm inputs and imported subsistence goods and the supply of credit. Guidelines need to be established to ensure reasonable rates of interest and a minimum percentage of credit is provided to small-scale farmers to help prevent farmers from mortgaging out their entire land to a few rich owners. Increased policing and stiffer legal action need to be taken to prevent forcible obstruction of competing transportation companies.

Additional legal measures are also required to combat illegal business and political activities, such as falsified land deeds and political interference in Forest Department court proceedings in Sri Lanka, illegal logging in Cameroon, and concerns about bribery of community leaders in Bolivia. Licensing of the sale and transportation of wood, coupled with numerous road checkpoints in Sri Lanka have been demonstrated to be effective in deterring large-scale illegal cutting of forest. Institution of an independent forestry ombudsman could complement licensing and checkpoints as a means to bringing to light illegal actions and reducing corruption. The forestry ombudsman would be responsible for auditing Forest Department enforcement activities and releasing findings to the public. Periodic publishing of findings concerning discrepancies between forestry infractions and cases brought to court, questionable court proceedings, inconsistencies in land deed records and flawed land auctions could help hold business leaders and politicians accountable to foreign funding bodies interested in conservation efforts and national constituents.

#### ***4.8 Supportive International Economic Interventions***

A suitable domestic macroeconomic policy framework needs to be supported by the international community. In contrast to much of the experience in Bolivia, donors

need to identify explicit measures to ensure that their lending does not exacerbate long-term deforestation. Moreover, donors, including the World Bank need to be discerning about the source and quality of information on which decisions are based. Donors also need to take into account institutional capacities and legal frameworks to ensure that liberalized economies do not lead to increased deforestation, as has happened in Sri Lanka, Bolivia and Cameroon. In the event of suspension of lending, donors should consider on-going collection of data to more readily facilitate robust analyses of sustainability for future lending.

In the event that the World Bank or IMF obligate countries to restructure their economies, potential negative impacts on the environment can be mitigated by involvement of other parts of the international community. In contrast to Cameroon, where the devaluation of the CFA led to increased clearing of forest for timber production, the 1977 devaluation of the Rupee had little impact on the amount of forest cleared for timber export in Sri Lanka because of commercial logging bans that were strengthened through IUCN and World Bank studies, and international recognition of the Sinharaja Forest Reserve as a World Natural Heritage site.

The international community needs to support the development of secondary manufacturing industries in developing countries through foreign direct investment and by opening borders to imports from developing countries. For example, developed country import tariffs on food crops, processed wood products and manufactured goods, have prevented Cameroon and Bolivia from diversifying their economies into other sectors with better long-term income generation potential.

The international community also needs to ensure that SAPs provide enough flexibility so that countries are not forced to implement policies that ultimately lead to

deforestation. SAPs further promoted Bolivian commercial agriculture, which is highly intensive and leaves soils extremely susceptible to nutrient depletion.<sup>265</sup> Many scientists feel that land that is currently highly profitable for soybean production is at considerable risk of becoming degraded pastureland. Similarly, the intensive logging of mahogany in Bolivia is not likely to be sustainable beyond 10-20 years. In both Bolivia and Cameroon, the reduction in government spending under SAPs resulted in a drop in agricultural subsidies and extension services for the rural poor. In Bolivia, policies that increased expanded soybean production only benefited large landowners and excluded the poor from additional access to agricultural lands. Increasing rural poverty has prevented rural populations from having the means necessary to pursue agricultural practices, including intensive agriculture and agroforestry that reduce pressures on forests.<sup>266</sup> Conceptualization of SAPs by donors, such as the IMF and World Bank, needs to account for minimum returns necessary to ensure adoption of the most environmentally sustainable livelihood. In Sri Lanka, ongoing government support for fertilizer subsidies and seed production may be an important means to ensure the profitability and hence preferability of intensive rice farming over more forest compromising slash-and-burn activities. SAPs should also allow enough flexibility for implementation of government-sponsored agroforestry programs. Given the long payback times of agroforestry, government subsidies, such as those for tree planting in homegardens in Sri Lanka, are required to provide conservation incentives to poor peasant farmers who lack the means to forego present day consumption to increase long-term benefits.

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<sup>265</sup> *ibid.*

<sup>266</sup> *ibid.*

SAPs focused on market liberalization need to involve carefully sequenced and phased approaches to allow sufficient time for development of private markets and necessary environmental institutions and laws. In the context of a poorly developed private sector, abrupt liberalization of cocoa marketing in Cameroon resulted in high bean losses and low prices for farmers in rural areas, encouraging shifts to slash-and-burn agriculture. Due to insufficient forestry restrictions, liberalization of the economy coupled with favorable soybean production policies resulted in rapid deforestation in the lowlands of Bolivia.

## **5 Conclusions**

Many developing countries are struggling to conserve their tropical forests. Conservation is critical to reduce biodiversity loss, mitigate climate change and prevent land degradation. However, higher levels of financial resources allocated to conservation are not likely to appreciably affect rates of deforestation unless developing country governments and the international community recognize the impact of macroeconomic policies on deforestation. Using a case study on Sri Lanka and comparing findings to literature on Bolivia and Cameroon, this paper explored the linkages between macroeconomic and sectoral policies and deforestation in order to determine the macroeconomic policy framework conducive to limiting deforestation.

For Sri Lanka, the case study explored the impact of the following macroeconomic and sectoral policies on deforestation: agriculture subsidies, trade and government-sponsored irrigation/settlement schemes. These policies were examined for the predominant proximate causes of deforestation, in particular chena (slash-and-burn

agriculture), irrigation and settlement schemes, illicit felling, smallholder tea, cardamom cultivation and prawn farming.

Agriculture subsidies had no impact on forest loss due to chena (slash-and-burn) agriculture, irrigated rice cultivation, smallholder tea or cardamom cultivation either because access to subsidies was restricted or because labor or land constraints prevented expansion of farms. Expansion of chena into forested areas was attributed to population growth.

Trade protection appears to have favored deforestation through increased cultivation of chena crops at certain times in particular regions, depending on the availability of alternative lifestyles, such as rice cultivation and the garment industry. However, further CGE modeling is required to separate out trade protection as a causal agent of deforestation in light of concomitant changes in other government agricultural policies concerning land ownership, communal versus private modes of agricultural production, and support for rice irrigation schemes.

Insufficient data was collected to evaluate the effects of export restrictions of wood products on deforestation. Other related government policies reduced the impact of timber-related trade measures on deforestation. Relatively abundant supplies of cheap domestic timber obtained from tree plantations, replacement of aging coconut and rubber plantation stands and homegardens have reduced pressures on forests. A logging ban in natural forests and monitoring of transported wood have also discouraged illicit felling. The effects of export duties on tea in reducing deforestation from smallholder tea were difficult to analyze since duties only applied to processed tea and not the green leaf produced by smallholders. Export duties on prawns had little impact on prawn-farming

since taxes were insignificant compared to profit margins. Corruption played a key role in facilitating the clearing of mangroves for prawn-farming.

Explicit government promotion of irrigation schemes was the main government policy that could be directly linked to deforestation. However, by enabling more intensive land-use, irrigation may have reduced future deforestation in light of growing demand for agricultural land. CGE analysis, exploring the linkages between irrigation schemes and chena, is necessary to determine the net impact of irrigation schemes on long-term deforestation rates.

The primary macroeconomic policy driver for deforestation in Bolivia has been government-sponsored settlement schemes for soybean cultivation. Long-term deforestation pressures remain high due to the unsustainability of soybean cultivation and the government's failure to take concrete measures to alleviate rural poverty. A lack of environmental planning and private market restrictions have also led to deforestation loss from logging.

In Cameroon, deforestation has been driven by the introduction and sudden removal of coffee and cocoa subsidies, which have led to the expansion of coffee and cocoa plantations or abandonment of plantations in favor of increased slash-and-burn agriculture. Lack of fiscal restraint and insufficient policies promoting economic diversification created conditions that necessitated abrupt removal of agricultural subsidies and liberalization of coffee and cocoa marketing.

Macroeconomic and sectoral policies, such as agricultural subsidies, trade and settlement schemes, have differed widely in their impact on deforestation in Sri Lanka, Bolivia and Cameroon. Nevertheless, an examination of these policies demonstrates that a macroeconomic policy framework amenable to forest conservation needs to include

explicit incorporation of environmental considerations in government-wide policy-making, be based on the long term, be focused on small-scale development targeted at disadvantaged groups, account for differing temporal and regional considerations, involve diversification, include private market restrictions and be supported by environmentally-friendly economic interventions by the international community.

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