



Draft Liberia Environment and Climate Analysis¹

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Introduction

Liberia is richly endowed with natural resources notably rubber, iron ore, timber, diamonds, and gold. The country benefits from fertile soils and favourable climatic conditions for the production of palm and coffee, among other products. Liberia also has large hydropower potential.

Liberia's political instability and recent civil war caused destruction of livelihoods, infrastructure, productive capacity, and financial resources. Rule of law, political institutions and administrative agencies were virtually non-existent. Past mismanagement of natural resources fueled and sustained civil conflicts.² Rural to urban migration is increasing³ and nearly three quarters for the population live on less than 1 dollar per day.

Economic growth is expected to be largely driven by natural resources sectors. Increased food security and proper management of natural resources is critical in reducing corruption and to increase stability.⁴ The international community can support this process. The government's efforts to improve governance and management of diamonds and timber have made the UN Security Council lift the imposed export ban. Concern for fast economic recovery may come at the expense of long term environmental sustainability.

The Environment and Climate Analysis aims at briefly presenting environmental challenges and opportunities in relation to poverty reduction, conflict and conflict prevention.

¹ This Policy Brief was written as a deskstudy at the request of Sida (att: Anders Hellgren) by Olof Drakenberg and Emelie Dahlberg at the Environmental Economics Unit (EEU), Department of Economics, Göteborg University, as part of Sida-EEU's institutional collaboration on environmental economics and strategic environmental assessment. Comments can be directed to olof.drakenberg@economics.gu.se. The views expressed in this Policy Brief are those of the authors and do not necessarily represent the views of Sida.

² Republic of Liberia, 2006

³ EU, 2006

⁴ Republic of Liberia, 2006

The analysis provides an input to the ongoing process to draft a new Swedish cooperation strategy for Liberia and responds to the Swedish Governments thematic priority of Environment and Climate Change.

The Environment and Climate analysis is a rapid desk study conducted in January 2008. Key sources include the Interim Poverty Reduction Strategy Paper, the EU Country Environmental Profile for Liberia, UNEP's post-conflict assessment and USAID's Post Conflict Liberia: Environmental Security as a Strategy for Sustainable Peace and Development.

It must be emphasized that the civil war has severely reduced data availability. Data reliability is low and figures should be seen as indicative.

Conflict, conflict prevention and the Environment

Environmental insecurity can be defined as “ a condition in which a nation or region fails to effectively govern, manage, and utilize its natural resources and environment, causing social, economic, or political instability that leads over time to heightened tensions, social turmoil, or conflict”.⁵ The description fits well with the insecure situation in Liberia where mismanagement of natural resources such as diamonds and timber has fuelled civil unrest and prolonged the civil war.⁶

Apart from killings, human suffering and the breakdown of institutions and physical capital the war has had a number of impacts on the ecosystems and natural resources. Examples of impacts that constrain economic and social recovery include:⁷

- destruction of electricity system thus increasing use of fuel wood and causing deforestation and loss of biodiversity.
- destruction of water and sewage infrastructure thus increasing water pollution in rivers and along the coast
- destruction of the rule of law increasing illegal logging and hunting threatening biodiversity
- migration and the creation of refugee camps encroaching of forests both directly and indirectly which in turn create conflict with local residents and increases water pollution. Property disputes are also likely to increase as refugees resettle.
- use of landmines thus reducing access to productive lands thus reducing food security and to a smaller extent polluting soils and water
- destruction of oil terminals, ships etc thus contaminating soils and water
- war and instability lead to short sightedness and constrain productive investments

Availability of precious natural resources can thus be a cause of conflict and conflict in itself leads to degradation of livelihoods and natural productive assets. Likewise, investments in the quality of water, lands and forests may increase stability and reduce the conflict risk.

A USAID study⁸ proposes the following components for a strategy to address the Liberia's interrelated environmental security situation.

- Improving the population's access to food and rural livelihoods
- Putting in place a forest concessions regime that benefits the country and its citizens while restoring ecosystem integrity.
- Exploiting mineral resources, particularly diamonds, in a sustainable manner.
- Improving property rights and establishing a sound land tenure policy.

⁵ FESS, 2006

⁶ IPRSP 2006, UNEP 2004

⁷ UNEP, 2004

⁸ USAID, 2006, Post Conflict Liberia: Environmental Security as a Strategy for Sustainable Peace and Development

- Redressing the country's severe income inequality by increasing employment opportunities through the appropriate and sustainable exploitation of natural resources and through other measures.

Key environmental issues

Liberia is within the tropical rain forest belt of West Africa. Most of the country comprises of forest except a narrow strip along the coast where mangrove vegetation alternate with coastal savannah. The climate conditions in the entire country allow the vegetation to develop into a tropical rainforest.

Key environmental issues are i) Natural resources degradation (forestry, land, water) ii) loss of biodiversity (forests, mangroves, marine, ecosystems, wetlands).⁹ See more information below. Climate change is expected to increase vulnerability to natural disasters (floods and storms) and sea level rise can be expected to primarily affect the large coastal population.

Overall, the main causes of environmental degradation include shifting cultivation, uncontrolled logging, fuel wood harvesting, encroachment by human settlement, illicit fishing and unsustainable mineral and sand mining activities.¹⁰ In addition weak property rights, poverty and insecurity create conditions for unsustainable exploitation of natural resources. Diverse land tenure systems cause disputes and constrain investments in agriculture such as soil conservation methods. As previously stated, the civil war with the destruction of infrastructure, institutions, rule of law and the large migration flows has had a detrimental impact on natural resources and ecosystems in Liberia.

Land degradation: Unregulated mining, uncontrolled forestry practices, slash and burn agriculture and human settlement contribute to land degradation. When forests are cleared for logging or agricultural use, particularly in the hilly regions, losses of nutrients and soils are often large thus hampering yields and food security. Fallow periods are often 6-10 years with cultivation periods of only 1-2 years.¹¹ Less than 10% of arable land is cultivated and irrigation is very limited. Agriculture is split into small holdings and commercial plantations. Insecurity, migration and poverty have increased pressure on areas such as along logging roads, at mining spots and along the coastline. Alluvial diamond mining contributes to erosion and contamination of soil and water.

Deforestation: About half of the population lives in or near forested areas. Estimates suggest that Liberia 3,4 million hectares of relatively intact forest and about 2,2 million hectares of poorer forest cover.¹² Between 1,5 -2 % of the forest cover is lost annually mainly driven by commercial logging¹³, shifting agriculture (slash and burn), mining and energy needs.¹⁴ The war increased dependence of traditional fuels and charcoal production contributed to 9% of GDP in 1999 compared with 2% in pre-war times. The civil war created conditions for overexploitation and accelerated degradation of forest resources. Large migration flows with some 500 000 internally displaced persons has created a pressure on forest resources. Lost forests often mean loss of biodiversity. Non timber forest products such as bush meat are important assets for the poor. Mangrove ecosystems are particularly threatened by the search of fuel wood. Mangroves are important breeding grounds for fisheries and serve a number of ecosystem services such as water purification and storm protection.

Water resources: Liberia is richly endowed with water and in general water quality is a bigger problem than water availability. Access to water and sanitation declined substantially during the war. Run offs from mining, soil erosion and insufficient waste management in urban areas contribute to

⁹ EU, 2006

¹⁰ Ibid

¹¹ Ibid.

¹² ITTO, 2005

¹³ According to World Rainforest Movement the production of roundwood increased by a spectacular 1300% between 1997-2001. The export ban reduced deforestation dramatically.

¹⁴ EU, 2006

water pollution. Hydro power generation capacity is reduced due to soil erosion that lowers the water storage.

Marine resources:

Fisheries have long contributed to livelihoods for coastal communities and industrial fishing started in the 1950s. Illegal fishing in Liberia's exclusive economic zone is considered rampant.¹⁵ Coastal fish resources are believed to be fully exploited, while the deep sea fisheries are under exploited.¹⁶ Breeding grounds for fish are threatened by destruction of coastal wetlands and water pollution from households, agricultural run-off, leaking fuel storage, vessels etc.

Climate Change and Natural Disasters risks:

Liberia is prone to flooding but not to drought. In early 2007 a wind storm in Ganta affected 3500 people and flood later in the year affected 17000 along St Pauls River. Casualties are relatively limited. Climate change is expected to result in more extreme weather situations such as heavy rains and drought in West Africa. Heavy rains, storm surges and sea level rise increase erosion and both urban and rural infrastructure are at risk, particularly for the poor. Heavily populated parts of the coast would be affected by frequent inundations and increased coastal erosion. Climate projections overall (particularly related to rainfall) are uncertain and caution is needed when projections are used to motivate investments that are only justifiable if the projections materialize.

Proposed short term adaptation measures include physical protection of important parts of Monrovia. Long term adaptation include improved urban growth planning to avoid settlements in lands likely to be flooded, climate proof new infrastructure investments, wetland preservation and public campaigns to raise awareness of dangers of living in coastal lowlands.¹⁷ It should be noted that research indicate that non climate specific policies such as economic diversification, education, health and investments in soil productivity loss show greater economic benefits and improvements of adaptive capacity than specific climate policies such as development of high temperature resistant crops.¹⁸

Impacts of climate change on Liberian agriculture and forestry are not well researched. Globally timber supply is expected to increase with climate change.¹⁹ Avoided deforestation is a hot topic at the ongoing UN climate convention negotiations and has a bearing on Liberia. Deforestation is a major contributor to climate change (accounting for 20-25% of global green house gas emissions) and it is likely that incentive schemes will develop that compensate for carbon storage in forests. It is critical that such schemes consider needs for forest dependent poor population. Global efforts to substitute fossil fuels with renewables increase pressure on fertile lands and could lead to increases food prices. This could increase incentives for conversion of forests to agriculture and cause deforestation.

Population, health and the environment

The central region of the country is densely populated 200 persons/km² compared with average density of 35 persons/km². Almost one of two Liberians lives in urban centers which is higher than most African countries. Population growth is low, 1,3 % but has recovered since the war.²⁰ About 80% of the population is unemployed and almost as many live on less than 1 dollar per day. In 2001 86% of the rural population was poor and 80% were subsistence farmers. The war has led to massive

¹⁵ FAO, 2008

¹⁶ Wiles, 2003

¹⁷ Ibid

¹⁸ Butt et al, 2006 For reference, the Stern review mention studies that suggest that relatively simple and low-cost adaptive measures, such as change in planting date and increased irrigation, could reduce yield losses by at least 30 - 60% compared with no adaptation

¹⁹ IPCC, 2007

²⁰ EU, 2006

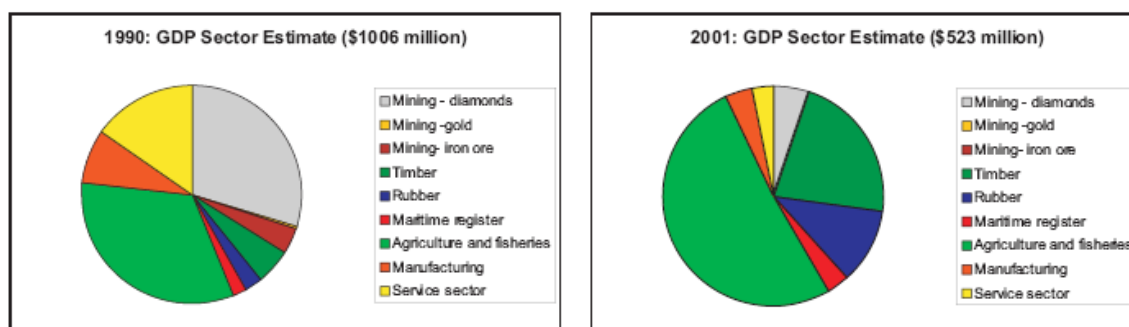
displacements and rural to urban migration is on the rise. Monrovia has doubled in size since before the war. More than 50% of the population in Monrovia is poor.²¹

Only 4% of rural households have access to safe drinking water compared to 25 % of urban population. In Monrovia water supply operates at 11% of its capacity and more than 10% of urban households need the supply by water tanks.²² Only 7% of the rural population has access to improved sanitation compared to 49 % of urban population. The urban figure is likely to be overestimated given that large parts of Monrovia’s sewage is non functional. Garbage collection is minimal thus contributing to water pollution and health hazards.

WHO estimate that 4.300 Liberians die due to diarrhoeal diseases every year which in relative terms ranks Liberia as one of the most affected countries in the world.²³ As 99,5% of the population use fuel wood for cooking in door air pollution is likely to be a leading cause for respiratory diseases mainly affecting children and women. However, due to lack of data no estimates have been made. Diseases reduce time for economic activities, education and contain employability.

Economic growth, the environment and climate change

The Liberian economy is highly natural resources dependent and the rich resources provides opportunities for poverty reduction. The graph below depicts the sectoral contribution of different sectors and highlights the shifts that took place as a result of the civil war. The service, manufacturing sectors were dramatically reduced.



Source: UNEP 2004

Agriculture remains the backbone of the economy accounting for 66 % of GDP (including fisheries²⁴) in 2005. The sector is hampered by falling productivity, cereal production per hectare has fallen with almost 1/3 between 1998 and today.²⁵ Overall, the economy declined by 87% between 1980-2005. Economic growth and employment opportunities have been hampered by the UN ban on exports of timber and diamonds. These were put in place primarily to halt lucrative exploitation of resources for financing the war. Collapse of the timber and diamond trade are estimated to have resulted in losses of 25 000 jobs in timber and 12 000 in diamond. Employment in rubber production has fallen with 4/5 down to 10 000 jobs.

²¹ Republic of Liberia, 2006

²² EU, 2006

²³ WHO, 2002

²⁴ In 2002 fisheries was estimated to contribute 12% of agricultural GDP and 3.2% of the national GDP. Real contribution is higher, considering the reliability of the official data and the rampant illegal fishing going on in Liberian coastal waters. Fisheries play a key role in the livelihoods of the coastal population, and directly employ about 33,000 people using about 3,500 small vessels (canoes). The industrial fishing is operated by about 15 companies using 30-40 licensed vessels. The reported landings of industrial fishing are considered grossly misleading, due to the “complete lack of monitor, control and surveillance”. FAO 2008

²⁵ Republic of Liberia, 2006

In 2006 the UN lifted the ban on timber exports and in 2007 on diamond exports after substantial government reform aimed at improving governance, transparency and collection of resource rents. Improved forest governance, benefit sharing and transparency may reduce the speed of recovery of the forestry sector according to the World Bank.²⁶ This highlights the difficult trade off between long term sustainability of the sector and fast economic recovery.²⁷

During the last couple of years the economy has been growing around 5-8 percent (8,7% estimated growth for 2007). Timber and rubber have been Liberia's main export items since after the war with export earnings of 85MUSD and 57MUSD respectively.²⁸

There is lack of data related to the economic impacts of climate change and adaptation to climate change. More extreme weather is expected to increase the vulnerability of poor residing in areas prone to flooding and infrastructure. It is also likely to increase erosion and negatively impact on agricultural productivity. Vulnerability is a reflection of human capacity to cope with risks or shocks. Wealth, access to technology and societal organisation are important determinants of a country's adaptive capacity. A nation's ranking on the Human Development Index is a proxy for its ability to cope with shocks as it encompasses important aspects like wealth, education and health issues. Due to lack of data there is no recent score for Liberia on HDI but it is likely that the country would be at the lowest end indicating large vulnerability to shocks.

Ultimately, the costs of climate change to Liberia will heavily depend on the success of global mitigation and the country's adaptive capacity. According to the Stern review a temperature rise of 5-6 % would result in costs of 5-10% of global GDP and for poor countries costs in excess of 10%. If mitigation efforts can reduce global warming to 2 degrees at 2050 costs would be substantially lower.

But as previously stated climate change could also offer an opportunity for Liberia to generate funds given the favourable conditions for forestry and carbon sequestration. Both voluntary schemes and mechanisms under the Kyoto protocol offer opportunities but the apparent security situation risk deter investments.

National development plan and institutional capacity and the environment

The interim PRSP from 2006 rests on four pillars and key priorities include revitalizing agriculture, promoting governance and rebuilding economic and social infrastructure. Focus is on the sectors that are likely to recover the fastest: agriculture (including fisheries and rubber), forestry, mining, and urban services.

The strategy considers sustainable use of natural resources and strong environmental management to be crucial for enhancing broad based growth, creating meaningful jobs and reducing poverty. Furthermore the government underlines the link between natural resources, governance, fight against corruption and security.²⁹

The strategy is well articulated in term of the need for institutional strengthening for improved natural resources management and other measures to address poor management of the natural assets that are critical for the livelihoods of the poor including land tenure issues, fisheries management, water and sanitation. Natural resources sectors are also likely to benefit from the strong focus on stability and governance.

²⁶ World Bank, 2007, Joint Staff Advisory Note

²⁷ As required by the law, the Forest Authority has established a panel to review prequalification applications from timber companies and it has adjusted projected revenues from the timber sector from \$5.2 million to \$1.9 million for the period 2007-2008. (UN security council Dec 2007)

²⁸ EU, 2006

²⁹ Republic of Liberia, 2006

The IPRSP primary focus on shorter term issues may explain why climate change risks including natural disaster preparedness are not mentioned in the IPRSP.

Institutional capacity after the war was extremely weak. Most government institutions have become dysfunctional because of lack of qualified staff, lack of resources and lack of financing. The condition of these institutions is further exacerbated by high levels of corruption.³⁰ Lack of clear mandate and activities constrain performance. The government has recently (2003-2006) enacted a new legal framework for sustainable use and conservation of natural resources. Implementation is demanded by sectoral ministries and an Environment Protection Agency has been put in place to coordinate. However capacity is insufficient and limits implementation.³¹ Strong political effort to access export markets for diamonds and timber has resulted in strengthened legislation, reforms and enforcement capacity related to these two sectors. Reform is judged to be needed in the fisheries sector that also suffers from capacity constraints.³²

Liberia is part to the following international environmental conventions; Biodiversity, Climate Change, Climate Change-Kyoto Protocol, Desertification, Endangered Species, Hazardous Wastes, Ozone Layer Protection, Ship Pollution, Tropical Timber 83, Tropical Timber 94, Wetlands. Liberia has signed, but not ratified the following conventions: Environmental Modification, Law of the Sea, Marine Life Conservation

Donor activities in the environmental sector³³

Donor interest for the environment has been limited. The EU is involved in the forest sector (assessments of forest cover, strengthening of forest management etc). The World Bank is involved in pro-poor biodiversity conservation, the Liberia forest initiative etc. UNDP supports the State of Environment report and alternative energy pilot programmes. UNEP supports rehabilitation of refugee camps etc. It should be noted that support to agriculture, water and sanitation, fishery etc are not included in this brief summary of donor activities. One such example is the Swedish support to FAO Sustainable fisheries livelihood programme.

Issues to consider

This brief review has shown that natural resources governance is critical for stability and poverty reduction in Liberia. It also highlights the difficult tradeoffs facing the government balancing the long term sustainable use of its rich resources and the need for short term results to prevent conflicts.

The Government needs stronger institutions across the board. The strengthening that has taken place in order to lift the export bans needs to be maintained. If successful it would both generate revenues for the government, improve resources management create conditions that attract responsible foreign investments in key sectors.

We have outlined a few issues for Sida's consideration and aligned them with the suggested three focus sectors by the Swedish Government; Democratic Governance and the principles of rule of law, Basic social services and Private sector and Trade development. The proposals are intended to serve as input to a discussion within Sida.

³⁰ Corruption in Liberia is perceived to be rampant in Transparency International Corruption Perception Index (score 2,1)

³¹ EU, 2006

³² FAO, 2008

³³ This section builds entirely on the EU Country Environmental Profile (2006)

Investments in water and sanitation provision:

The Liberian population has limited access to basic services such as safe drinking water and sanitation. Provision of water and sanitation and basic waste management may provide opportunities for job creation and visible improvements for the poor.

In line with the focus area Basic social services, Sida could consider support service delivery related to water, sanitation and/or waste management.

Continued support for governance and transparency in the mining sectors:

Transparent and efficient concessions are important for generating employment, foreign exchange earnings and government revenues that can be used for pro- poor investments. In line with the focus area Democratic governance and the principles of rule of law Sida could consider support for governance, transparency and proper use of environmental impact assessment that include broad stakeholder involvement.

Support of forest management and transparency on forest concessions:

The forest sector is a key source of revenue and it is important to make sure concessions are accorded and distributed in a transparent way. Capacity building is needed, in terms of learning more about forest management and provision of technical assistance, for government officials and other stakeholders. In line with the focus area of promoting Private sector and trade development Sida could consider support capacity building for Forest administration to ensure effective implementation of policies to avoid delays. It could also be envisioned to engage in schemes aimed at improving capacity of the private sector to align with forestry requirements.

Improving property rights and establishing a sound land tenure policy:

In Liberia high confusion over land tenure system and unclear ownership rights creates uncertainty and conflict. The lack of land security is a constraint to agricultural productivity. Further, resettlements of IDPs risk increase land conflicts. Clear property rights create incentives for investments increasing productivity. Improving property rights calls for careful design to ensure that the poor are not disadvantaged and should be combined with conflict resolution mechanisms. The private sector is mainly constituted by individual farmers. In line with the focus sector on broad Private sector and Trade development Sida could consider supporting the strengthening of effective land policies to regulate land tenure and land use.

Assessing climate change impacts in planning, foras and development activities:

The key role for government in relation to climate change is to provide high quality information, to undertake land use planning in an effective way and to ensure that major planning and public sector investments take account of climate change.³⁴ In line with the thematic focus on environment and climate change Sida could make sure climate change impacts are assessed in all Swedish sectors and discuss how to enhance the governments capacity to assess impacts of climate change and to spread the information to society.

³⁴ Stern, 2006

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Table 1 Selected indicators

	Liberia	Low income group*
Population	3,3	
Forest area (% of area)	32,7	23,9
Internal freshwater resources per capita	60,915	3,149
Annual change in forest area (2000-2005)	-1,5	0,5
Agricultural land (% of area)	27	45
Access to improved water	61	75
Access to improved sanitation	27	38
Corruption index 2007	2,1	

Source: World Bank, 2007, Little Green Data Book and Transparency International

*Low income group of nations (World Bank)

Table 2 Sectoral origin of GDP at current prices (MUSD)

Sector	2001	2002	2003	2004	2005
Agriculture	240.8	275.3	236.2	267.5	298.5
Rubber	54	59.12	43.9	71	89.6
Coffee	0.1	0.2	0	n/a	0.1
Cocoa	1	0.4	0.9	3	3.8
Rice	66.8	73.3	53.6	85	85.7
Cassava	39.6	48.3	49.9	32.3	33.3
Others	79.3	93.3	87.9	84.3	86
Forestry, hunting, gathering & fishing	152.3	154.2	95	101.5	105.8
Logs & timber	108	106.7	59.7	61.1	64
Charcoal & wood	39.2	40.7	31.2	34.4	35.5
Mining & quarrying	8.5	0.3	0.3	0.3	0.3
Iron ore	n/a	n/a	n/a	n/a	n/a
Gold	0.3	0.3	0.3	0.3	0.3
Diamond	0.1	n/a	n/a	n/a	n/a
Manufacturing	24.8	26.5	15.2	26	32.9
Cement	9.3	9.9	5.7	15	20.7
Beverages	15.5	16.5	9.5	11	12.2
Others					
Tertiary	106.6	107.6	88.7	126.1	143.2
Transport & telecommunication	28.4	30.1	28.1	33.2	39
Trade, hotels, etc	20.1	21.4	20.7	22.9	29.2
Construction	9	11	8.4	17	18.8
Financial institutions	15.4	11.6	9	11	13.4
Energy (water, electricity, etc.)	2	2.1	2	3.9	4.5
Government services	19.8	21.2	13	24.4	24.3
Other services	11.9	12.3	7.5	13.7	14
Discrepancy	3	3.2	2.8	2.9	3.1
GDP at current prices	521.9	560.7	432.6	493.5	543.4
Per capita	200.7	207.7	153	170.1	181.1
Real GDP % change	4.8	7.8	-23.5	14.6	10.1
Population (projected)	2.6	2.7	2.8	2.9	3

Source: MPEA/IMF 2005

Table 3 Top natural disasters

Disaster type	Date	No Affected
Extreme Temperature	1990	1,000,000
Epidemic	25-Jun-2003	17,561
Flood	26-Aug-2007	17,000
Flood	17-Sep-1998	5,000
Wind Storm	21-Mar-2007	3,500
Wind Storm	11-Aug-1995	2,000
Epidemic	1-Jan-1980	1,887
Epidemic	Aug-2003	1,857
Epidemic	2-Aug-2005	674
Epidemic	1-Jul-2002	661

<http://www.emdat.be/Database/CountryProfile/countryprofile.php#summtable>