



Netherlands Commission for
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SEA and ESIA for Economic Corridors and Infrastructure Development

The purpose of this case is to provide information on recent experiences in the use of environmental and social impact assessment (ESIA)¹ and, moreover, strategic environmental assessment (SEA) for the infrastructure sector. The case focusses on the surge of economic corridors around the world, with infrastructure as a vitally important component.

While the role of ESIA in assessing, avoiding, mitigating and compensating the impacts of individual infrastructure projects is fairly well known, the positive role of SEA in developing a vision on the planning of economic corridors and associated infrastructure is only recently becoming visible. The OECD has defined SEA as a range of analytical and participatory approaches that aim to integrate environmental considerations into policies, plans, and programmes and evaluate the interlinkages with economic and social considerations. It can play a proactive role in integrating infrastructure activities in the broader context of regional development planning and in aligning these activities with existing national policies (including biodiversity policies).

This document is relevant for:

- Government authorities responsible for regulation of the infrastructure sector;
- Authorities responsible for national and regional development planning;
- Authorities with responsibilities for protection of environment, biodiversity, human rights and social justice;
- International finance institutes and donors supporting infrastructure development;
- Civil society organisations representing stakeholders and/or biodiversity (potentially) affected by infrastructure development activities;
- Private sector companies dependent on, or involved in developing new or upgrading existing infrastructure.

Infrastructure and economic corridors

Estimates of annual global infrastructure investment needs range from \$3 trillion to \$7 trillion. It is estimated that by 2050, 25 million kilometres of new roads will be built. This represents a 60 per cent increase in global road infrastructure since 2010. It is further estimated that 90 per cent of new road construction will occur in developing countries, many of which are exceptionally high in biodiversity. With regard to railway infrastructure, the situation

¹¹ Multilateral development banks nowadays often use the term Environmental and Social Impact Assessment (ESIA) to emphasise the inclusive nature of impact assessment. The term EIA is used in most national legal contexts; whether social aspects are included or not differs per country



Biodiversity Convention perspective on biodiversity mainstreaming through ESIA/SEA

Mainstreaming. The CBD Conference of Parties decided to consider the mainstreaming of biodiversity into the sectors of energy and mining, infrastructure, manufacturing and processing, and health (Decision XIII/3). From the perspective of the Convention, a key aim of mainstreaming biodiversity in these sectors is to avoid, reduce or mitigate any negative impacts, while maximizing any potential benefits to biodiversity. Article 6(b) of the Convention calls for Parties to “integrate, as far as possible and as appropriate, the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies”.

ESIA and SEA. Two of the most important tools for addressing the impacts from the infrastructure, energy and mining sectors, and to a lesser extent, the manufacturing and processing sectors, are environmental and social impact assessment (ESIA) and strategic environmental assessment (SEA) (CBD/SBSTTA/21/5). Convention Article 14 asks for the use of impact assessment, elaborated in “Voluntary Guidelines on Biodiversity-Inclusive Impact Assessment” (Decision VIII/28), further detailed for marine and coastal areas in Decision XI/18.

The 2030 Agenda for Sustainable Development includes a number of goals that are closely related to the above mentioned sectors. Given the indivisible nature of the 2030 Agenda, these goals and targets must be achieved while also achieving the goals for biodiversity, climate action, as well as multiple targets for sustainability. ESIA and SEA are internationally practised, often legally embedded, instruments capable of assessing the consequences of policies, plans programmes and projects from an integrated SDG perspective.

is similar. It is estimated that, over the next 40 years, passenger and freight travel will double over 2010 levels. To meet this demand, rail infrastructure will increase with an estimated 335,000 kilometres of rail track.

Much of the anticipated infrastructure development will be driven by the need to access resources, such as minerals, oil and gas and timber, as well as in order to improve trade and transportation. The infrastructure sector is intricately linked to developments in other sectors. This is why international economic corridors are high on the political agenda. Economic corridors are the focus of large targeted investment strategies, which include major transport systems and bilateral agreements on trade, power interconnection and generation, tourism, agriculture, and telecommunications.

Infrastructure serves to connect ‘nodes’ or ‘hubs’ with concentrations of activities such as seaports, industrial centres, regional distribution centres, urban areas and areas of agricultural development. Such linear infrastructure is aimed at enhancing the competitiveness of a corridor by reducing the cost of transport and of doing business and facilitating the start-up and operation of business ventures in the corridor. It includes roads, railways, waterways, pipelines, power lines and cables.

Corridors may be turned into Special Economic Zones with special fiscal regimes, as a measure to boost economic activities within the corridor. Countries may also have geostrategic interests in the creation of international infrastructure corridors to have better access to their markets abroad.

Issues linked to infrastructure development

Direct impacts. The nature of infrastructure projects differs widely. Direct impacts depend on type of activity (e.g. road or pipeline), applied technology (e.g. above or underground pipeline), geographic circumstances (e.g. seismic, flood, weather related risks), type of ecosystem (e.g. wetland or dryland), population density (in relation to impacts by noise, dust, pollution, accident risks, etc.), traffic density (disturbance; wildlife-vehicle collision risk) and more. In general, linear infrastructure projects use

the concept of ‘effect zone’, i.e. a zone of a certain width parallel to the entire project, used to quantify potential negative ecological, environmental and social impacts.

From a biodiversity perspective important potential direct impacts are habitat loss, fragmentation, disturbance, altered drainage patterns, and erosion/sedimentation of aquatic habitats. Infrastructure can act as a barrier in wildlife migration corridors; road induced animal mortality can be significant; power transmission lines are notorious bird killers. Transport infrastructure may serve as a means to rapidly spread invasive, non-native plant and animal species.

Indirect impacts. Infrastructure facilitates further developments, with intended (e.g. planned human settlement) or unintended consequences (e.g. illegal settlement, hunting or logging in formerly inaccessible areas, spread of communicable diseases such as AIDS). These impacts are usually more severe and affecting a wider area than the direct infrastructure impacts. Especially road expansion can open up areas for new settlement and exploitation, potentially leading to overexploitation of resources, land speculation, human wildlife conflicts, loss of culture, local knowledge and livelihood of indigenous groups.

Planning hierarchy

In planning of economic corridors three tiers, or levels of decision making can be recognised. At each level both the nature of activities and the geographical area of intervention are more narrowly defined:

1. **Plan definition.** Based on national development policies, the needs and opportunities for development are identified within a broadly defined corridor. A corridor aims at connecting existing or potential development 'nodes' or 'hubs' to (inter)national markets. Sectors to be developed are identified and related infrastructure needs, defined. Often, a corridor connects different countries, so the planning may be coordinated under a supranational body. In this phase a corridor may be represented by a network of connected nodes; lines connecting the nodes do not necessarily have to be geographically defined (yet).
2. **Programme definition.** Based on priorities defined in the overarching plan, investment programmes for a specific area and/or sector are defined, closely coordinated with the identification of alternative types and routings of linear infrastructure. For example, the transport of goods can be done by road, rail, waterway or multimodal. Obviously a national transport policy will provide guidance. The routing alternatives are geographically defined zones up to some 100 km width.
3. **Project definition.** Definition of concrete projects to be implemented. For linear infrastructure the focus lies on

Table 1: Wildlife impacts by linear infrastructure UNEP/CMS/COP11/Doc.23.3.2

Potential Impact	Roads	Rail Lines	Pipelines	Fencing ¹
Wildlife strikes	High	Medium	Low	Not applicable
Entanglement/trap mortality	Not applicable	Not applicable	Low	High
Habitat fragmentation	High	High	Low	High
Altering behaviour	High	High	Low	High
Barrier to movement	High	High	Low	High
Altering use of habitat	High	High	Low	High
Increased human presence	High	Medium	Medium	Not applicable
Increased hunting	High	Low	Low	Not applicable
Conduits for invasive alien species	High	High	Low	Not applicable
Effects on population genetics	High	High	Low	High
Air pollution	High	Low	Not applicable	Not applicable
Altering natural processes	Low	Low	Low	High
Changed discharges in water bodies	High	High	Medium	Not applicable

Relationship rating: high - High (red) medium - Medium (green) low - Low (yellow) not applicable - Not applicable (blue)

technical design and selection of the exact location within the selected routing zone.

In practice, corridor development will not neatly follow the above hierarchy. A corridor initiative often builds on ongoing regional development processes; it is a combination of up-to-date existing activities, upgrading of old facilities and completely new activities. For example, the LAPSET corridor in Northern Kenya creates significant new infrastructure to connect the already upgraded port of Lamu with the hinterland (see box 1). Contrary to this, the Southern Agricultural Growth Corridor of Tanzania (SAGCOT) is a public-private partnership intended to improve incomes, employment and food security in southern Tanzania, building on the already available infrastructure. The planning of multiple corridors in the Greater Mekong Sub region (see box 2) is a mixture of both.

The role of ESIA and SEA

Good Environmental Impact Assessment can prevent or remediate many issues at the level of individual projects. Many examples of good practice guidance documents on sustainable infrastructure development have been developed for countries, sub-sectors (roads, pipelines, powerlines, etc.) and themes (eco-friendly design measures; guidelines for areas with migratory mammals; etc.).



ESIA is, however, not capable of addressing issues like:

- Decisions at higher planning levels, on for example the strategic nodes to be connected, the priority sectors to be developed, the location and dimensioning of industrial zones to be developed, the type of infrastructure (e.g. road, rail, multimodal) to be developed, and the geographic location (routing) of such infrastructure.
- Assessing the in-country staff capacity, expertise, regulations, policies and institutions to coordinate the development of new corridors and to balance the interests of the corridor investors with other social, economic and environmental interests.
- Assessment of the contribution of the corridor to a country development strategy: how can projects in the corridor contribute to inclusive and sustainable growth (SDGs); how can they contribute to a National Biodiversity Strategy and Action Plan (NBSAP)?
- Assess the access to required resources (e.g. power and water).
- Availability of labour; social cohesion within communities of locals and migrant workers.
- The cumulative, cross-boundary and climate change effects of all activities.

What SEA can provide

Interconnected projects along entire corridors may have cumulative and multiplier impacts on: sustainability; critical ecosystems and biodiversity; and the poor and disadvantaged. These impacts are likely to be significant and will require an integrated approach to management. Corridor-wide SEAs are therefore needed as a basis for shaping and guiding development and for setting the context for more detailed environmental assessment at lower planning level. An increasing number of such SEAs is being produced over the last decade, often initiated by multilateral donors, but increasingly adopted by individual countries and international corridor authorities.

At the highest planning tier, the (inter)national economic corridor plan, SEA can contribute in:

- Integrating environmental, social and economic concerns and alternatives into corridor development planning;
- Align national sector plans within a country and between countries;
- Align the corridor plan with relevant other national policies, such as a National Biodiversity Strategy and Action Plan;
- Improve the cross-sector collaboration and coordination during the planning process;

- Assess the adequacy of the existing institutional capacity;
- Strengthening of relevant regulatory frame-works (environment, health & safety, cultural heritage, biodiversity, etc.);
- Addressing the cumulative, trans-boundary and climate change effects;
- Assessing consequences of population movements;
- (Required capacity for) Compliance and enforcement mechanisms;
- Streamlining of governance mechanisms and inter-ministry / international coordination.

An example of how SEA can position a corridor plan with a broader development context is the SEA for the East-African LAPSET Corridor. Example 2 is about the use of biodiversity corridors to inform decision making on economic corridors.

Example 1: SEA for the East-African LAPSET Corridor

The LAPSET Corridor Development Authority (LCDA) is developing the Lamu Port-South Sudan- Ethiopia (LAPSET) Infrastructure Corridor, an integrated transport infrastructure corridor. It spans over 2000 km and brings together Kenya, Ethiopia and South Sudan. The program consists of seven key infrastructure projects, including port development, interregional highways, crude and product oil pipelines, railway lines, 3 international airports, 3 resort cities, and a multipurpose dam along the Tana River.

The draft SEA has recently been published. In 47 meetings a total of 1871 stakeholders had the opportunity to discuss the proposed plans and raise issues. The SEA is a good example of SEA at the highest strategic level, superimposing an ambitious and large corridor plan on a region with serious environmental and social problems.

Six questions were framed to focus the SEA Study:

- What are the defining features of the Northern Counties targeted to be transformed through LAPSET;
- How well is LAPSET attuned to drive the economic transformation;
- What is the prevailing legal regulatory, policy, institutional and strategy framework;
- What opportunities are available for LAPSET;
- What are the social and environmental costs attendant to achievement of LAPSET goals;
- What measures need to be put in place to secure gains anticipated under LAPSET.

The impact analysis addressed three different perspectives: (i) the compatibility/relevance of the plan to government planning goals at national, regional and county levels; (ii) international standards for sustainable development, and (iii) stated stakeholder concerns and interests.

In the assessment the SEA identified a number of major concerns for the corridor:

LAND. Increasing structural poverty due to drought, declining land productivity, accelerated erosion. In a subsistence economy that relies on ecosystem goods and services, land becomes a critical resource whose access and control is central to livelihood security and is often defended aggressively. The impact of LAPSSET can be positive or negative and highly depends on how the programme is implemented.

WATER. On account of projected population growth, the national water availability situation will by 2030 drop to absolute scarcity. Water demand will largely outstrip supply by 2030. Imposition of LAPSSET interventions on such strained water budgets will aggravate an already stressed scenario.

WILDLIFE. LAPSSET is being developed against the backdrop of massive decline in the national wildlife resource base, referred to as Kenya's silent disaster. Yet, wildlife provides the main selling point for tourism, Kenya's number one foreign income earner. The Corridor interferes with 13 protected areas, many community-owned and private ranches or conservancies, 12 important bird areas, 10 National Parks or Reserves and several migration routes of large mammals. Although the transport corridor itself will pose direct and long-term consequences to wildlife, it is the anticipated realignment in land-use that will probably pose the greatest threat.

POTENTIAL CONFLICT. The most drastic long-term impact of LAPSSET is land use transformation along the Corridor and beyond. A scenario whereby jobs and opportunities associated with LAPSSET appear to benefit newcomers at the expense of locals can be a potential source of conflict. Armed conflict between groups of mobile pastoralists driven from their dry season grazing area and other groups already is a fact of

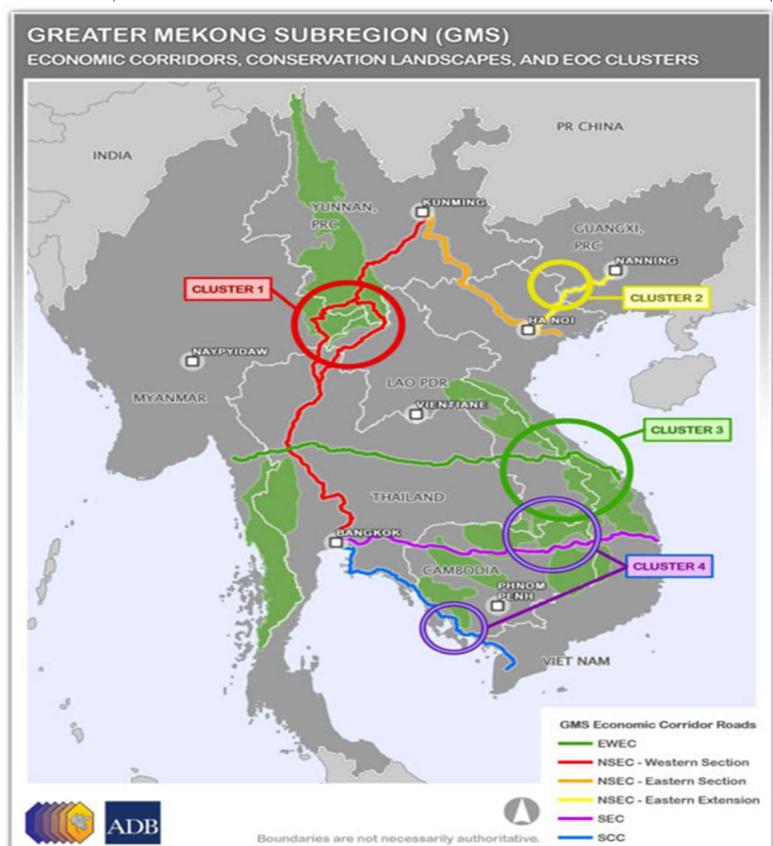
life in the region; sabotage of the corridor is considered a possibility.

A large number of measures is defined to counteract the observed problems, in terms of (i) policy adjustments, (ii) legislative action, and (iii) strategic action plans, all within a set time frame. The SEA further calls for follow up actions, such as full ESIA studies for all LAPSSET projects, Resettlement Action Plans for displaced people prepared in full consultation with stakeholders, and where doubts on the impact prevail, particularly with regard to water and wildlife, the pre-cautionary approach should be adopted.

Example 2: Biodiversity corridors in the Greater Mekong Subregion

The Greater Mekong Subregion (GMS) is one of the fastest growing areas in the world. Under the GMS Economic Cooperation Program (ECP) billions have been spent on infrastructure to provide physical connectivity in the region. Physical transport corridors are developed to serve as economic corridors.

The GMS is also one of the world's richest biodiversity hotspots. The pressures associated with the region's economic growth are causing habitat fragmentation and unprecedented loss of biodiversity, including key





The role of ESIA and SEA in mainstreaming biodiversity

ecosystems services that sustain national economies. Without dedicated action, GMS may lose more than half of its remaining natural land and water habitats over the next century.

The GMS Core Environment Program (CEP) and the Biodiversity Conservation Corridors Initiative (BCI) were launched to, among other goals, (i) promote the use of SEA for economic corridors and sector strategies, and (ii) to establish sustainable management and use regimes in biodiversity conservation corridors.

BCI consists of a network of connected protected and sustainable use areas to conserve the region's critical ecosystems. Biodiversity corridors are a strategy for combating habitat fragmentation and conserving threatened species and high-value ecological processes that require large spatial areas for their viability over the long-term. This resulted in a map with clearly demarcated areas of prime conservation interest.

The very existence of the Biodiversity Corridor map has had a significant impact: (i) all planning studies took the map into account; (ii) the international donor community puts heavier requirements on projects located in the biodiversity corridor; (iii) additional safeguards are being requested for proposed projects; and (iv) national leaders of the participating countries have signed for the BCI.

By simply superimposing an economic corridor development plan over the biodiversity corridor map, areas of potential conflict are highlighted and the need to think about potential alternatives or mitigation measures immediately becomes obvious. SEA provided the procedural context to facilitate this process. In the pilot SEA for the North-South Economic Corridor a start was made to also add ecosystem services to the BCI map.

At the **second planning tier** of programme development, SEA can assist in:

- Align the routing alternatives with spatial / regional development plans;
- Assess location alternatives of industrial zones in relation to infrastructural connectivity;
- Assessing potential positive and negative interactions with productive sectors (livestock, agriculture, fisheries, etc.);
- Establishing priorities for conservation and development, characterisation of stakeholders;
- Addressing human rights, land use rights, and community participation;
- Planning of public services where new developments are expected (education, healthcare, public water supply).

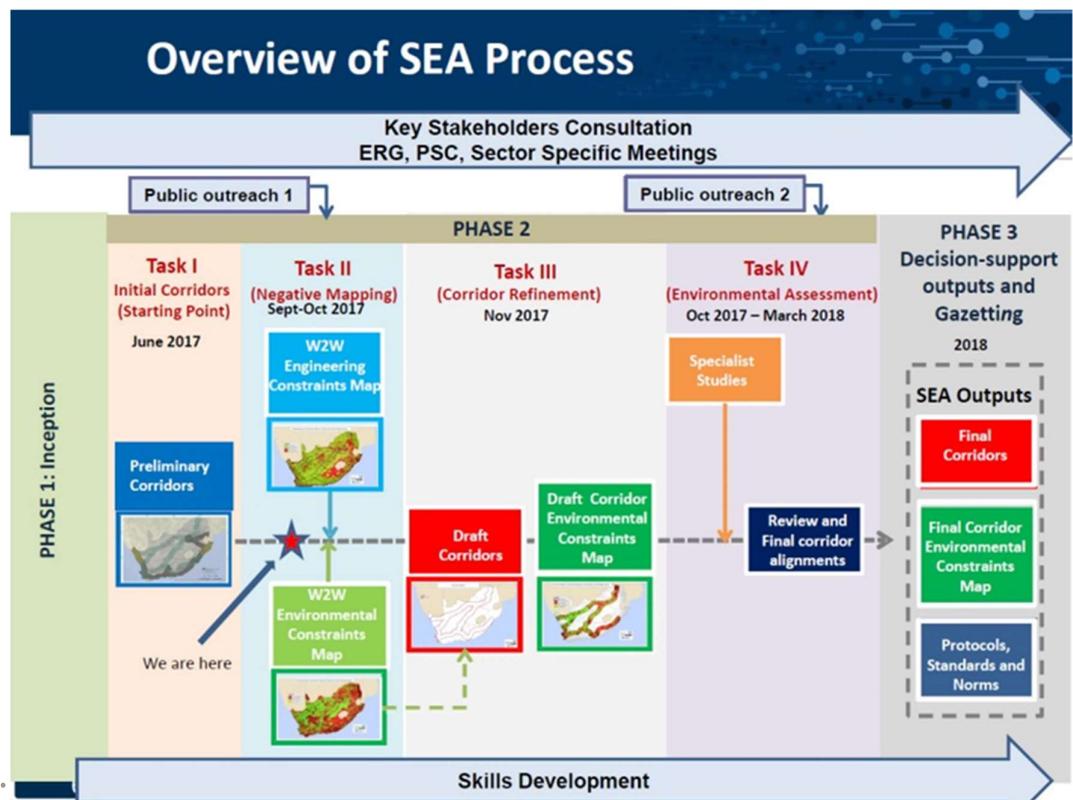
Example 3 provides information on how SEA can pro-actively inform routing decisions.

Example 3: Steps in the SEA for the development of a gas pipeline network for South Africa

Phase 1: Positive mapping based on energy supply and demand resulting in preliminary corridors

Phase 2: Assessment Phase

- Task I: Confirmation of initial corridors – 100 km wide, linking supply and demand areas. Gather





information from gas users, business and government stakeholders.

- Task II: Negative mapping, based on environmental (biodiversity!) and engineering constraints; identify areas of low, medium/high (mitigate) and very high sensitivity (avoid).
- Task III: Corridor refinement: optimal placement from 'utilisation' and 'constraints' perspectives
- Task IV: Specialists assessment and stakeholder input for final energy corridor alignment
- Task V: Gazetting process – release of SEA for public comment

Phase 3: Decision-Making Framework: environmental management measures and planning interventions for inclusion in legal environmental framework and local government planning tools.²

Advantages of SEA

For governments, the use of SEA leads to better preparedness and strengthened governance for management of social, biodiversity and natural resources issues. It provides clarity of tasks that need to be carried out, with clear



division of responsibilities over different government agencies and private sector partners. It furthermore provides a clear view on the anxieties and aspirations of other stakeholders in society.

For society the use of SEA may lead to a better contribution of an economic corridor to regional and national development, while minimising its negative consequences. The weakest groups in society and biodiversity receive the extra attention they require, preferably accompanied by pro-poor and pro-environment investment options.

Decision-making needs	Environmental and social assessment issues
<p>National policies related to economic corridors</p> <ul style="list-style-type: none"> • National development policy • Sector and spatial policies • Regulatory frameworks (social, environmental, biodiversity, financial) • Additional investment needs (public services, urban planning, etc.) • Capacity needs (compliance & enforcement, vocational education, r&d, etc.) 	<p>Economic Corridor SEA</p> <ul style="list-style-type: none"> • Development scenarios • Infrastructure alternatives / combinations • Assessment of adequacy of institutions • Stakeholder analysis & consultation • Present and future situation (business as usual) • Assessment criteria: environmental and social • Risk assessment • Governance arrangements/ international coordination
<p>Corridor programme definition</p> <ul style="list-style-type: none"> • Connect supply and demand areas • Specify objectives and design criteria • Organise (inter)national and regional sectoral and stakeholder coordination • Align with regional planning 	<p>Routing Programme SEA</p> <ul style="list-style-type: none"> • Assess alternative routings and technologies • Regional stakeholders consultation • Environmental, biodiversity and social priorities • Consistency with regional / spatial planning • Sector interactions & cumulative impacts
<p>Infrastructure project</p> <ul style="list-style-type: none"> • Siting and License decisions • Enforcement of Environmental and Social Management Plan • Roles & responsibilities of proponent and local government 	<p>Project ESIA</p> <ul style="list-style-type: none"> • Requirements for construction and operation, including mitigation and compensation measures • Site specific location alternatives • Resettlement planning and compensation • Communities involvement plan

²<https://gasnetwork.csir.co.za/sea-process/>



For the private sector the use of SEA by government agencies has the advantage of working with well-prepared government agencies that know what social, economic and environmental issues are at stake. Necessary regulatory instruments have been prepared. Such clarity of roles and responsibilities for private companies and government agencies may contribute to effective investments and maximising benefits for companies as well as society. The process takes place within transparent boundaries of sustainable and inclusive development and is established in collaboration with stakeholders from society. Last but not least, ESIA for private or public investment projects becomes much easier, with significant data already available and clear social and environmental conditions provided.

The NCEA

The Netherlands Commission for Environmental Assessment is an independent body of experts. It advises national and international governments on the quality of environmental assessment reports in order to contribute to sound decision-making. In addition, the NCEA supports the strengthening of EA systems in low and middle income countries and makes its extensive knowledge of environmental assessment available to all.

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Examples of SEAs for plan- and programme level

Plan level SEAs

- 2017. SEA for LAPSET Corridor Development (Kenya, South Sudan, Ethiopia) <http://www.lapsset.go.ke>
- 2012. Strategic Regional Environmental and Social Assessment (SRESA) Interim Report of SAGCOT: the Southern Agricultural Growth Corridor of Tanzania <http://www.sagcot.com/>
- 2012. Strategic Environmental, Poverty and Social Assessment of Trade and Transport Sector Reforms in Pakistan (World Bank)

Programme level SEAs

- 2009. GMS-CEP North-South Economic Corridor Strategy and Action Plan, linking Kunming to Bangkok, Kunming to Hanoi, and Hanoi to Nanning. <http://www.gms-eoc.org>
- 2016. Northern Economic Corridor (NEC) - SEAs for the Uganda and Kenya sections. <http://www.works.go.ug/nec/>
- IRRSA. South American Council of Infrastructure and Planning (COSIPLAN) has under the IRRSA infrastructure programme developed a Strategic Environmental and Social Evaluation Methodology for their network of corridor plans. <http://www.iirsa.org/>