



Cambodia Environmental and Climate Change Policy Brief¹

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This Policy Brief aims to summarise the key environmental and climate change problems and opportunities for Cambodia, related to poverty reduction and economic development and the Swedish government's thematic priority Environment and Climate which includes four focus areas; (i) climate change adaptation, (ii) energy, (iii) environment and security, and (iv) water. It is worth noting that it has been difficult to find robust environmental data for Cambodia; where data is available there are variations between different sources. If no other source is stated, the main reference is the EC Country Environmental Profile (2005).

Table of contents

Executive Summary.....	1
1. Introduction	2
2. Key Environmental Problems, their Causes and opportunities	3
2.1 Key environmental problems and their causes	3
2.2 Opportunities	6
3. Effects of the environmental problems.....	7
3.1 Impact on poverty (vulnerability, security)	7
3.2 Impacts on Economic Development.....	10
3.3 Impacts on Public Health.....	12
4. What are key actors doing to manage the environmental problems?	13
4.1 Key actors	13
4.2 Environmental mainstreaming of national and sector strategies	13
4.3 Gaps and overlaps.....	14
4.4 Other actors	15
5. Governance and implementation	15
6. What are the implications for Swedish Development Cooperation?.....	17
6.1 Conclusions	17
6.2 Issues for Sida to consider	18
References	21
Annex 1. Indicators for sustainable development Cambodia	23
Annex 2: The Millennium Ecosystem Assessment	24

Executive Summary

Cambodia's economic growth has been high the last decade, resulting in improved living conditions. However, poverty is still widespread and mainly a rural problem. Corruption, abuse of power, and weak governance, constitute major challenges to economic growth, poverty reduction and sustainable management of natural resources.

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The key environmental problems in Cambodia include habitat loss and declining biodiversity (in particular destruction of mangrove swamps and declining fish stocks), deforestation, land degradation, and natural hazards and disasters e.g. floods and droughts. Climate change is expected to increase the frequency and intensity of extreme weather events such as floods, droughts and windstorms as well as coastal inundation due to sea-level rise.

Cambodia's (rural) poor depend disproportionately on public goods for their livelihoods, so declining quality of, or access to, natural resources affects the poor heavily. The poor are more vulnerable to external shocks due to limited asset base (including natural capital), livelihood opportunities and lack of access to decision-making, and have less ability to adapt to environmental changes such as climate change. The main environment-related security issues in Cambodia are related to degradation of ecosystems, unreliable access to food and water, lack of secure tenure to land, lack of access to resource-based safety-nets such as goods and services from ecosystems (forests, fish, etc), low ability of households to accumulate assets including natural capital, pollution, and existence of conflicts over resources.

Cambodia has fuelled its economic growth by drawing on its natural resource assets, but at the cost of deteriorating these same assets. The natural resources are not managed in a sustainable way, which jeopardises long-term economic growth and poverty reduction. On the other hand, if the natural resources were sustainably managed and state revenues re-invested for development (infrastructure, education, health, etc.), there are opportunities for improved productivity, sustained economic growth, employment, and improved livelihood options. Sustainable management of newly discovered reserves of oil and gas will be crucial to ensure that economic exploitation of these resources contributes to poverty reduction and does not lead to environmental degradation.

Environment and climate change is a thematic priority for the Swedish government and should always be integrated into Swedish development cooperation. This review shows that there are many important linkages between environment (including climate change) and the sectors Sweden supports, namely democratic governance, human rights, and education.

1. Introduction

Cambodia emerged in the beginning of the 1990s from decades of conflict, as one of the poorest countries in the world. Thereafter, the country's economic growth has been high², especially during the 2000s, and the living conditions have improved. Poverty is, however, still widespread: 34% of Cambodia's population lives on less than \$1/day, and 78% below \$2/day.³ Cambodia is largely a rural economy with a young population: 85% of its total population of around 14 million people (2008) are living in rural areas and employed in agriculture.⁴ Over half of the population is less than 21 years old, and the population growth is high (1.8%, 2009 estimates). The major economic challenge for Cambodia over the next decade will be creation of enough jobs to handle its demographic imbalance.⁵ The population lacks education and literacy rates are low, especially for women (57% compared to 79% for

² Between 1996 and 2004 the annual growth averaged 7.8%, and in 2005 and 2006 the economic growth was 13.5% and 10.8% respectively (ADB, 2007).

³ Cambodia has a Human Development Index value of 0.598 and is ranked 131 out of 177 countries (HDR 2007/2008). Cambodia is a "medium human development" country, at the same level as Lao PDR (rank 130) and Myanmar (rank 132).

⁴ RGC MTR, 2008

⁵ CIA The World Factbook.

men); the population also lacks productive skills, particularly in the poverty-ridden countryside, which suffers from an almost total lack of basic infrastructure.

Corruption⁶, abuse of power, and weak governance, constitute major challenges to economic growth and poverty reduction. Land grabs and other abuses by the elite are common, trees are illegally logged, and mines are exploited. The government does not fully respect freedom of speech and human rights conditions are deteriorating.⁷ The HIV/AIDS prevalence is high and although progress has been made in reducing the prevalence (from 3.2% in 1997 to 1.6% in 2007)⁸, HIV/AIDS remains one of the major development challenges in the country.

2. Key Environmental Problems, their Causes and opportunities

Cambodia has a monsoon climate with three seasons: a rainy, a dry, and a cooler season. The temperature variations are, however, small. The intensity and duration of the rains vary markedly from year to year and have a pronounced effect on agricultural production. The terrain is mostly low, flat plains, with mountains in the southwest and north. The most important natural resources in Cambodia are land and water, timber, minerals, and (newly discovered) oil and gas. Cambodia also has a large hydropower potential.

2.1 Key environmental problems and their causes

The key environmental problems (further described below) in Cambodia include habitat loss and declining biodiversity (in particular destruction of mangrove swamps and declining fish stocks), deforestation, land degradation, natural hazards and disasters e.g. floods and droughts, and water pollution. Climate change is expected to increase the frequency and intensity of extreme weather events such as floods, droughts and windstorms, as well as the problems associated with sea-level rise.⁹

Loss of ecosystem services and biodiversity: Cambodia is endowed with a rich biodiversity. Its natural resources, complex hydrological regimes, and diverse ecosystems provide a wealth on which a majority of the population depends. The Tonle Sap River and Lake are examples of important ecosystems that for instance regulate the floodwater from the Mekong River and provide enormous fishing potential. The livelihoods of a majority of the people living in the rural areas around the Tonle Sap Lake depend on the annual flood pulse and the resources it enables.¹⁰ The regular flooding provide important breeding and feeding grounds for fish and other species and is crucial for the continuous provisioning of fundamental ecosystem services for human welfare (see Annex 2). The Tonle Sap floodplain has been given the status of international biosphere reserve. There is evidence of declining productivity of Cambodia's fisheries due to overfishing and destruction of critical habitats including flooded forests and by drainage of wetlands.¹¹ Besides leading to overexploitation of its resources, the mismanagement and corruption is undermining food security, human rights and basic social needs, and is failing to deliver fiscal income from the fishery sector.

⁶ Cambodia scored 1.8 in Transparency International's 2008 Corruption Perception Index, and was ranked 166 out of 180 countries.

⁷ The Freedom House, Map of Freedom 2008: www.freedomhouse.org

⁸ The BODY – The complete HIV/AIDS resource: <http://www.thebody.com/content/art40375.html>

⁹ RGC NAPA, 2006.

¹⁰ TKK & SEA START RC 2009.

¹¹ The size of inundated forests has been reduced through fuel wood harvesting and conversion of land to agricultural use, resulting in the reduction of the yields of fish in lake. Tonle Sap becomes shallower due to increased sedimentation, which may cause floods to the areas around the lake.

Other biodiversity threats include increasing population; deforestation; low levels of public participation in decision making; natural disasters; climate change; loss of habitat through overexploitation of biological resources; wildlife trade; water pollution; unsustainable agricultural practices; and weakly implemented policies.

Deforestation: The forests in Cambodia provide important livelihood opportunities and ecosystem services, including climate regulation and water purification, and help to regulate water flow in one of the world's largest river basins, the Mekong. Although deforestation rate in Cambodia has decreased during the past few years due to efforts to pursue a forestry reform, it remains high. Between 1990 and 2005 the annual average deforestation rate was 1.4% - almost three times the global average.¹² In total, the forest cover has decreased by 15% since the 1970s and currently, approximately 59% of Cambodia's total land area is covered by forests (some 10.6 million hectares). Deforestation and associated loss of biodiversity undermine the resilience of the forest ecosystem to threats such as disease and climate change. The main causes of deforestation are illegal logging (up to 94% of the total deforestation is estimated to be illegal¹³), increased demand for fuel wood¹⁴ and charcoal, a lack of transparency in the concession system and unsustainable harvesting by concessionaires, poor management, demographic pressure including expansion of agricultural land due to an increasing population, new human settlements, and land grabs. Since road access is a strong driving force for deforestation and new roads have been built into the northeastern parts of Cambodia there is a clear risk for accelerating deforestation. One of the major challenges in combating deforestation in the country is the corruption issue. Corruption has greatly hindered the efforts to conserve the protected forests and natural parks.

Land degradation: Cambodian soils tend to be of low fertility and the agricultural productivity is largely dependent on deposition of silt from annual floods, the use of animal manures, and by rotational systems in the uplands. Soil infertility has been recognised as one of the most serious constraints to crop yield improvement in Cambodia. Land degradation is a growing concern and soil erosion is a major problem. The main causes of erosion are deforestation and unsustainable agricultural practices, which pose a risk to food security. Furthermore, overuse of pesticides is a growing and serious threat to food security, human health and pollution to land and water. Agricultural expansion is limited by the presence of an estimated 4-6 million landmines, which are estimated to restrict access to 40% of the arable land.

Water pollution and scarcity: Fresh water resources are abundant in Cambodia but, ironically, water shortages are common all year around.¹⁵ Although national water-related activities are not well developed, Cambodia is vulnerable to upstream water activities, and construction of dams in the Mekong River will have large effects on the flood pulse, fisheries, and agricultural productivity.¹⁶ Poorly planned water infrastructure projects have large effects

¹² The deforestation rate of 1.4% in Cambodia can be compared with the East Asia & Pacific group average of 0.1% (WB, 2008) or a global average annual deforestation rate of 0.5%.

¹³ EC Cambodia Strategy Paper 2007-2013.

¹⁴ Although the vast majority of the rural population rely on wood fuel to meet their energy needs (with an average consumption of approximately 3 m³ per family and year) it is not evident that the poor contributes most to deforestation (Bradely, 2009; Dasgupta et al., 2003.)

¹⁵ Interviews held with 684 households in 17 provinces, showed that 81% of the households interviewed suffered from water shortages for agricultural uses, while 54% suffered from water shortages for personal uses (RGC NAPA 2006).

¹⁶ TKK et al., 2009

on downstream communities. Industrial point-source pollution to water is a minor problem in Cambodia, due to the low level of industrialisation, and the chemical quality of most urban and rural drinking water sources is generally good. However, naturally occurring arsenic in (about 9% of the) groundwater sources has been detected at levels above the WHO guideline value in five of thirteen provinces. Furthermore increased use of agrochemicals poses an escalating threat to both surface and groundwater quality. *Marine and coastal ecosystems* (including mangroves) are threatened by charcoal mining, shrimp aquaculture, and offshore oil and gas development, shipping and hotel business and by future sea-level rise.

Natural hazards and disasters: Floods (and occasional droughts and windstorms) are quite frequent in Cambodia and appear to be increasing since 1989 after which statistics are available. For example, the flooding in 2000-2002 was the worst in recent history, resulting in a high number of internally displaced people, hundreds of deaths and economic losses. Deforestation and soil erosion exacerbates problems from flooding, and as deforestation continues the supply of water will become less regular and increased flooding could put the Phnom Penh population in danger.¹⁷ In many cases it is the unpredictability of the floods (e.g. floods coming at unexpected times of year) that causes problems, rather than the flood itself, as communities are in many cases well adjusted to responding to, and benefitting from, seasonal flooding.

Climate change: Cambodia contributes little to climate change but will be affected by its impacts. Although Cambodia is not highly exposed to climate hazards (except the Mekong Delta on the border to Vietnam) almost all the provinces in Cambodia are vulnerable to climate change due to their low adaptive capacity and dependence on climate-sensitive livelihoods.¹⁸ As much as climate change mitigation is about energy, climate change adaptation in Cambodia is largely about water and health concerns and the strengthening of institutional capacity. The climate change impacts in Cambodia will largely be felt in Tonle Sap through changed water flows in the Mekong, altering the unique flood pulse system, and in coastal zones through sea-level rise, increased erosion and salinisation. It is likely to be wetter, with higher water levels and more extensive flooded area as well as longer flood duration, however the effects of climate change on the monsoon system are not yet fully understood. Responding to climate change should start by linking efforts to reduce vulnerability to present climate-related disasters with those aimed at building longer-term resilience to climate change. It is important to note that climate change is not the only factor affecting the Mekong flows; planned large-scale hydropower dams is estimated to have a remarkable impact on the quantity and quality of the flow. The combined impact is a serious concern for the Tonle Sap.

A separate climate change analysis has been performed for Cambodia in parallel with this assignment, which is why climate change aspects are not detailed in this review. For more information related to climate change, see Cambodia Climate Change Analysis (Smith et al., 2009).

¹⁷ 13 natural disasters were reported in Cambodia between 1984 and 2003. Mean annual number of victims (people killed or affected) in Cambodia during this period was 4,337 per 100,000 (compared to Lao PDR: 7,314; Thailand: 2,552; and Vietnam: 3,616 per 100,000). Guha-Sapir, et al., 2004.

¹⁸ Anshory Yusuf & Fransisco, 2009.

2.2 Opportunities

Cambodia enjoys one of the highest natural capital endowments per capita in East Asia, which could constitute a solid basis for economic development and poverty reduction, provided there is good governance at all levels, effective regulatory frameworks, rigorous environmental and social safeguards, redistribution of wealth and the protection of rights. The most important natural resources in Cambodia are agricultural land, water resources, fisheries, forestry, minerals, and until now unexploited nature. The annual flood pulse in Tonle Sap provides a wealth of food and other ecosystem services which are important for most people living in that area. Cambodia has a large hydropower potential. Oil and gas resources have been recently discovered but not yet exploited. Cambodia also has an opportunity to value the green component of its economy. There is a growing demand in the international market for environmentally friendly products, fair trade products, and green tourism.

The environment/poverty nexus in Cambodia implies that support to improving natural resource management in some cases will have strong **pro-poor effects**, including: reducing indoor air pollution (with positive health effects mainly on women and children), increasing access to water and sanitation, and access to education. The ongoing **decentralisation** efforts in Cambodia could provide an opportunity to develop and implement plans that are more sustainable and adapted to local preferences. However, along with the transfer of power and responsibility must also come adequate resources so that local authorities can build capacity to carry out these decentralised responsibilities. Implementation of **good governance** practices and a strengthened **civil society** would benefit the path towards more sustainable resource management and have pro-poor effects.

- The country's economy is strongly dependent on natural resources, and **agriculture** for generating employment, incomes and potential foreign trades. Improving infrastructure is a way to enhance agricultural productivity. Farms with access to markets in their villages have 26% higher crop yields than those without. Farms closer to roads also have higher yields; reducing the distance from a village to an all-weather-road by one km raises productivity by about 30,000 Riel/ha.¹⁹ (Care should however be taken as access to roads may have a negative impact on HIV/AIDS prevalence). Furthermore, lack of irrigation systems is a commonly cited constraint to improved agricultural productivity.²⁰ With improved integrated land and water resource management, taking land-use change, deforestation and climate change into account, there are opportunities to improve agricultural productivity, employment rates, and livelihood opportunities.
- **Fisheries** play a critical role in rural livelihood, providing food security, income and employment for a large proportion of the rural population. There are opportunities to improve rural livelihoods and public revenue through improved resource management, expansion of processing, and a more equitable distribution of fishery benefits, for example by improving and pursuing the governance reforms and decentralisation process.
- There are also opportunities to explore options related to the unique ecosystems. **Community-based natural resource management and ecotourism** can provide alternative livelihoods and encourage sustainable management of natural resources.

¹⁹ WB, 2006

²⁰ The proportion of irrigated land in Cambodia is the lowest in Southeast Asia. Crop yields are 10% higher on irrigated land for the same levels of other variables, and land with access to irrigation facilities during the dry season has on average 15% greater rental value and 10% higher sale value than land without such access (WB, 2006)

- The **forests** constitute a great resource; the challenge is to use these resources for the benefit of the people and the countries without destroying them. Progress can be made by recognising that forestlands are part of the rural economy and people's livelihoods. Policies could better address the linkages among community livelihoods, investments, markets and infrastructure, rather than viewing forests as raw material for export-oriented processing. More specifically, Reduced Emissions from Deforestation and Land Degradation (REDD)²¹ could provide an opportunity to preserve the forests and reduce emissions of greenhouse gasses while benefitting economically, and the possibilities of REDD having pro-poor benefits could be investigated. Trade in certified timber products, from planned, sustainably managed forests, is another opportunity. There is a huge market for non-timber forest products (e.g. bio-trade and biotechnology) that could be explored.
- Most rural communities rely on wells, ponds, and canals. **Rainwater harvesting** could be an opportunity to improve water supply for safe drinking water (already considered in the NAPA, 2006).
- High cost for electricity has been identified as a constraint to economic growth. **Rural electrification** could enhance development of small-scale industries as well as providing opportunities for evening-studies for pupils and students. In general, rural electrification has shown to have positive gender effects. In Cambodia, many feasible options exist to meet energy needs that do not destroy the rivers, including solar and wind power. It is instrumental that Cambodia's energy planning process is opened to public participation and that alternative/renewable energy sources are explored.
- Moreover, Cambodia has large potential in the recently discovered **mineral** (including bauxite, gold, iron and gems), **oil and gas resources**. These resources could, if managed well, provide important state revenues and a way to lift Cambodia's people out of poverty. Exploitation of fossil and mineral resources are however often connected with environmental impacts such as pollution (including increased emissions of greenhouse gasses), land-use change, and decreasing access to natural resources for communities, so environmental and social safeguards are crucial.

3. Effects of the environmental problems

The environmental problems in Cambodia lower the value of and access to productive resources and also create health problems, especially for the poor, which increases vulnerability and complicates economic development and the fight against poverty.

3.1 Impact on poverty (vulnerability, security)

The share of Cambodians below the poverty line fell from 47% in 1994 to about 35% in 2004. However, while living standards have improved, the gap between rich and poor has increased sharply in recent years.²² Poverty is predominantly a rural problem; over 80% of the population (90% of the poor) live in rural areas. However, the urban population is growing and urban poverty increasing. A poverty mapping in Cambodia reveals that the poor are residing in areas characterised by low access to water and highly fragile soils.

Besides **agriculture, fisheries and forest** resources play a critical role supporting livelihoods, especially in providing diversifying subsistence and income-generating activities. Combined,

²¹ REDD is anticipated to become a part of the new (post Kyoto) climate regime and concerns payments for reduced deforestation and land degradation, and may be included in climate change mitigation funding.

²² ADB, 2007; WB, 2009. Cambodia's GINI Index is 43 (CIA Factbook), implying a relatively unequal household income distribution making Cambodia one of the most unequal countries in the region.

they provide a safety net to families during difficult times.²³ Between 20% and 58% of household income derive from common access resources including fuel wood, fishery, and resources provided by the mangroves (with heavier reliance among poorer households).²⁴ Amongst the poor, a quarter depended solely on fishery and forestry products for over half of their income in 2004.²⁵

The poor face a number of interlocking and mutually reinforcing problems, including *lack of secure land tenure, remoteness from markets and services, lack of productive assets, lack of access to decision-making processes, low levels of education and high dependency ratios.*²⁶

Vulnerability

Cambodia's (rural) poor are disproportionately dependent on public goods for their livelihoods, so declining quality of, or access to, natural resources negatively affects the poor. The poor are more vulnerable to external shocks due to limited asset base, livelihood opportunities and little access to decision-making, and have less ability to adapt to environmental changes such as climate change.

The poorest households seem to be clearly the most vulnerable due to their weaker asset base and narrow livelihood and income opportunities. Existence of supplementary (secondary or multiple) livelihoods enable an increased asset base²⁷, but the lack of alternative livelihood opportunities poses a considerable problem to many poor Cambodians. Ill health is another factor causing the fall into poverty or deepening poverty, by forcing distress sale of productive assets such as land, and/or long-term debt situations, reducing households' future income.

Most Cambodian households are engaged in **agriculture**. Although the agricultural productivity has increased during the last decade, it is still much lower in Cambodia than in the neighbouring countries, and food security continues to be a problem with a third of the population suffering from hunger.²⁸ In agricultural villages, the challenges caused by negative impacts from environmental changes are further intensified by the increasing population coupled with unavailability of new agricultural land.

More than half of Cambodia's rural population depends on **fish and aquatic resources** for some portion of their livelihood. No country in the world depends more on inland fisheries than Cambodia. Together with rice, fisheries form the backbone of the country's food security and provide invaluable revenue and employment (direct and indirectly for over 2 million Cambodians). Fish is the leading source (75%) of animal protein in the rural diet and a vital source of nutrition in a country where 30% of the children are undernourished.²⁹ Poorly planned water infrastructure negatively affects the well-being of Cambodia's rural population because it hinders the free flow of rivers and inhibits the invaluable flood pulse. For instance, construction of the Yali Falls Dam upstream in Vietnam affected some 55,000 villagers in Cambodia and caused major re-settlements.³⁰

²³ Bradely, 2009

²⁴ PEP, 2005.

²⁵ WB, 2006.

²⁶ WB, 2006

²⁷ TKK et al., 2009.

²⁸ WB, 2004.

²⁹ Knutsson et al., 2009.

³⁰ www.internationalrivers.org accessed 2009-09-07

Over the last decade, rural livelihoods have faced increasing challenges due to rapid decline in resources. **Logging and forest clearing** for development and **unsustainable harvest of fish** (by commercial enterprises, military, local authorities, and a growing rural population) have resulted in high rates of forest loss and degradation and a reduction in the productive value of fisheries. This has had serious impacts on local livelihoods, affecting agricultural productivity, loss of wildlife habitats and of an undefined reservoir of genetic resources that could be exploited for foods. An increase runoff to rivers may cause floods and destroy human lives, crops, and infrastructure.

Climate change in Cambodia is likely to exacerbate many current problems which pose problems for national development (such as access to water). The National Adaptation Programme of Action (NAPA) identifies increased frequency and intensity of floods, sea level rise, and spreading of vector borne diseases as the most important impacts of climate change in Cambodia. Although the people of Cambodia have always dealt with the natural, highly variable hydrology, the country's economic and institutional capacity to handle unexpected changes remains limited. Adaptive capacity seems to be worse for the population groups which rely very strongly on only one livelihood source, as is often the case for the poorest households in both fishing and agricultural villages. Resilience of the population in the Tonle Sap area is already now relatively weak and is not likely to increase without a concerted effort. Fishing communities in Cambodia are especially vulnerable to climate change as they seem to have low possibilities of broadening into other livelihood sources such as agriculture as there is no land available.³¹ As mentioned above it is important to note that in relation to water resources, the effect of upstream dams and regional agreements on water use is at least as important, if not more so, than the effect of climate change on these resources.

Security

Lack of security is a fundamental dimension of poverty. The main environment-related security issues in Cambodia are *related to decreasing resilience of ecosystems, unreliable access to food and water, lack of secure tenure to land, lack of access to resource-based safety-nets such as goods and services from the natural commons (forests, fish, etc), low ability of households to accumulate assets including natural capital, pollution, and existence of conflicts over resources*. Women are disproportionately at risk from environmental degradation, conflicts, and natural disasters, due to gender roles, and historic, cultural and socio-economic reasons.

Extreme inequality of access to fishing rights, insufficient land tenure rights, bad governance, corruption, growing population pressures, severe poverty, and a weakened civil society have led to over-exploitation of resources and reduced ecosystem resilience³², placing the people who depend upon them at risk. Plans for new dams on the Mekong mainstream pose other hazards for the sustainability of the natural resources provided by the river. Inequality in distribution of wealth as well as in the access to the resources and assets seems to have intensified during the past years.³³

³¹ TKK et al., 2009

³² Ecosystem resilience is the capacity of the ecosystem to tolerate disturbance without collapsing. A resilient ecosystem can withstand shocks and rebuild itself when necessary.

³³ TKK, et a., 2009

Land is the most important asset in Cambodia. Land distribution is unequal with almost half of the rural population having less than 0.75 ha of land. The average size of agricultural holdings is around 1 hectare per household, with female-headed households and marginal groups having much less. The proportion of rural households lacking land for cultivation has risen from 13% in 1997 to 20% in 2004, a problem that is exacerbated by interconnected problems of unclear property rights (80% of rural households that owned land in 2004 were without land titles).³⁴ Unsecure land titles inhibit investments resulting in reduced agricultural productivity, low food security, environmental degradation, and low growth. Weak property rights and lack of voice puts the poor at disadvantage.

Increasing use of pesticides has played a role in increasing crop yields in the short term. However, many of the pesticides fail to meet international quality standards, are hazardous, and applied with little or no regard for sustainability, suitability, or safety. Besides direct poisoning of farmers, water, land and air are polluted, which has negative long-term effects on agricultural productivity and food security, ecosystem functioning, tourism industry, and economic development.³⁵

Furthermore, conflicts have increased around access and use of natural resources due to growing pressure on the natural resources base and can have a significant impact on livelihoods investments and growth.³⁶ For example, privatisation of fishery resources and their division into large-scale commercial, middle scale and family fishing lots, has caused friction between competing stakeholders. Conflicts, intimidation and violence have escalated in recent years. Abuses have not been met by a strong response and there are few, if any, opportunities for fishers' grievances to be addressed.

3.2 Impacts on Economic Development

Cambodia has fuelled its economic growth by drawing on its assets (forests, fisheries, land) but at the cost of deteriorating these assets, which implies unsustainable management which may negatively impact on long-term economic development and poverty reduction.

Cambodia has experienced an impressive (mainly urban-based) economic growth since the 1990s, driven largely by an expansion in the garment sector, construction, agriculture, and tourism. The **garment industry** currently contributes more than 85% of Cambodia's exports and employs around 320,000 people.³⁷ Between 1993 and 2004 the industry sector's contribution to GDP has doubled to 30% - but it still employs only 8% of the workforce. The number of **tourists** visiting Cambodia is increasing year by year; in 2007 Cambodia received over 2 million tourists, contributing with 300,000 jobs and \$1.4 billion in foreign exchange earnings.³⁸

More widespread electrification can pave the way for small-scale economic activities and be positive for poverty reduction. **Hydropower** development has a great potential to support economic growth and much needed influx of foreign currency by exporting electricity to Thailand. However, if the plans are not taking into account the great importance of the ecosystem services to local livelihoods the dams could irreparably damage these resources and constrain Cambodia's sustainable development. There is good potential to explore the

³⁴ WB, 2004; WB, 2006

³⁵ EC CEP, 2005; and WB, 2004.

³⁶ WB, 2006

³⁷ CIA Factbook

³⁸ RGC MTR, 2008a.

use of small-scale renewable energy for rural electrification, which could also have co-benefits in reducing indoor air pollution.

The **agriculture, forestry and fishery** sectors combined account for 40% of the GDP and employs around 77% of the labour force. Agricultural growth in Cambodia is low relative to growth in the industrial and service sectors and also low relative to its neighbour countries during comparable stages of development. The agricultural productivity (measured in crop yields, or value-added per unit of labour or profit per hectare) has been and still is the lowest among East, Southeast, and South Asian countries. *The main reasons for the low agricultural growth include poorly-defined property rights, inadequate infrastructure for irrigation and transport, low levels of human capital, high levels of household-level vulnerability, and low state capacity.* The increasing landlessness exacerbates the problem, and evidence from other countries show that asset inequality, as measured by the land distribution, has a significant growth-reducing impact. **Education** has shown to significantly enhance productivity, farm profitability, and household per capita consumption in rural Cambodia. An additional year of schooling for the household head enhances productivity on average 40,000 Riels/ha.³⁹

Efforts to improve agricultural productivity include improving irrigation and increasing the use of **pesticides**. According to the EC the direct costs for importing pesticide are high: around €6-9 million per year. Indirect costs are more difficult to estimate but include costs for negative impact on food security, public health, on the export market, and tourism sector. Furthermore, only 20-40% of pesticide imports are authorised, leading to loss in state revenues.

The **fishery** sector is of great importance for Cambodia, contributing to about 7% of the GDP and employing 10.5% full time and 34% part time of the total employed. Coastal marine fish catches go mainly for export, mostly in unprocessed form. The inland ecosystems (mainly Tonle Sap and Mekong basins) produce an estimated 200,000 to 430,000 tonnes of fish each year with a value of up to €400 million. The Tonle Sap Basin contributes alone with an estimated 40-70% of Cambodia's protein intake, and 5% of GDP⁴⁰. A decline in inland fisheries is noticed, mainly due to unsustainable harvesting and loss of habitats, but also disputes and pollution, which might have large negative impacts on food security and fishing communities' resilience.

The rate of poverty reduction could have been higher if more of the growth had been in the agricultural sectors and in rural areas. According to the World Bank (2006) efforts to obtain economic growth in Cambodia need to be more pro-poor, broad based and employment generating, requiring *secure property rights especially for small holders, equitable access to common property resources, investments in human development (education and health), and increased investment in development infrastructure.*

Unemployment will continue to be a great challenge for Cambodia as approximately 270 000 job seekers, primarily youths, are entering the labour market each year. Inability to create jobs will have grave effects on poverty causing increased urbanisation (especially of youth), and may cause social unrest.

³⁹ WB, 2006; WB, 2004.

⁴⁰ WB CAS, 2005

Natural disasters such as floods and droughts have resulted in a significant number of fatalities and economic losses. Between 1998 and 2002, floods accounted for 70% of rice production losses, while drought accounted for 20% of losses. The floods during 2000-2002 resulted in 438 casualties and caused damages amounting to \$205 million. These events are expected to become more frequent due to **climate change** with a variety of socio-economic impacts (including sea-level rise affecting settlements and beach resorts, coastal fisheries and mangrove forests).⁴¹ There has been no national costing of the impact of climate change on Cambodia, but a recent study on the cost of climate change in SE Asia by the Asian Development Bank suggests it could be in the region of 6-7% of GDP by 2100⁴². This figure should be taken as being indicative of potentially high costs *if adaptation activities are not undertaken*.

It is debated whether high-value natural resources represent a “blessing” or a “resource curse”. Revenues from **minerals** and the newly found **oil- and gas reserves** can ensure Cambodia’s economic development if carefully managed. Careful management entails economic and governmental challenges: international experience shows that poor countries with weak institutions and high capital of natural resources risks falling into the “natural resource curse”. There is a risk that volatile international markets, in combination with weak institutions, will lead to macroeconomic instability and is a potential breeding ground for mismanagement, corruption, and conflict. However it has been shown that the “curse” is not inevitable, it can be addressed through good governance and sound economic policies.⁴³

3.3 Impacts on Public Health

Access to safe drinking water and sanitation and good nutrition is crucial for a healthy life. The public health situation in Cambodia is serious. According to the Ministry of Planning, 42% of the rural population and 76% of the urban population have access to safe water resource. Poor households have much less access to safe water than higher-income households.⁴⁴ 16% of rural and 55% of urban population respectively have access to improved sanitation. Sewerage cover is only about 10% in Phnom Penh and of the 194 factories in the city assessed in 2000, only 8 had on-site primary treatment and their effluents generally exceeded Cambodia’s water quality standards.

Child mortality has increased since mid-1990s, but appears to be declining again. The main causes of under-five mortality are diarrhoea, acute respiratory infections and vaccine preventable diseases such as measles. According to WHO estimates, there are more than 12,500 annual deaths in Cambodia due to: diarrhoea caused by polluted water/bad hygiene (85%)⁴⁵, indoor air pollution (13%) and outdoor air pollution (2%), see table below. The table shows figures for Lao PDR, Thailand and Vietnam for comparison. A majority of the rural poor depend on wood-fuel as an energy source for cooking, causing indoor air pollution, which mostly affects women and children. Reducing indoor air pollution will yield disproportionate benefits for the poor.

⁴¹ RGC NAPA, 2006.

⁴² ADB 2009

⁴³ OECD, 2008.

⁴⁴ WB, 2004.

⁴⁵ This figure only includes diarrhoeal diseases. Other water related diseases are not included in the estimates. Hence, the total number of deaths related to hygiene, water and sanitation is higher.

WHO estimates	Water Sanitation & Hygiene		Indoor air pollution		Outdoor air pollution	
	Country	Diarrhoea deaths/year	Diarrhoea DALYs/1000 capita per year	Deaths/year	DALYs/1000 capita per year	Deaths/year
Lao PDR	4 900	28	2 400	14	<100	0
Cambodia	10 600	25	1 600	3.8	300	0.2
Thailand	2 800	2	4 600	1.5	2 800	0.4
Vietnam	9 400	4	10 600	2.0	6 300	0.5

Source: WHO, 2007(data from 2002)

Cases of both malaria and dengue fever have dropped during the last years but remain among the highest in the region.⁴⁶ Climate change is expected to increase the risk of malaria and dengue fever, as well as other waterborne or vector borne diseases.

The increased use of agrochemicals is a threat to human health. As much as 88% of pesticide-using farmers experience symptoms of poisoning. Local ponds and paddys are water resources for bathing, drinking, washing and cooking food. If this water becomes polluted with pesticides, chronic poisoning may results. No cases of acute poisoning or death from pesticides have been documented in Cambodia, but medical staff at provincial and commune level suspect poisoning to be the cause of death in a number of cases.

4. What are key actors doing to manage the environmental problems?

4.1 Key actors

Key actors in Cambodia related to environment, natural resources and climate change are: the Ministry of Environment (MoE) and its Cambodia Climate Change Office (CCCO); Ministry of Agriculture, Forestry and Fisheries (MAFF), Ministry of Water Resources and Meteorology (MOWRAM), and Ministry of Industry, Mines and Energy (MIME). The National Climate Change Committee (NCCC) is a cross-ministerial policy making body to address climate change issues in Cambodia. MoE has the main mandate for environmental protection and management. The important ‘Law on Administration and Management of the Commune’ (2001) grants executive and legislative authority to semi-autonomous democratically elected commune councils, at the local level of government in Cambodia. Commune councils have authority to protect the environment and natural resources within their commune boundaries, although management decisions on forestry issues are excluded from their mandate unless granted specific authority from the RGC.⁴⁷

4.2 Environmental mainstreaming of national and sector strategies

The main national development document is the National Strategic Development Plan (NSDP) 2006-2010, and the main programme for climate change adaptation in Cambodia is the National Adaptation Programme of Action, the NAPA (2006). The government is currently in the process of preparing a report on Vulnerability and Adaptation Assessment to Climate Change in Cambodia as part of its 2nd national communication UNFCCC. The Strategic National Action Plan for Disaster Risk Reduction (SNAP-DRR 2008-2013) was launched during March 2009.

⁴⁶RGC MoP, 2005b

⁴⁷ EC CEP, 2005.

The **NSDP** puts governance issues at the centre of its strategic framework. This is encouraging since corruption, patronage, rent-seeking, and other forms of bad governance are strongly linked to unsustainable natural resource use in Cambodia. The NSDP fails, however, to meet international good practices for environmental integration.⁴⁸

The **NAPA** identifies agriculture, forestry, human health, and the coastal zone, as national priority sectors for climate change adaptation. Water resources are mainly included through the linkages with agriculture and food security. There is no emphasis on fisheries, despite their remarkable social and economic importance and clear vulnerability to environmental change.

Some of the priorities identified in the **SNAP-DRR** are institutional capacity building and mainstreaming of disaster risk reduction into relevant government policies and programs, including land management, urban planning, youth, health, and rural development. However, currently the disaster risk management field in Cambodia appears uncoordinated and external support fragmented. Interventions are yet to make sustainable impact but focus is shifting from post-disaster assistance to prevention.⁴⁹

MAFF and MOWRAM have developed a *joint* Strategy for Agriculture and Water (**SAW**) and attempts are made to have an integrated approach to land and water management. The SAW states that natural resources must be utilised sustainably and equitably, and should particularly be available for poor and female-headed households. The SAW notes the importance of secure land titles to be able to improve agricultural productivity, and it states the importance of protecting water courses from agrochemical pollution. Notable areas lacking in the SAW related to poverty, environment and climate change include: (i) No mention of controlling deforestation caused by agricultural expansion; and no priority is given to preserving diversity of local varieties of rice and other crops, (few high-yielding species can increase vulnerability to pests).

4.3 Gaps and overlaps

There are a large variety of gaps or uncertainties in mandates, related to efficient environmental and climate change management. Some examples are:

- The Ministry of Environment has the main mandate for environmental protection and management under the law. However, decisions concerning land use and exploitation of natural resources are made by line ministries e.g. Ministry of Agriculture, Forests and Fisheries, Ministry of Public Works and Transport, and Ministry of Industry, Mines and Energy.
- The sub-decree on EIA Process (1999) states that Environmental Impact Assessments (EIA) must be submitted to MoE for review and approval. However, if the review is not conducted within the time required, the EIA is considered approved.
- Work has been delegated to commune councils without adhering powers. They have “neither substantial financial resources, a full formal natural resource management mandate, control over the security apparatus, nor sufficient clout in the political hierarchy.”⁵⁰

⁴⁸ Andersson et al., 2006.

⁴⁹ GFDRR, 2009

⁵⁰ Sedara et al., 2009

- Development strategies are sectoral and climate change adaptation actions remain scattered and sectoral, and suffer from lack of coordination and cooperation between different actors.⁵¹
- Government's primary mechanism for management of natural resources has been to contract large areas to national and foreign investors. Forest and fishery concessions are generally granted without coordination with MAFF or the Council of Ministers.⁵²
- National water quality surveillance and monitoring system is needed.
- The opportunity for synergies and coordination between the NCCC and the NCDM on disaster risk reduction and climate change adaptation are not currently being exploited.

4.4 Other actors

Cambodia has entered into strategic and significant partnership with bilateral and multilateral donor agencies, for reconstructing physical and social institutions destroyed over two decades of war and upheaval. The government is attempting to place itself in the driver's seat, and donors are in the process of enhancing their alignment to national priorities and harmonise with other donors, which is much needed. According to the World Bank, it was often the case that uncoordinated and donor-led aid slowed or even undermined the evolution of good governance.⁵³

Community Based Organisations (CBOs) will play an important role in being the intermediaries in the dialogue between people and authorities now emerging in rural Cambodia. The mandates of CBOs, for instance in dealing with common property, need to be made more clear in order for the CBOs to become legitimate. Local participation is important in order to understand local adaptation activities and assure that the voice of the vulnerable groups are accounted for in development processes. Often people in rural areas have strategies and systems for sustainability and adaptation measures, although they are not always shared or taken serious.

There are a number of national and international private companies and concessionaires that are interested in investing in the extractive industry, hydropower production, and forest and fishery harvesting. With good governance practices (transparency, accountability, non-discrimination, and public participation), strict enforcement of laws and regulations, and adequate safeguard measures related to environmental and social protection, private investments could contribute to Cambodia's development.

5. Governance and implementation

According to the NSDP, good governance is "the most important precondition to economic development". However, governance remains the weak link in Cambodia. Key elements for an environmental policy and legislative framework are in place, but environmental management and implementation is very weak. The MoE is lacking both resources and capacity to fulfil its mandate. In 2001, the MoE received 0.3% of governmental expenditures (which is low compared to the World Bank recommended environmental spending of 1.4% to 2.5% for developing countries).

The key issue for Public Financial Management (PFM), from an environmental perspective, is the disconnect between environmental policy and regulation on the one hand, and public

⁵¹ TKK, 2009

⁵² WB, 2004

⁵³ WB CAS, 2005.

investment decision on the other. Most major public investment decisions are made without compliance with the provision of the Environment Law, which require public scrutiny, especially environmental and social impact assessment. The MoE does not have the power to insist on such compliance.

The **fishery** sector is organised around a privatised fishing lot system. Access to fishing grounds has been restricted, most directly affecting those with the greatest dependency of the fishery resources – the rural poor. The system of commercial fishing lots has failed to reflect the true value of the fishery and consistently delivered a shortfall in revenue to the treasury. The lot-system has encouraged short-term overexploitation and created an inequitable division of the resource, as a handful of lot owners have monopolised the best fishing areas, excluding local communities. Weak governance has resulted in inefficiency. Corruption, illegal practices and lack of transparency pervade the sector and law enforcement is weak or non-existent.

According to the EC (CEP, 2005) **forest** concessions are an inadequate tool for managing forest exploitation in Cambodia. Concessions were usually granted through non-transparent processes. The direct revenue from concessions has been far below expectations, while the contribution of these concessions to growth and employment has been rather modest. Local communities have seen few benefits from these concessions but are instead marginalised. Landlessness is now estimated at 12-20% while average farm size is reportedly declining. The environmental consequences have been extremely negative. Forest concessionaires are required to prepare Social and Environmental Impact Assessments in consultations with communities, but the legislation has not been enforced by the Forest Administration. Conflicts over distribution of benefits from forest management will continue as long as there is a lack of transparency and local participation in terms of decision-making on granting or approving of forest concessions. Because of unsustainable and/or illegal logging, RGC has implemented a logging moratorium and cancelled around 40% of the forest concessions. Cancellation of concessions has placed large volumes of land under state management, without a corresponding increase in the state's capacity to manage these. Following the national moratorium on logging, the government introduced a new system for extracting timber. Under this system forested areas are auctioned off in a public bidding process and the highest bidder is given permission to harvest timber during one year, following sustainable management practices. There has been limited interest of potential bidders, and the legal market cannot yet compete with the illegal market for timber. **Community forestry** is still in its early stages with 59 sites legally approved nationally. Local communities are enabled to secure rights to manage forest areas under 15-year renewable agreements.⁵⁴

One of the priorities of the RGC is to enhance **agricultural** productivity and improve food security. Efforts are made to promote large-scale irrigation. Whilst this obviously is a pro-poor measure, “such a broad solution to low agricultural output can lead to the overuse of land and the increased use of fertilisers and pesticides, which damages the groundwater table and the inland fishing industry”.⁵⁵ Expansion of agricultural land can also be problematic if it involves deforestation or land-use change of other ecosystems such as wetlands or mangroves.

The Cambodian government is on the threshold of committing to an extensive **hydropower** program mostly with the backing of Chinese financiers and construction companies, with

⁵⁴ Bradley, 2009

⁵⁵ EC-Cambodia Strategy Paper 2007-2013.

large-scale effects on biodiversity and livelihood. Of particular concern is the proposed Sambor hydropower project, located on the Mekong mainstream in Kratie province. If approved, it could impact on the Mekong River's fisheries and those communities dependent upon them for income and subsistence, as well as on endangered species such as the Irrawaddy dolphin.

In sum, the RGC does not manage its environment and natural resources in a sustainable way. Top-level political will to implement good governance practices is crucial but it appears to fluctuate. The area of **extractive industries** is critical; the legal and fiscal regime for both petroleum and mining should be clarified urgently. If and when the revenue base turns out to be large, external monitoring mechanisms would be useful in reinforcing accountability in the sector. In particular for revenue collection, the Extractive Industries Transparency Initiative (**EITI**) provides a process and label to strengthen accountability and to signal Cambodia's commitment to transparency. However, after initially agreeing to endorse the EITI, the Cambodian government has announced that it will not endorse it.

The institutions responsible for natural resource management and the companies operating in Cambodia need to be made more accountable and transparent. Poor governance leads to inequality in land holdings which weaken future economic growth. It contributes to deforestation and misuse of the country's natural resources. Without a serious effort to improve public financial accountability or to better manage the country's natural resources, the poor will play a high price in terms of their human and physical capital. In the longer perspective, both the nation and the region will suffer ecosystem-, biodiversity- and natural resource loss giving wide range consequences for all people.

6. What are the implications for Swedish Development Cooperation?

6.1 Conclusions

Cambodia's diverse ecosystems have been important for economic growth and contributed to improved living standards. However, the *natural resources have not been managed in a sustainable or equitable manner*, which has led to over-exploitation and depletion. Environmental management and environmental protection is both an end in itself and a means to sustainable development. Poor environmental quality, on the other hand, enhances poverty, causes diseases, and affects living standards, food security and livelihood opportunities negatively, and complicates long-term economic growth.

Poverty in Cambodia is still mainly a rural problem, closely linked with issues such as: access to good-quality natural resources and productive assets, secure land tenure, and access to markets. The rural poor are facing increasing challenges due to rapid decline in natural resources. Poverty in Cambodia is more a legacy of decades of internal conflicts and bad governance than lack of resources or opportunities. Key elements for an environmental policy and legislative framework are in place but *implementation and enforcement remains very weak*. Therefore, *improving governance, and capacities for enforcement and policy implementation, is likely to benefit also natural resource management*.

Decentralisation may pose new challenges for environmental management. The challenges could, however, be turned into opportunities by sensitive and participatory local planning suitable for the local needs. Decentralisation of power and responsibilities must be matched with the resources for local bodies to carry out their activities. There is a high potential for poverty reduction and pro-poor economic growth provided there is good governance,

effective regulatory frameworks, rigorous environmental and social safeguards, and the protection of rights. As the important economic sectors are related to natural resources, a *sustainable and equitable use of these resources is a prerequisite for long-term development*. If the pressure for further exploitation (e.g. mining and forest concessions or petroleum extraction) is not met by political will and institutional capacity to meet these demands, the potential vacuum that would follow is a breeding ground for corruption, abuse of local communities, and unsustainable exploitation of natural resources. The tensions between economic development and environmental protection could be managed with support from donors.

Women and men have different roles in society why they will be differently affected by environmental- and climate change. Women and men have different opportunities and possibilities to influence good governance, etc. Therefore it is vital to include gender aspects in all analyses and projects that are being conducted.

6.2 Issues for Sida to consider

Environment and climate change is a thematic priority for the Swedish government and should always be integrated into Swedish development cooperation. This review has shown that there are many important linkages between environment (including climate change) and the sectors Sweden supports, namely democracy, human rights, and education. Some suggestions on how to pursue environment and climate change integration in these sectors are presented below.

Furthermore, Sida has initiated a support to climate change adaptation in Cambodia, through the three-year Climate Change Initiative (CCI). Besides the CCI, there are also opportunities to initiate new long-term support to Cambodia, targeted towards environment and climate change. It would therefore be positive if the short-term support through the CCI could be linked to a possible long-term development cooperation effort rather than a separate one-time support.

Swedish development cooperation with Cambodia is increasingly sector-programme based rather than project based. Sida is actively promoting principles of alignment and harmonisation in all its development cooperation with Cambodia. With this in mind, please find below issues for Sida to consider related to development cooperation with Cambodia.

Integration of environment and climate change into democratic governance

- ❖ Many of the environmental problems in Cambodia are linked to the lack of good governance practices. Support to **enhanced democratic governance**, including fight against corruption and promotion of accountable and transparent institutions, is very likely to benefit also the management of natural resources.
- ❖ **Policy implementation:** although there have been some progress in environmental legislation and policy integration, there have been remarkably limited impacts on implementation, the formulation of budgets, environmental investments, enforcement of (new) legislation, and use of cost-effective policy instruments. Governance and incentive structures should be made to work for environmentally sustainable development. Sida could in a dialogue with the RGC consider:
 - Monitoring that environmental policies and regulations are reflected in the actual *public investment decisions*.

- Support implementation of *policy instruments that promote sustainable and pro-poor development*, to help create the right incentive structure for sustainable behaviour of firms, institutions, and individuals. Examples include removing perverse subsidies and setting fees and taxes right (“internalising externalities”, taxing “public bads” and subsidising “public goods”), introducing environmental fiscal reforms, securing tenure or user rights, and promoting strategic environmental assessments.
- Monitor that the *decentralisation* process includes decentralisation of mandates as well as resources, to manage natural resources in a sustainable way.
- Cambodia must have political will and adequate institutional capacity to be able to manage the growing private investments in the *extractive industry*. Implementation of Corporate Social Responsible processes such as the Extractive Industries Transparency Initiative (EITI) must be supported by *reforms to improve governance over natural resources, and revenue transparency*.

Integration of environment and climate change into human rights

- ❖ A strengthened civil society will enable effective participatory processes, and enable women and men to claim their **rights to access** to land, forests, fishery, and other **ecosystem services** and take part in **decision making** related to natural resources.
- ❖ An enhanced understanding of environment and climate change issues is critical for communities’ ability to adapt to a changing environment and climate. **Access to information** can help to empower poor women and men to take part in decision making and improve their livelihoods. Care should be taken to not only create new information but to use the information already available in order to bring about change.

Integration of environment and climate change into education

- ❖ There are gains to be made if issues related to environment and climate change are included into **school curriculum** or **vocational training**. Improved knowledge contributes to among others sustainable management of natural resources, increased household incomes and improved livelihoods, land management, and agricultural productivity.
- ❖ Sida may want to consider highlighting the importance of access to environmental resources and climate change to **school attendance and children’s performance** in the dialogue with RGC.
 - Low access to natural resources lowers children’s (especially girls’) school attendance due to more time being spent on household tasks.
 - Access to clean water and improved sanitation (at schools) are especially important to children’s (especially girls’) attendance as well as to children’s and teachers’ health.
 - Malnutrition and increased morbidity due to changes in water availability, may adversely affect children’s performance at school.

Climate Change Initiative

- ❖ It is important to keep in mind that development, environment and climate change are intertwined and that climate change adaptation is inseparable from sustainable development. Support to **integration of climate change concerns** into national strategic

plans and budgets must be followed by a *real allocation* of financial and human resources, implementation, monitoring and enforcement.

- ❖ There are links between **climate change adaptation and disaster risk management** in Cambodia. Strengthening the links between these two approaches could create immediate and long-term benefits. Increasing dialogue and alignment between the NCCC and the NCDM would be a clear place to start.
- ❖ Sida could consider giving **institutional support to NCCC**, to increase their capacity to **plan, implement and monitor** policies and strategies to improve the adaptive capacity of communities. Attention should be given to the *cross-cutting nature* of climate change, and to the risk that inadequate spatial planning and badly planned infrastructure will reinforce the negative impacts of climate change.
- ❖ Improving the understanding of environmental- and climate issues in Cambodia is critical to policy formulation. Sida could consider supporting the **national research capacity** in the natural sciences and provide policy relevant information.
- ❖ There are opportunities to take advantage of the synergies with the Forest, Climate and Livelihood Research Network (Focali)⁵⁶ in order to generate lessons of national and wider (regional and global) importance regarding opportunities and challenges in relation to Reduced Emissions from Deforestation and Degradation (REDD) and carbon markets. Sustainable forest management will generate adaptation co-benefits.

Finally, this policy brief touches upon a range of highly complex issues. Needless to say, there are many aspects that deserve a much more detailed level of analysis. We hope, however, that this Policy Brief fulfils its aim of being a point of departure for a discussion on how environmental and natural resources aspects can be integrated into Swedish development cooperation with Cambodia. Further information on climate change in Cambodia can be found in Smith *et al.* 2009 Climate Change Analysis for Cambodia.

⁵⁶ www.focali.se

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Annex 1. Indicators for sustainable development Cambodia

Indicators	MDG 7 ⁵⁷	1990	1995	2006	2008
Population total (million)		10	11	14	14
Mortality rate, under-5 (per 1,000)		119	119	141	82
Agriculture, value added (% of GDP)			50	32	
Forest area (% of total area)	Yes			59.2	59.2
Nationally protected areas (% of total area)	Yes			18.5	9.9
GDP per unit of energy use (PPP \$ per kg oil equivalent)	No			--	--
CO ₂ emissions (metric tons per capita)	Yes	0	0	0.0	0.04
Access to an improved water source (% of population)	Yes	19	19	34	41
Access to improved sanitation (% of population)	Yes			16	17

Source: www.worldbank.org and www.developmentgoals.org

⁵⁷ The Millennium Development Goal 7 “Ensuring environmental sustainability” is divided into the following three targets: (a) Integrate the principles of sustainable development into country policies and programs and reverse the loss of environmental resources. (b) Halve by 2015 the proportion of people without sustainable access to safe drinking. (c) Achieve by 2020 a significant improvement in the lives of at least 100 million slum dwellers. The set of indicators listed in the table has been developed for the assessment of the development process in relation to the targets.

Annex 2: The Millennium Ecosystem Assessment

The Millennium Ecosystem Assessment in brief

The Millennium Ecosystem Assessment (MA) was called for by the United Nations Secretary-General Kofi Annan in 2000. Initiated in 2001, the objective of the MA was to assess the consequences of ecosystem change for human well-being and the scientific basis for action needed to enhance the conservation and sustainable use of those systems and their contribution to human well-being. The MA has involved the work of more than 1,360 experts worldwide. Their findings, contained in five technical volumes and six synthesis reports, provide a state-of-the-art scientific appraisal of the condition and trends in the world's ecosystems and the services they provide (such as clean water, food, forest products, flood control, and natural resources) and the options to restore, conserve or enhance the sustainable use of ecosystems.

There is a growing understanding of the fundamental role ecosystems and the services they provide play for human welfare, see Fig. 1 describing the linkages between biodiversity, ecosystem services and human well-being.

Key findings of the Millennium Ecosystem Assessment⁵⁸, finalised in 2005 and the so far most comprehensive survey of the ecological state of the planet, include:

- 60% of world ecosystem services have been degraded
- Of 24 evaluated ecosystems, 15 are being damaged, see Table 1.
- About a quarter of the Earth's land surface is now cultivated.
- People now use between 40 percent and 50 percent of all available freshwater running off the land. Water withdrawals have doubled over the past 40 years.
- Over a quarter of all fish stocks are overharvested.
- Since 1980, about 35 percent of mangroves have been lost
- Nutrient pollution has led to eutrophication of waters and coastal dead zones
- Species extinction rates are now 100-1,000 times above the background rate

The degradation of ecosystem services is hence already a significant barrier to achieving the Millennium Development Goals, contributes to growing inequities and disparities across groups of people, and is sometimes the principal factor causing poverty and social conflicts.

Figure 1. Links between biodiversity, ecosystem services and human well-being

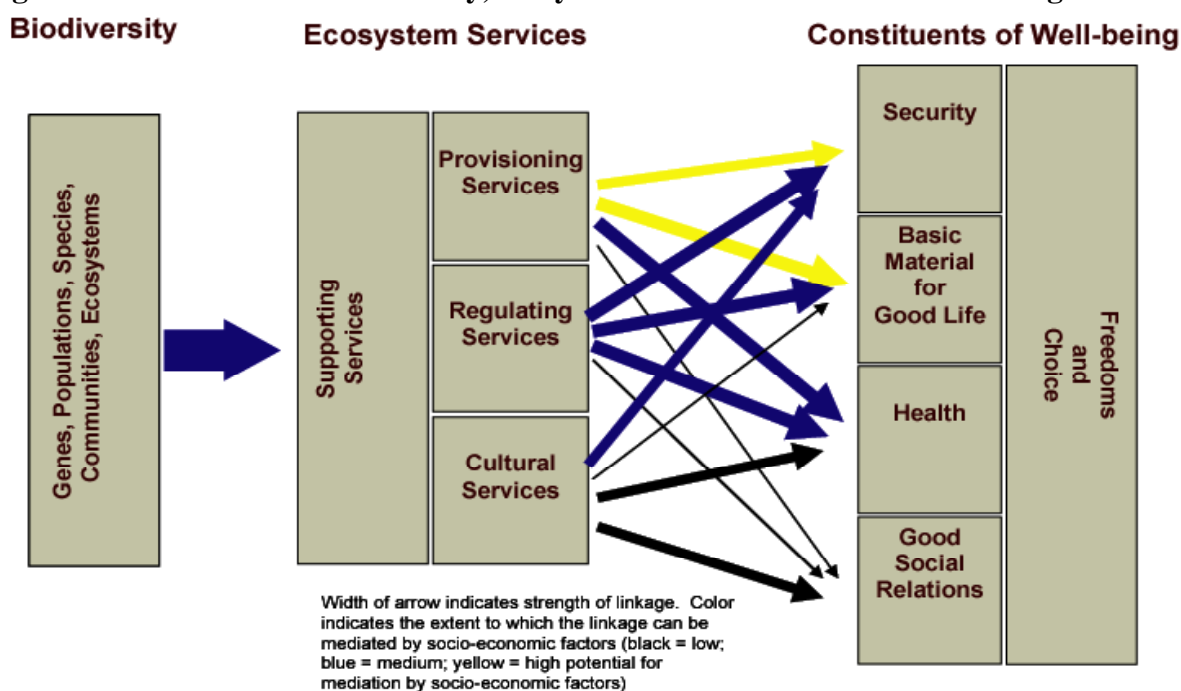


Table 1: Global condition of Ecosystem Services Examined by the Millennium Ecosystem Assessment

Ecosystem Services	Enhanced	Mixed	Degraded
Provisioning	Crops Livestock Aquaculture Carbon	Timber Fiber	Capture fisheries Wild foods Wood fuel Genetic resources Biochemicals Fresh Water
Regulating	Carbon sequestration	Water regulation Disease regulation	Air quality regulation Regional & local climate regulation Erosion regulation Water purification Pest regulation Pollination Natural Hazard regulation
Cultural		Recreation & ecotourism	Spiritual & religious Aesthetic values

For additional information on the MA including presentation materials etc, see <http://www.maweb.org>