Ref. Ares(2017)3086183 - 20/06/2017

European Commission

Integrating the environment and climate change into EU international cooperation and development: Towards sustainable development

SECTOR NOTE: WATER AND SANITATION




This sector note has been prepared to complement the European Commission (EC) Guidelines on *Integrating the environment and climate change into EU international cooperation and development: Towards sustainable development* (EC, 2016a; hereafter referred to as 'the Guidelines'). It provides specific guidance for actions in the water and sanitation sector. The Guidelines and other mainstreaming tools are available on Capacity4Dev.

Part 1: Policy basis

Access to water and sanitation is an essential element of human development and well-being, and is recognised as a human right — its limited realisation primarily affects the poor. Water supports all life processes, and water resources underpin health, livelihoods, agriculture and food security, industrial activity, energy generation, the functioning of ecosystems and more. As a result of demographic and economic growth, demand for water is rising, and there is growing competition between water uses and users. Concurrently, an increasing number of regions across the globe are suffering from water scarcity and deteriorating water quality. Sustainable water resources management, including the development of adequate sanitation services, is thus a must for all development interventions; it is also crucial for effective climate change adaptation.

In recognition of the important linkages between sustainable development and the water sector, the European Union (EU) has both adhered to key global initiatives and commitments, and developed a set of policies which emphasise the importance of increasing access to water and sanitation and improving the management of water resources as a public good supporting many areas of social and economic development.

The **2030 Agenda for Sustainable Development** is a commitment by world leaders to balance economic, social and environmental objectives. It puts environmental sustainability and climate change at the heart of development. Mainstreaming environment and climate change into water sector management is essential to achieving many of the Sustainable Development

'Water is the primary medium through which climate change influences Earth's ecosystem and thus the livelihood and well-being of societies'.

— UN-Water, 2010

Directorate-General for International Cooperation and Development

Goals (SDGs), particularly the following. [i put these in number order]

- **Goal 2 — Zero hunger.** Improved access to water and sanitation integrating environmental and climate-related considerations can contribute to ending malnutrition and reducing stunting and wasting in children (Target 2.2), doubling the agricultural productivity and incomes of small-scale food producers (Target 2.3), ensuring sustainable food production systems and implementing resilient agricultural practices (Target 2.4).

- **Goal 3 — Good health and well-being.** Environmentally sustainable access to water and sanitation services can contribute to ending preventable deaths of newborns and children under age five (Target 3.1), combating waterborne diseases and other communicable diseases (Target 3.3), and reducing the number of deaths and illnesses from pollution (Target 3.9).

- **Goal 6 — Clean water and sanitation.** Mainstreaming supports the targets associated with achieving access to safe and affordable drinking water for all (Target 6.1), achieving access to adequate sanitation and hygiene for all (Target 6.2), improving water quality (Target 6.3), substantially increasing water use efficiency and reducing the number of people suffering from water scarcity (Target 6.4), implementing integrated water resources management (IWRM; Target 6.5), and protecting and restoring water-related ecosystems (Target 6.6).

IWRM is 'a process which promotes the coordinated development and management of water, land and related resources in order to maximise economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems' (GWP, n.d.).

- **Goal 12 — Responsible consumption and production.** Mainstreaming in the water sector supports the sustainable management and efficient use of natural resources (Target 12.2); and is in line with the objective of reducing the release of chemicals and wastes into air, water and soil (Target 12.4).

- **Goal 13 — Climate action.** Sustainable water resources management is crucial to strengthening resilience and adaptive capacity to climate-related hazards (Target 13.1), while adequate wastewater treatment can contribute to climate change mitigation objectives.

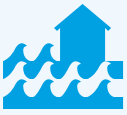
- **Goal 14 — Life below water and Goal 15 — Life on land.** Sustainable water resources management supports the sustainable management, protection and restoration of coastal ecosystems (Target 14.2); the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services (Target 15.1); efforts to combat desertification and land degradation (Target 15.3); and action to reduce the degradation of natural habitats and halt the loss of biodiversity (Target 15.5).

Mainstreaming of environmental and climate-related considerations in water sector development can also contribute to **Goal 7 — Affordable and clean energy**, as water plays a significant role in both renewable and

DID YOU KNOW THAT…?

Water use is growing twice as fast as population: by 2025, 1.8 billion people will be living in countries or regions with absolute water scarcity, and two-thirds of the world population could live under water stress conditions (UN-Water, 2013)

Up to 90% of wastewater in developing countries flows untreated into rivers, lakes and coastal zones, threatening health, food security and access to safe drinking and bathing water (~~WWAP, 2012 based on~~ Corcoran et al., 2010) [ok?]



90% of natural disasters are water related, and their frequency and intensity tend to increase (WWAP, 2012) [that's not a publication in the source list; please advise]

non-renewable energy generation; **Goal 8 — Decent work and economic growth**, in relation to resource efficiency in consumption and production and efforts to decouple economic growth from environmental degradation; **Goal 9 — Industry, innovation and infrastructure**, in relation to greater adoption of clean and environmentally sound technologies and industrial processes; and **Goal 11 — Sustainable cities and communities**, as water and sanitation infrastructure are an important aspect of sustainable human settlement planning and management.

The Paris Agreement on Climate Change, adopted in the context of the United Nations Framework Convention on Climate Change (UNFCCC), is the first-ever universal, legally binding global climate agreement. It outlines a strong shared vision and ambition to combat climate change and undertake actions and investment that promote low-carbon, resilient and sustainable development. Mainstreaming environment and climate change into water sector development is key to climate change adaptation, as changes in rainfall patterns and the water cycle are one of the main causes of adverse impacts of climate change on human well-being, economic activities and ecosystems. The sector also offers opportunities to contribute to climate change mitigation, e.g. through improved management of wastewater.

Many developing countries have identified water as a key sector for implementation of the adaptation component of their intended nationally determined contributions (INDCs; C2ES, 2015). These INDCs are a central feature of the Paris Agreement and become nationally determined contributions (NDCs) upon country ratification of the agreement. [kept wording as per energy note; ok?] Agricultural water management, flood and drought management, integrated water management [IWRM?] and improved access to drinking water feature prominently in developing country (I)NDCs; some also identify water-related opportunities for mitigation, e.g. in relation to hydropower, energy production from wastewater or reduced use of fossil fuels for irrigation water pumping (FWP and Coalition Eau, 2016).

At the EU level, the 'Proposal for a new European consensus on development: Our world, our dignity, our future' (EC, 2016b) recognises that 'water demand and water stress will increase significantly over the next decades, making it a major challenge for adaptation to climate change impacts'. It reaffirms the commitment of the EU and its Member States to support improved access to water 'without damaging effects on the environment', through support for sustainable and integrated water management.

The global strategy for the EU's foreign and security policy, 'Shared vision, common action: A stronger Europe' (EU, 2016), notes that 'climate change and environmental degradation exacerbate potential conflict, in light of their impact on desertification, land degradation, and water and food scarcity'. In response to this threat, the EU intends to support partner governments in surrounding regions to 'devise sustainable responses to food production and the use of water and energy'.

Two EU commitments entail increased attention to and spending on actions related to climate change and biodiversity:

- 'A budget for Europe 2020' (EC, 2011a) stipulates that 'Climate action objectives will represent at least 20% of EU spending in the period 2014–2020'. In

DID YOU KNOW THAT...?

positive trends

~~Globally, agriculture accounts for about 70% of freshwater withdrawals and up to 90% in some developing countries;~~ improved irrigation practice has the potential of increasing water use efficiency from 30-50% to over 80% (www.gwp.org; FAO, 1997) [very old data! please advise]

The potential savings from increased water productivity in irrigation could be as high as USD 115 billion annually by 2030 (WWAP, 2016, based on Dobbs et al., 2011)

In developing countries, the benefit-to-cost ratios of investment in basic water and sanitation services can be as high as 7 to 1 (WWAP, 2016, based on OECD, 2011).

the water sector, this implies [best word?] systematically addressing water resource sustainability in the context of a changing climate. Increasing the share of the external cooperation budget dedicated to climate change–relevant actions — notably through support for sustainable water management as a means of adaptation — is one way for the EU to contribute to the international objective of mobilising USD 100 billion per year by 2020 to help developing countries respond to climate change.

- The EU has endorsed the Hyderabad objective to 'double total biodiversity-related international financial resource flows to developing countries by 2015 compared to an agreed average from 2006–2010 and to at least maintain support at that level until 2020' (UNEP, 2014). The water sector offers [insert modifier? numerous? rich?] opportunities to contribute to meeting this pledge.

A variety of other **policy commitments** require an increasing focus on mainstreaming environment and climate change into water sector interventions, including the following.

- 'Water management in developing countries: Policy and priorities for EU development cooperation' (Commission of the European Communities, 2002) notes that water is a fundamental social, economic and environmental resource, and is thus a key issue in poverty reduction and sustainable development; sound environmental sanitation is 'essential for human health, dignity and productive work'. It stresses the importance of addressing environmental concerns and adopting integrated approaches to water resources management.

- 'EU development policy in support of inclusive growth and sustainable development: Increasing the impact of EU development policy' (EC, 2010) stresses the need for sustainable use and management of natural resources including water, and for increased focus on major issues such as water scarcity in the context of climate change.

- 'Protection of water resources and integrated sustainable water management in the European Union and beyond' (Council of the European Union, 2011) underlines the importance of mainstreaming environment and climate change into the water sector, recognising the value of water-related ecosystem services, and acknowledging their transboundary nature (i.e. the fact that aquifer systems, lakes, rivers and river basins frequently straddle borders, which calls for cross-border management of water resources).

- 'Council conclusions on EU water diplomacy' (Council of the European Union, 2013) stress that 'managing the effects of climate change and demographic and economic development, as well as reconciling different uses of water resources such as drinking water and sanitation, agriculture, food production, industry and energy, are major water security challenges'. In this context, the new EU Water Diplomacy initiative supports strengthened international cooperation to address these challenges and prevent water-related conflicts.

To support investment in water and sanitation, the EU launched the EU Water Initiative in 2002. Its mission is to help strengthen political commitment through innovative partnerships and collaboration so as to promote a multi-stakeholder approach to water and sanitation that comprehensively addresses social, economic and environmental objectives. In parallel, EU international cooperation interventions are increasingly supporting and implementing an approach based on the **water-energy-food security nexus**. This approach supports cross-sectoral analysis of the complex interdependencies that exist between food security, access to energy and water use — recognising that (i) water, land and energy are part of the same ecosystems; (ii) production of drinking water, energy and food depends on the same natural resources and ecosystem services; and (iii) each sector depends on services from the other sectors (EC, 2015b). Consequently, the nexus approach promotes more coordinated and integrated management of natural resources across sectors and scales to manage trade-offs and exploit synergies (FAO, 2014).

These commitments and initiatives are fully in line with the EU's **own water policy**, as recently restated in the 'Council conclusions on sustainable water management' (Council of the European Union, 2016). These emphasise the need for mainstreaming sustainable use and management of water resources into other policies including those related to food, agriculture, fisheries, energy, transport, industry, spatial planning, urban development and tourism; encourage the use of

green infrastructure measures such as natural water retention to safeguard and enhance the water storage potential of landscapes and aquifers; and promote water re-use, combined with water saving and efficiency measures, to address water scarcity and adapt to climate change.

Green infrastructure is 'a strategically planned and delivered network of ecosystems and green spaces including parks, rivers, wetlands and private gardens. It focuses on ecosystems that provide important services such as storm water protection, water and air quality improvement as well as regulation of local climate' (TEEB 2010, p. 113).

Part 2: Why mainstream?

Access to safe and adequate water and sanitation services is crucial for ensuring the population's health and productivity, and for achieving human development and economic growth. All freshwater ultimately depends on healthy and well-functioning ecosystems. Ecosystem degradation, combined with greater variability in rainfall arising from climate change, can lead to water scarcity, water quality deterioration and severe droughts and floods — negatively affecting socio-economic development, especially in developing countries that are often highly exposed to water risks. Over-extraction of water, especially for agriculture, has led to widespread ecological disasters in many areas of the world, such as the shrinking of the Aral Sea and rising salinity in the once-fertile plains that surround it. Poor management of sanitation and other liquid waste has resulted in serious pollution of waterways in many countries, degrading ecosystems which are essential in conserving water resources and leading to severe health impacts.

As the pressure on finite water resources increases, so too does the need to integrate environment and climate change into water management operations in order to preserve the ecosystems that regulate water flows throughout the year and minimise both overuse and contamination of surface and groundwater. The effects of climate change also need to be taken into account, as many adaptation and mitigation options entail greater use of water while the availability of the resource decreases or becomes less predictable.

Mainstreaming environment and climate change in the water sector also offers plenty of opportunities, notably for enhancing livelihoods and development outcomes — e.g. by supporting green job creation and innovation in relation to water recycling, wastewater re-use and water efficiency. Table 1 and Part 4 provide further examples of opportunities.

Mainstreaming is defined by the EC as 'the process of systematically integrating a selected value/idea/theme into all domains of the EU development cooperation to promote specific as well as general development outcomes' (EC, 2016a). Mainstreaming involves an iterative process of change in the culture and practices of institutions, aimed at balancing environmental, economic and social objectives and contributing to sustainable development.

Table 1 presents the key reasons for mainstreaming environment and climate change into sector development; the four categories noted in the table provide a structure for presenting opportunities for mainstreaming in this guidance note. Part 4 provides concrete guidance for mainstreaming, identifying risks and opportunities associated with water sector programmes/projects and activities and highlighting how they can be addressed or realised.

Part 3: When and how to mainstream?

There are opportunities for mainstreaming throughout the cycle of operations. Table 2 shows entry points and mainstreaming tools and actions that can be used or taken at different stages of the cycle. Policy dialogue (Box 1) occurs at all phases as an ongoing process.

Guidance for each phase and a short explanation about the proposed tools are provided in the text below; also see the Guidelines for definitions of the tools and other key terms.

Table 1 **Why mainstream environment and climate change in the water sector?**

To address environment and climate–related risks and constraints that could jeopardise achievement of the objectives of partner policies, plans and programmes supported by the EU	• **To ensure that policies, plans, programmes and investments in water and sanitation infrastructure supported by the EU are resilient to the effects of climate change** (e.g. ensuring that water sector infrastructure is climate-proofed against droughts, floods, extreme weather events and sea level rise) • **To ensure that water and sanitation investments and services are not threatened by environmental degradation** (e.g. no reduction in the quantity and/or quality of water resources available due to catchment and ecosystem degradation including contamination from human settlements) • **To anticipate the effects of climate change on water demand patterns and water supply capacity** • **To better assess and manage the trade-offs and synergies inherent in the water-energy-food security nexus** (e.g. competition for water between hydropower generation and food production)
To identify, avoid and mitigate any harmful impacts of EU development cooperation on environment and climate	• **To ensure that partner policies, plans and programmes supported by the EU do not significantly increase greenhouse gas emissions** (e.g. ensuring that water sector operations are energy efficient and, where possible, use renewable energy sources; and that wastewater is treated and sludge adequately disposed of) • **To ensure that partner policies, plans and programmes supported by the EU do not cause significant environmental damage** (e.g. by ensuring that wastewater is treated and disposed of safely, or that larger water resource developments such as dams conserve ecosystems and biodiversity) • **To better assess and manage the environmental trade-offs associated with water sector policy and specific investments** (e.g. increased water use efficiency in irrigation systems, if not compensated by a reduction in water withdrawals, will reduce the amount of water available to downstream users from irrigation system losses in the form of return flow and aquifer recharge) (FAO, 2012)
To realise opportunities for longer-term benefits for socio-economic development	• To achieve major gains in **public health** and realise the **human rights** of the mostly poor and marginalised communities which are without safe water and sanitation • To improve the health, productivity and **access to education** of children, especially girls, by reducing the burden of carrying water and ensuring dignified school sanitation facilities • To reduce people's **vulnerability to external shocks** and threats to their lives and livelihoods (e.g. by reducing the incidence and severity of floods as a result of implementing effective catchment management practices) • To support the **creation of green jobs** (e.g. associated with the use of recycled water and treated wastewater in agriculture, horticulture and aquaculture; or the deployment and servicing of water-efficient irrigation equipment), thus contributing to the transition to a **green economy** • To exploit the **productivity, efficiency and competitiveness gains** associated with water use efficiency measures in the domestic, commercial, industrial and public spheres
To realise opportunities contributing to EU policies on environment, climate change and biodiversity	• To curb environmental degradation and enhance access to clean water and sanitation services (**SDGs**) • To integrate environmentally sustainable, low-carbon options in partner policies, plans and programmes supported by the EU (e.g. by generating electricity from sludge waste at wastewater treatment plants) • To increase developing countries' **access to green economy technology** and the **engagement of the private sector** in related infrastructure development and value chains • To increase the engagement of the private sector in developing countries in green economy technology (e.g. by developing sanitation-related infrastructure and services as businesses) • To contribute to global commitments to **protect biodiversity** and **combat desertification** (e.g. through water and soil conservation measures, sustainable management of catchments including environmental protection, and the use of water allocation rights to ensure safe extraction levels) • To contribute to **conflict prevention** by working on environmental management of transboundary water courses, as research has shown that no countries engaged in cooperating over water resources have gone to war and that cooperation over water can lead to broader political cooperation (Strategic Foresight Group, 2011)

Table 2 Mainstreaming opportunities throughout the cycle of operations

PHASE	MAINSTREAMING TOOL OR ACTION	
Programming	• Country environmental profile (CEP)	Policy dialogue/capacity development
Identification and formulation	• Environmental and climate change screening and identification of needs for a strategic environmental assessment (SEA), environmental impact assessment (EIA) or climate risk screening [shouldn't that be CRA?] • SEA • EIA • Climate risk assessment (CRA) • Rio markers	
Implementation	• Environmental management plan (EMP) • Climate risk management plan (CRMP) • Monitoring indicators • Results-oriented monitoring (ROM) missions	
Evaluation	• Evaluation indicators	

Programming

Identifying environmental and climate change risks and opportunities early on in the cycle of operations means they will be more effectively addressed, as necessary financial provisions can be made and the framework set for mainstreaming in subsequent phases.

The key elements of EU development cooperation in any given country or region are specified in the programming documents, particularly the Multiannual Indicative Programmes (MIPs) which highlight the overall and specific objectives, expected results and programming indicators in selected focal areas.

Entry point: Country situation analysis

The country situation analysis is the first entry point for mainstreaming in the programming phase. If programming has been completed, the country situation analysis can be updated in preparation of mid-term reviews, where they are planned, or in the preparation of future programming cycles.

Mainstreaming action: **Analyse the country environmental and climate change context.**

The analysis should provide an overview of a country's environmental and climate change issues, as well as of the related institutional, policy and regulatory framework. It should assess these vis-à-vis their relationship to poverty, look at previous and ongoing donor support, and provide recommendations for better mainstreaming. A succinct and proven tool for undertaking this analysis is the country environmental profile (CEP), which identifies and analyses key environmental and climate challenges and opportunities, and informs strategic orientations in light of these. The CEP should also cover the economic opportunities linked to improved environmental management and climate change mitigation and adaptation. Where water is anticipated to be a focal sector, some aspects that could be addressed include the following:

- **the nature, magnitude and severity of environmental degradation caused by water abstraction and use** (see Part 4 for examples);
- **the nature, magnitude and severity of impacts of environmental degradation and climate change on the water and sanitation sector** (see Part 4 for examples);

BOX 1 Policy dialogue: A key element of effective mainstreaming

Experience shows that simply applying environmental impact and assessment tools does not necessarily result in improved environmental and climate-related performance of a sector policy, programme or project, especially if they remain donor-led exercises with little or no national ownership. This is where policy dialogue comes in. Such dialogue can help partner governments and the EU reach consensus on the goals and priorities of development cooperation, and it plays a critical role in the promotion of the environment and climate change mainstreaming agenda.

Policy dialogue takes place throughout the entire cycle of operations. Because of the strong linkages between water and other key social and economic sectors, policy dialogue on water and sanitation should be extended beyond the ministry in charge of water to ministries responsible for health, agriculture, natural resources, forestry, fisheries and aquaculture, town [city?] and country planning, energy, industry, mining, transport and tourism — and ideally also engage the private sector and civil society organisations. Environment and climate change should be an integral part of this dialogue, with key points raised including the following:

- **relevance of mainstreaming from a development perspective**, e.g. [ok? to make all bullets parallel construction] to raise awareness of the economic costs of environmental degradation associated with sector activities, the economic costs of insufficient integration of environmental and climate change aspects in sector development and investment, and the economic benefits associated with investment in in water use efficiency (see Part 4 for examples);
- **inter-sectoral coordination** to promote coordination across sectors, institutions and users, as competencies regarding water and sanitation are spread widely and IWRM requires strong collaboration mechanisms;
- **need for, and value of, monitoring the sector's environmental performance and climate resilience to allow for informed decision-making**, e.g. to support the planning of catchment rehabilitation activities based on the identification of high-priority 'hotspots';
- **options for mitigating negative environmental impacts on the sector** (see Part 4 for examples);
- **options for harnessing the social and economic benefits of sustainable water resources management** (see Part 4 for examples);
- **capacity and institutional needs to enable national stakeholders to engage in these options**, e.g. with regard to the awareness and capacity of industry associations to promote water use efficiency and re-use of water, or the integration of IWRM skills in academic and technical/vocational education curricula;
- **reflection on lessons learned and environmental performance of the sector**, e.g. the outcomes of pilot or more advanced experiences with the promotion of improved sanitation and hygiene education; with more efficient use and re-use of water; or with improved allocation of water rights and the development of market mechanisms to trade them.

Policy dialogue is most effective when backed up with evidence and information, such as data, studies and examples of previous experiences.

- **the trade-offs and synergies inherent in the water-energy-food security nexus, and their implications for natural resources management** — e.g. competition for water resources between energy sector and agricultural and environmental uses, [ok?] role of access to water and sanitation in improving food security and nutrition;
- **the drivers of unsustainable practices** — e.g. fuel subsidies promoting excessive pumping of water for irrigation, other water subsidies;
- **obstacles to the transition to more sustainable water resources management practices** — e.g. failure to set adequate charges for water and sanitation services removing incentives for users to invest in water use efficiency and water resource protection, absence of a legal and regulatory framework for allocating water rights, weak land use and infrastructure planning processes;
- **options available for a transition to more sustainable water management practices** — e.g.

identification of areas where water use efficiency gains could be achieved at a relatively low cost or with a short payback period, implementation of IWRM practices;

- **opportunities for achieving co-benefits from investments in sanitation, wastewater treatment, water re-use and water use efficiency** (see Part 4 for examples).

If a CEP is not available and cannot be prepared, a range of other documents can be consulted for information on a country's environmental and climate change situation. Part 5 provides a list of possible sources of information. Box 2 provides an example of CEP use in the programming phase.

Entry point: Drafting the programming documents

Mainstreaming action: **Integrate environment and climate change into the Multiannual Indicative Programme.**

Based on the potential harmful effects, risks, challenges and opportunities identified earlier, the next step is to explore how to mainstream climate change and environment into the cooperation strategy. Opportunities to avoid or mitigate environmental damage, contribute to climate change mitigation and resilience, and support the transition to a green economy should be reflected in the MIP's overall objective, specific objectives, expected results and/or indicators. Part 4 provides examples of specific measures to promote environmental sustainability and address climate change in the water sector.

In identifying opportunities for mainstreaming, consider the following actions.

- **Develop or strengthen the policy and regulatory framework** (e.g. introduction of or improvements in fiscal mechanisms to provide incentives for water efficiency, water re-use, sanitation and safe disposal of liquid wastes; setting up of catchment management organisations; strengthening of inter-institutional coordination mechanisms among the different government bodies with competence over water resources management).

BOX 2 Case study: Lesotho's water sector reforms based on CEP recommendations

Lesotho's 2014–2020 National Indicative Programme (NIP) identifies water as one of the priority sectors to be supported through a sector reform contract. Based on the recommendations of the 2012 CEP, the NIP expands support to the water sector beyond water supply and sanitation to water resource and catchment management. This focus addresses the long-term challenge documented by the CEP of land degradation in watersheds. Also in line with the CEP, the NIP's intervention framework for the water sector incorporates the following indicator: 'Catchment conservation plans prepared, adopted and implemented for the six designated catchment areas'.

Sources: EU, 2012; EU, 2014b.

- **Build capacity** of public and private sector actors and industry associations to promote/implement environmentally sustainable and climate-resilient practices (e.g. capacity building for catchment management and biodiversity measures in water impoundment and hydropower schemes; training in water use efficiency measures for agricultural, industrial and domestic users).

- **Communicate and raise awareness** (e.g. through targeted seminars as well as television and radio campaigns, for a wider audience) about the environmental and climate-related stakes and the opportunities associated with sustainable water resources management.

Mainstreaming action: **Identify [did not change to "pre-identify"] the specific environment/climate change assessment tool(s) to be applied during identification and formulation and/or implementation.**

Three tools are available to analyse in detail the relationships between a programme/project and environment and climate change: strategic environmental assessment (SEA; applicable to policies and plans or to programmes and projects that provide strategic-level support), an environmental impact assessment (EIA;

applicable to projects) and a climate risk assessment (CRA; applicable to projects).

A note of explanation about strategic-level projects: Often, interventions based on the project modality provide sector support at a strategic level, e.g. through the development of sector policies and plans, enhancement of the sector's institutional set-up and regulatory framework, or support for multiple infrastructure investments. In such cases, an SEA is the relevant tool for mainstreaming environment and climate change.

These tools help analyse the potential impacts of implementing a programme/project on environment and climate and on climate change vulnerability, as well as its exposure and vulnerability to the effects of environmental degradation and climate change. They also help in identifying environmentally friendly options and appropriate measures to minimise risks and impacts and to make best use of opportunities.

Based on the objectives and expected results of EU cooperation in the selected focal sectors, and taking into account the anticipated aid modalities (project and/or programme-based/strategic-level support), conduct preliminary screening in accordance with the process described in Annex 3 of the Guidelines. Either: [ok?]

- include a commitment in the MIP to undertake an SEA, EIA and/or CRA; or
- if at this stage it looks like no such assessment will be required, provide a justification to this effect [ok?] (e.g. the existence of a reasonably recent and up-to-date SEA carried out by the government, the EU and/or other donors).

Mainstreaming action: Include indicators in the programming document that capture key environmental and climate change concerns.

The United Nations has developed a detailed set of targets and indicators for the SDGs, some of which will be directly relevant for EU-supported policies, plans and programmes within the water sector. The EC Directorate-General for International Cooperation and Development (DEVCO) has developed an EU Results Framework (EC, 2015a) as well as Sector Indicator Guidance for Programming (EC, 2013), which provides a list of indicators that can be used in each sector, including environment and climate change–relevant indicators for the water sector. Box 3 provides examples of indicators drawn from DEVCO practice and from the list of proposed SDG indicators.

Entry point: Policy dialogue

Mainstreaming action: Include environment and climate change in the policy dialogue agenda, and engage government and key stakeholders including civil society.

Policy dialogue is relevant throughout the programme and project cycle. A clear, simple and realistic agenda for policy dialogue that aims to advance mainstreaming in the water sector will emerge from the country analysis and from engagement with key stakeholders at programming and at all subsequent phases as experience is gained and issues arise. In the water sector, this engagement will include many actors, including policymakers and planners from the water sector and from key water-dependent sectors (see Box 1), sector regulators and specific agencies, water utilities and companies, current and potential investors and financial service providers, as well as private sector and civil society organisations representing water service users.

Identification and formulation

Mainstreaming is especially important during identification and formulation. The identification of a programme/project begins with an analysis of the situation, which should cover environmental and climate-related concerns and opportunities. Formulation fleshes out the programme/project design, which must include measures to minimise environmental impacts and climatic risks and make best use of opportunities to enhance the state of the environment and contribute to low-carbon, climate-resilient development.

Figure 1 presents a decision tree showing the sequence of decision-making for mainstreaming during this phase from problem analysis, through screening and assessment, to action formulation.

BOX 3 Examples of environment and climate change indicators for the water sector in country programming

- Fresh renewable water resources per person (m^3/person)
- Level of water stress (freshwater withdrawal as a percentage of available freshwater resources)
- Change in water use efficiency over time (e.g. intensity of water use in agriculture/energy sector/industry expressed as hl/output unit or value added unit) [edit ok? any way to simplify/ clarify? what's "hl"?]
- Water losses in piped systems (percentage of total supply)
- Percentage of population using safely managed drinking water services
- Percentage of population using safely managed sanitation services, including a handwashing facility with soap and water
- Percentage of wastewater safely treated
- Mortality rate attributed to exposure to unsafe water, unsafe sanitation and lack of hygiene (deaths per 100 000 people per year, total population and specific age groups such as under five)
- Degraded catchments (km^2)
- Rehabilitated and sustainably managed catchments (km^2)
- Existence/status of an IWRM plan
- Degree of IWRM implementation (0–100)
- Percentage of transboundary basin area with an operational arrangement for water cooperation
- Presence of effective environmental controls on water abstraction and disposal into water bodies
- Percentage of water bodies with good ambient water quality (quality criteria and thresholds to be defined)
- Percentage change in the extent of water-related ecosystems over time [ok?]
- Number of hectares of protected areas/ wetlands [ok?] managed with EU support

Entry point: Problem analysis

Mainstreaming action: Ensure the problem analysis identifies environment and climate change issues.

Part 4 provides some insight into the environmental and climate change risks and opportunities in the water sector. These issues and linkages can also be identified by reviewing certain key documents.

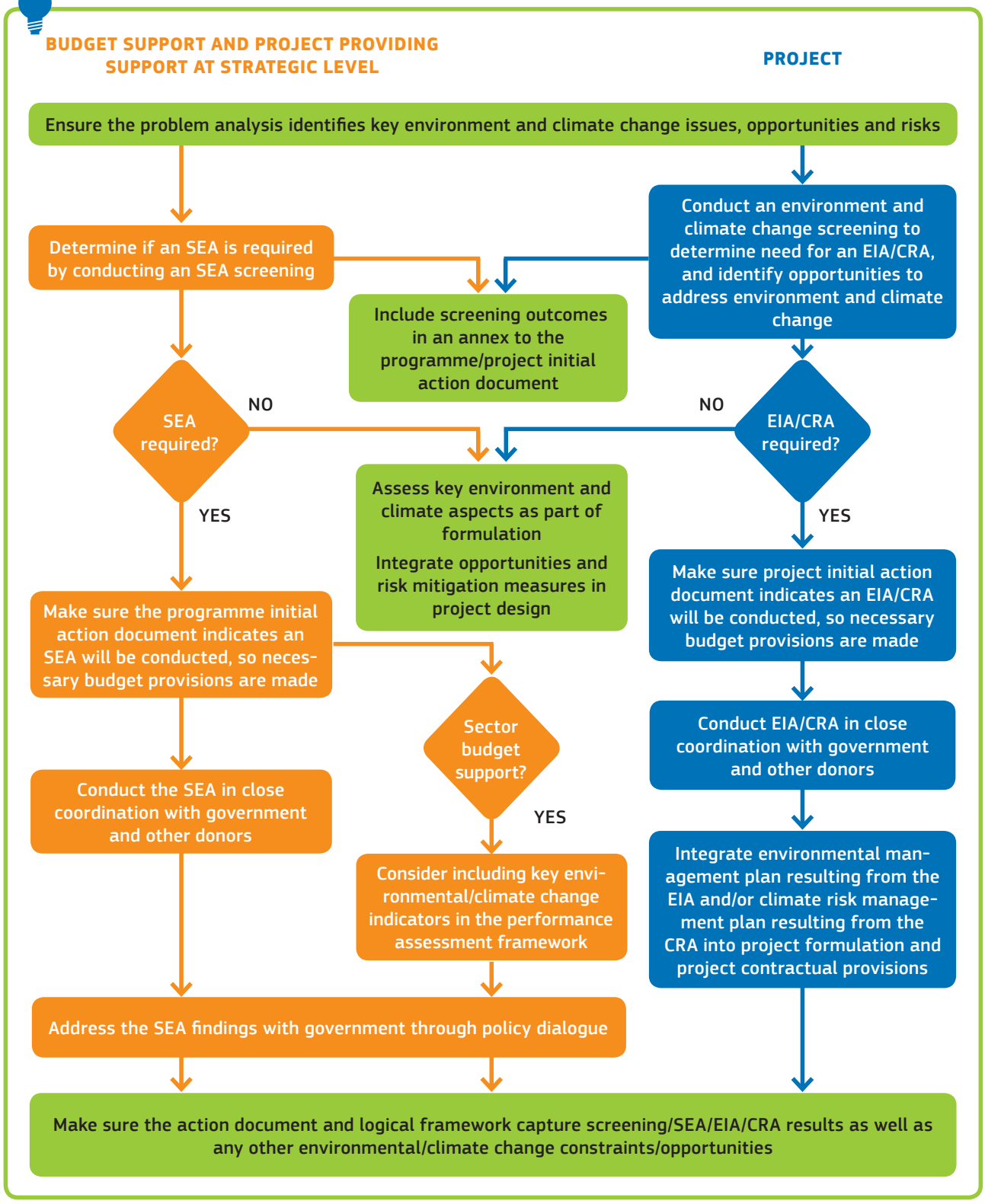
- **Policy documents** — such as sector policies, strategies and plans for the environment, climate change, the water sector and key water-dependent sectors — may provide an overview of environmental and climate change challenges in the country with regard to water and sanitation. They may also include specific environmental protection and climate change adaptation/mitigation objectives or measures relevant to the sector (e.g. commitments, targets or measures for increasing water quality in priority rivers and water bodies, improving water use efficiency, improving energy efficiency in the water sector, enhancing access to sanitation).

- The **national communications to the UNFCCC** provide an overview of the country's vulnerability to climate change by sector, as well as overall and sector-specific greenhouse gas (GHG) emissions. The NDCs set countries' objectives in the fight against climate change (mitigation and also adaptation in many cases). Similarly, national reports to the Convention on Biological Diversity (CBD) and the United Nations Convention to Combat Desertification (UNCCD) provide overviews of important environmental issues (respectively, biodiversity and land degradation) which are closely related to water.

See Part 5 for additional documents with useful information and analyses.

Because the identification of programmes and projects is undertaken in close coordination with the partner government, ensure that environmental and climate change aspects are addressed through policy dialogue (see Box 1). Similarly, make sure to identify and engage relevant environment and climate change–related

FIGURE 1 **Steps during identification and formulation**



stakeholders in programme/project identification and formulation. [did not change to passive voice]

Entry point: Environmental and climate change screenings and assessments

Mainstreaming action: **Undertake environmental and climate change risk screenings to determine if the programme/project is environmentally or climatically sensitive, thus requiring a detailed assessment.**

An environment and climate change screening is required for all actions at the identification stage.

The formulation phase involves fleshing out the programme/project as well as analysing its feasibility. Environmental and climatic factors may compromise this feasibility and thus deserve careful attention. In the case of **more environmentally and/or climatically sensitive interventions**, SEAs (for programmes or projects that provide strategic-level support) and EIAs and CRAs (for projects) can be used to help explore linkages to environment/climate change; identify appropriate measures to address them; and guide decision-making to policies or technologies that contribute to low-carbon, environmentally sustainable development.

The need for undertaking a dedicated EIA or CRA is determined by a screening process described in Annex 3 of the Guidelines. For projects, the need for an EIA is usually determined by national legislation. Screening should be carried out during the identification phase (if not before); the actual SEA, EIA and/or CRA is ideally prepared during formulation. (It may also be undertaken during implementation, with a view — especially in the case of an SEA — to improving implementation and/or informing the next phases or future policies.) If no ad hoc study is required, screening will help identify issues and opportunities to consider in the identification and formulation studies. The summary of the screening process must be submitted together with the initial action document to the quality support group. Box 4 provides an example of mainstreaming environment and climate change during project formulation.

Because of the strong relevance of environmental and climate change issues to water sector development, it

BOX 4 Case study: Mainstreaming environment in budget support for Bolivia's water and sanitation sector

The overall objective of EU support to Bolivia's Programme for Water and Sanitation in Peri-urban Areas is 'to improve the living conditions of the population of suburban areas through the implementation of the National Basic Sanitation Plan, based on sustainable management of water resources promoting systems adapted to climate change'. [where is this quote from?] This budget support programme seeks to promote the adoption of technologies and measures leading to improved water use efficiency and greater resilience to climate change. To this end, the selected disbursement criteria include (i) annual increases in the number of water connections in peri-urban areas, a proportion of which are to include climate change adaptation measures; and (ii) annual increases in the number of connections to sanitation in suburban areas, a proportion of which are also to include climate change adaptation measures.

Water supply adaptation measures are defined as including (i) connections of households equipped with low-consumption sanitary devices that contribute to the efficient use of water, (ii) connections to water intake and distribution networks designed to withstand floods and prolonged droughts, and (iii) measures to reduce water losses and unaccounted-for water consumption. Sanitation adaptation measures are defined as including (i) ecological sanitation connections which support the final disposal of waste, either through shared or individual waste collection systems; (ii) sewerage connections of households equipped with low-consumption sanitary devices, discharging to a wastewater treatment plant operated according to standards; and (iii) connections with a wastewater treatment plant the output of which is re-used for agricultural or other purposes, fulfilling norms in terms of the quality of treated water.

Because climate change adaptation had not yet been incorporated into industry standards at the time of programme approval, national monitoring systems had to be adapted to support the tracking of new variables.

Sources: EC, 2011b; EU, 2010c; EU, 2014a ; EU, 2015a.

is highly recommended an SEA be carried out to inform the development [ok?] of sector support programmes and assimilated [associated?] projects; implementation of an EIA is generally a legal requirement for all large water infrastructure projects.

Entry point: Preparation of the action document

Mainstreaming action: Ensure that environmental and climate change concerns and opportunities are reflected in programme/project specifications, necessary budget provisions are made and relevant indicators are included.

Environmental and climate-related considerations identified in the context of problem analysis and screening and through specific assessments need to be reflected in programme/project objectives, expected results, indicators (see Box 5 for examples of relevant indicators) and/or activities, as appropriate. For specific suggestions on opportunities for mainstreaming environment and climate change which can be reflected in sector programme/project objectives and activities, see Part 4.

Even in the case of programmes and projects that do not require an SEA, EIA or CRA (either because they are less sensitive or because their scale is insufficient to justify undertaking a dedicated assessment), environment and climate change should be considered. The Guidelines (Annex 4) provide specific guidance on integrating related considerations into formulation studies.

Budget allocations for the programme/project should take into consideration any additional costs that pertain to environmental and climate change mainstreaming (e.g. for conducting further assessments as part of programme/project implementation, for implementing an environmental management plan, or for undertaking specific climate change adaptation measures). The tools and opportunities for mainstreaming environment and climate change in budget support programmes differ from those typically used in the case of projects. Box 6 provides a brief description of the key

BOX 5 Examples of environment and climate change indicators for monitoring performance of water and sanitation programmes and projects

Development outcome indicators:

- Number/percentage of households connected to a sustainably managed/climate-resilient water supply network
- Number/percentage of households connected to an ecological sanitation system
- Percentage of population living in open defecation–free communities
- Irrigation water efficiency (percentage; this indicator should be specified and interpreted carefully, as reduced water losses in irrigation systems are not necessarily an indicator of water resource sustainability)
- Percentage of wastewater treated
- Percentage of treated wastewater re-used for human or environmental purposes
- Number/surface (km^2) of catchments under effective sustainable management measures (e.g. IWRM, integrated watershed management)

Development output indicators:

- Catchment/river basin management plans adopted
- Climate change impact and vulnerability assessment completed and adaptation strategy for water sector developed
- Water storage capacity (m^3)
- Losses in the water supply system (as percentage of total supply)
- Percentage of water supply and treatment costs effectively recovered through water pricing
- Existence and level of incentives for water use efficiency
- Existence and enforcement of a clear framework for allocating water rights
- Number of businesses implementing water efficiency management practices
- Number of businesses using technologies and production methods that prevent or reduce water pollution

BOX 6 Mainstreaming in water sector reform contracts

The selection and use of appropriate indicators comprise the main avenue for mainstreaming in budget support. [added that sentence; ok?] Indicator selection is critical under budget support, as the sector performance assessment framework is the primary tool available to the EC to ensure the support it provides is delivering results. Considering the prominence of environmental and climate change issues associated with energy sector development and their importance in sustainability, the performance assessment framework and the criteria which determine the disbursement of variable tranches of water sector reform contracts should always include one or more indicators that capture related concerns.

Other mainstreaming options in relation to budget support are to:

- Include discussions on the environment and climate change in sector policy dialogue, highlighting the importance of reducing climate-related risks and adverse environmental impacts and stressing the opportunities and development benefits of environmentally sustainable, climate-smart approaches to sector development (see Box 1).
- Support implementation of an SEA of the water sector (if not yet available) to inform future policies, plans or programmes and favour low-carbon, environmentally sustainable choices. This can be done as part of the implementation of support measures that generally accompany the provision of budget support.
- Support capacity development for national stakeholders in relation to environment and climate change (also as part of support measures). For example, assistance can be provided to build capacities for implementing IWRM or integrated watershed management approaches.

Further guidance on mainstreaming under budget support is provided in Section 3 of the Guidelines.

mainstreaming approaches available in water sector reform contracts; Box 8 provides a concrete example.

Mainstreaming action: **Assess whether the action requires a Rio or aid to environment marker and contributes to climate change or biodiversity financing.**

On the cover page of the action document, policy markers — including Rio convention markers — must be selected to support statistical reporting by the Development Assistance Committee (DAC) of the Organisation for Economic Co-operation and Development (OECD). The Rio markers were developed to measure the contribution of donors to fulfilling their pledges at the Rio Conference of 1992. The EU uses Rio markers to track financial contributions to biodiversity, desertification and climate change (both mitigation and adaptation). Markers should be selected consistently and rigorously. If a theme is marked as either a significant programme/project objective (marker value = 1) or a principal programme/project objective (marker value = 2), 40% or 100%, respectively, of the action's budget is accounted for as relevant to the theme. Annex 8 of the Guidelines provides detailed information on Rio markers and their use.

In water sector interventions that promote sustainable water resources management in the context of a changing climate (which would be expected from all sector interventions), a [the?] **climate change mitigation marker** (one of the Rio markers) and the **aid to environment marker** will always be justified. A climate change mitigation marker may also be justified where the action is expected to contribute to reduced emissions of GHGs (e.g. through energy efficiency measures or the use of renewable energy to power water supply and treatment systems). The OECD DAC's 'Indicative table to guide Rio marking by sector/sub-sector: Climate change adaptation and climate change mitigation' provides the rationale for attributing a climate marker and examples of qualifying activities in various sectors, including water (OECD DAC, n.d.).

The OECD DAC's statistical reporting directives specify that an activity arising from a national action plan linked to a Rio convention — such as national adaptation programmes of action (NAPAs), national adaptation plans (NAPs), nationally appropriate mitigation actions (NAMAs) and (I)NDCs — 'automatically qualifies as principal objective, as the Conventions provide the motivation for the design of the activity' (OECD DAC, n.d., p. 8).

Implementation

During implementation, the programme/project has to be steered and monitored to ensure it does not cause harmful environmental and climate impacts and that its results are not jeopardised by climate change or environmental degradation — and to enable appropriate remedial action to be taken as necessary. During this phase, strategic or technological options can be chosen and new activities or measures identified to further enhance positive environmental and climate impacts. New opportunities to strengthen environmental and climate-related performance will arise throughout implementation (see Box 7 for examples).

[delete? see *] Regardless of whether prior mainstreaming has taken place, a results-oriented monitoring mission is an opportunity to address the environmental and climate-related performance of a programme/project. The Delegation can include relevant indicators to ensure this external monitoring identifies opportunities to enhance programme/project environmental and climate change performance.

Entry point: Preparation of contractual documents

Mainstreaming action: Further integrate environmental and climate change considerations and incorporate environmental management plan/climate risk management plan and other measures into contracts/agreements.

Where substantive and sufficient mainstreaming has occurred during identification and formulation, implementation translates these intentions into concrete action. During this phase, it is essential to (i) track the

BOX 7 Examples of mainstreaming opportunities in an ongoing water programme/project

Programme/project activities:

- Promote policy dialogue or exchange of experience among stakeholders on policies in the water and water-dependent sectors that encourage water and energy efficiency; promote the development of sanitation infrastructure and services; minimise pollution including GHG emissions; address environmental monitoring and the regulation of water abstraction and discharge; protect catchments; raise user awareness on the conservation and protection of water resources; and generally enhance resilience to the effects of climate change
- Introduce water-efficient technology options, and select those with a lower environmental and carbon footprint
- Climate-proof ongoing and planned infrastructure development, and promote investment that supports increased resilience to climate change (e.g. rainwater harvesting and small-scale on-farm water storage to bridge drought periods)
- Promote the integration of the water-related component of the (I)NDC into water and other relevant sector and national strategies (as a step towards their operationalisation)
- Build the capacities of water sector and water-consuming stakeholders with regard to options and measures for improving the environmental and climate-related performance of water supply, use and treatment
- Support awareness raising (among policymakers and planners, water utilities, government and industrial water users, farmers and the general public) about the benefits associated with sustainable water resources management and the need to charge a fair price for use of the resource

Programme management and operations:

- Adopt a green procurement policy (e.g. purchase/use fuel-efficient vehicles, energy-efficient lighting and appliances, recycled/certified paper, certified or Forest Law Enforcement, Governance and Trade (FLEGT) licensed wood for construction, biodegradable cleaning products, recycling and waste sorting)
- Promote supply of goods and services from the local community/train community members to be able to deliver quality goods and services, e.g. to reduce carbon footprint from transport and shipping of imported goods

relevant measures that were integrated in the programme/project design; (ii) promote environmental sustainability in contract specifications; and (iii) when dealing with a project that was subject to an EIA or a CRA, make sure the corresponding environmental management plan (EMP) and/or climate risk management plan (CRMP) is implemented and monitored. This tracking should be integrated into the action's overall monitoring system.

The EMP prepared as part of an EIA specifies how the mitigation measures identified will be implemented (by whom, when, where) and how these will be monitored to verify their effectiveness to contain adverse environmental impacts. The CRMP prepared as part of a CRA identifies the actions needed to implement the CRA recommendations in the form of an operational plan. EMP/CRMP recommendations need to be incorporated in the contractual documents linked to project implementation (e.g. contracts for water and sanitation infrastructure construction or rehabilitation works, service contracts for institutional and capacity-building support for water sector planners and regulators).

For ongoing programmes/projects where environment and climate change were not integrated at all or sufficiently [ok?] into the design, options still exist for enhancing their environmental and climate performance. Existing activities can be assessed to identify opportunities for improving their environmental and climate change performance, and activities reoriented or complemented accordingly. Box 7 presents a number of opportunities specific to the water sector.

Entry point: Monitoring and steering mechanisms

Mainstreaming action: **Ensure relevant environmental and climate change indicators are included in the action's monitoring system, plans and reports, results-oriented monitoring and other reviews (e.g. joint sector or budget support reviews), and ensure environmental and climate change results are regularly discussed by relevant stakeholders and the steering body.**

Programme/project monitoring should include appropriate indicators that can (i) help identify if key environmental and climate change concerns and opportunities are being addressed; (ii) track the efficiency and effectiveness of mainstreaming measures; and (iii) allow prompt identification of adverse environmental impacts that may arise, thereby enabling the programme/project to be adapted or revised accordingly. The participation of relevant stakeholders during monitoring should be encouraged. Boxes 3 and 5 give examples of indicators relevant for the water sector.

Building on the monitoring and results reporting, regularly assess the situation with regard to the four objectives in Table 1. Depending on the programme/project stage of implementation, a more in-depth assessment can be done as part of the mid-term evaluation, which offers a unique opportunity for reorienting a programme/project if needed (see below); [*] as part of a results-oriented monitoring mission; or through independent assessment of the programme/project environmental footprint. The findings may indicate a need to reorient existing activities, add some complementary activities, and/or add environmental and climate change–related indicators to the monitoring system.

Box 8 provides an example of environmental and climate change mainstreaming in the implementation of a water project.

Evaluation

The evaluation phase looks at the relevance, effectiveness, efficiency, impact and sustainability of the programme/project, so as to draw lessons to inform the next cycle of operations. There are two main points at which evaluation takes place: during the **mid-term review** and at the end of a programme/project. The mid-term evaluation results inform the continuation of the programme/project; the **final evaluation** results inform the next programming period.

Entry point: Mid-term and final evaluations

Mainstreaming action: **Ensure the evaluation criteria selected capture the key environmental and climate change concerns. [did not add "and questions" since no questions are mentioned here]**

The indicators suggested in Boxes 3 and 5 for incorporation in the programming document and the logical

BOX 8 Case study: Implementing Egypt's Water Sector Reform Programme —building on momentum

Since 2007, the EU has supported Egypt in implementing a Water Sector Reform Support Programme aimed at improving the sector's policy framework so as to ensure an adequate drinking water supply; improving resource use efficiency, balancing the conflicting needs of industry, agriculture and other water uses; as well as protecting public health and the environment. Environment and climate change considerations were well mainstreamed into the programme, but the national commitment to making necessary but unpopular reforms was weak. This lack of resolve translated into slow progress during the first few years of implementation. Nonetheless, the EU and its partners continued to work with the Egyptian authorities through continuous policy dialogue, provision of technical assistance and monitoring of the agreed indicators.

During 2012–2013, there was a change in the priority given by the national partners to environment and climate change. This in turn led to slow increases in water tariffs and a review of water supply infrastructure design, national water standards including those for water re-use, and other regulations which had been hampering sector performance.

Four factors appear to have contributed to Egypt's subsequent success in mainstreaming environment and climate change in the sector: (i) worsening water security as river flows declined, water use increased and upstream nations staked claims for withholding more water; (ii) the development of effective tools and studies including master plans at the governorate level, with the help of technical assistance; (iii) the integration of sustainability aspects in the disbursement criteria for sector budget support; and (iv) policy dialogue. Furthermore, the EU has supported processes that had developed a high degree of readiness to mainstream environment and climate change, which means that momentum could be built on and full advantage taken of the change in political mind-set.

One area that has not yet been successful is the handling of sludge from household septic tanks. Improvement here requires the cooperation of three ministries (environment, housing and water resources). Egyptian authorities note that, in hindsight, a disbursement criterion on inter-ministerial cooperation could have been helpful in triggering a solution. In any case, as a result of rising awareness of the importance of these aspects for quality of life and environmental sustainability, improving wastewater management and citizen access to sanitation has been included as a priority sector in the Single Support Framework for EU support to Egypt 2014-2016.

Sources: EU, 2010a; EU, 2010b; EU, 2015b; discussions with EU Delegation to Egypt and national authorities.

framework or performance assessment framework can be useful in evaluation. Evaluation can also address the following environmental and climate change–related aspects:

- whether an SEA, EIA and/or CRA was required and, if so, whether it was carried out
- whether and to what extent the environment and climate change–related measures recommended (e.g. by the above-mentioned assessments or the mid-term evaluation) were implemented — and, if so, how successfully
- whether the programme/project has addressed the environmental/climate change issues in a **relevant** manner (i.e. the most important environmental issues and options were identified in the problem analysis and activities were appropriately designed to address them)
- whether programme/project actions were **effective** in promoting environment-friendly and climate-resilient practices (e.g. successful introduction of water harvesting)
- whether the programme/project made environmentally **efficient** use of means (e.g. minimising the use of polluting agrochemicals and water)
- whether the programme/project has had any **positive impact** by contributing to sustainable development, including environmental sustainability, low-carbon development and climate resilience (e.g. increasing energy efficiency in the water sector, reducing the discharge of untreated liquid waste)

- whether the programme/project has had a direct or indirect **negative impact** on the environment and climate resilience (e.g. reducing biodiversity in the vicinity of water impoundments, or polluting groundwater through improper design of latrines)
- whether the programme/project's **sustainability** is threatened by environmental degradation and/or climate change (e.g. water supply and irrigation investments undermined by the failure to implement catchment protection measures)

To ensure the above points are adequately addressed in evaluations, (i) environment and climate change–related key points should be clearly reflected in the evaluation terms of reference, and (ii) the evaluation team should have relevant environment and climate change expertise. Experience shows that if these factors are lacking, evaluation coverage of environment and climate change aspects tends to be shallow and unlikely to adequately capture associated issues and opportunities.

Mainstreaming action: **Ensure the evaluation results inform continuation of the programme/project and of future programmes/projects.**

The results of the **mid-term evaluation** should be discussed and necessary changes integrated in the programme/project to enhance its environmental and climate change performance. Lessons from the **final evaluation** regarding environmental and climate change performance should be drawn and disseminated to inform the design of future programmes/projects. Moreover, evaluation results can inform policy dialogue.

Box 9 provides an example of a country programme evaluation which assessed the environmental performance of cooperation in the water sector.

BOX 9 Case study: Evaluation of the Namibian Water Resources Management and Integrated Water Resources Management-Cuvelai Etosha Basin projects

In 2013, GIZ (the German cooperation agency) and the EU commissioned an evaluation of two closely connected projects: Namibian Water Resources Management (NWRM) and Integrated Water Resources Management-Cuvelai Etosha Basin (IWRM-CEB). These projects were implemented in the north of Namibia in an area that is poor and prone to flood and droughts, arising mainly from climate conditions prevailing in the watershed area in Angola. The evaluation found that the projects had led to significant environmental results. Notably, some town councils were improving their solid waste management; irrigation schemes were lining canals to reduce water loss; and the regulatory framework was being better implemented, with towns and regional councils applying for wastewater disposal permits.

The assessment noted that these and other practical improvements were possible even though some of the projects' wider, more ambitious institutional aims — such as the development of strong basin management committees and the completion of an IWRM plan — were delayed. Recommendations were made to improve internal communication and project management arrangements and simplify the aims of future IWRM projects.

A set of knowledge management modules were developed covering IWRM institutions, stakeholder involvement practice, IWRM information management, IWRM planning and capacity development.

Source: PEMconsult, 2013.

Part 4: Environment and climate change risks, hazards and opportunities for sector activities

The contents of this part draw, in particular, on Bates et al. 2008, Corcoran et al. 2010, Hirji and Davis 2009, International Water Management Institute, 2007, IWMI 2010, Major et al. 2011, OECD 2014, Russi et al. 2013, Sadoff et al. 2015, WWAP 2015.

A. INCREASING ACCESS TO SAFE DOMESTIC WATER SUPPLY

Areas of intervention

Supply-side measures:

- Extension and development of piped and point source water supply systems to service un- and underserved urban, peri-urban and rural areas
- Extension and development of water supply treatment infrastructure
- Operation and maintenance of water supply infrastructure
- Monitoring and regulation of domestic water quality

Demand-side measures:

- Improvements in policies, regulations and the institutional framework to encourage efficient water use and regulate water allocation and abstraction for domestic supply purposes
- Introduction of water-saving devices and technology, including metering
- Use of economic instruments (primarily water tariffs) to recover costs and encourage water use efficiency
- Awareness raising and capacity building on water safety and water use efficiency for water users, water providers and utilities

	WHAT THEY ARE	HOW TO ADDRESS/AVOID/MINIMISE
Key risks and hazards	• Vulnerability of water supply and treatment infrastructure to extreme weather events and other effects of climate change (e.g. storms, floods (which are a major cause of contamination of freshwater supplies), sea level rise, coastal erosion, glacial lake outbursts) — exacerbating the risks already associated with environmental degradation (e.g. watershed degradation leading to landslides and siltation of reservoirs, nutrient concentration promoting the development of invasive aquatic species) • Limitations in the availability and/or quality of water resources arising from climate change (e.g. increased variability of precipitation, shrinking of glaciers affecting river flows, increased incidence of severe floods and/or droughts, seawater intrusion in coastal aquifers) and ecosystem degradation (e.g. deforestation of upper catchment areas, wetlands degradation ~~[Wetlands provide key ecosystem services including clean water provision, wastewater treatment, groundwater replenishment and flood mitigation more cost-effectively and sustainably than alternative man-made infrastructure, and also support the functioning of man-made infrastructure to deliver water supply and sewage treatment (Russi et al., 2013).]~~ water pollution by residential and industrial wastewater and agricultural runoff) — resulting in higher costs for procuring and/or treating water • Water scarcity associated with climate change and environmental degradation leading to inequitable access to water supply, and negatively affecting health and livelihoods	• Help governments, regulators and water utilities/companies **assess risks to water security and quality** and the costs associated with climate change and environmental degradation, and identify actions needed to address them • **Climate-proof** water infrastructure against both extreme and slow-onset events (e.g. deepening of wells for groundwater extraction, but note that in the absence of demand management, this may only be a temporary fix as it is likely to result in aquifer depletion; relocation of catchment points away from coastal areas subject to seawater intrusion) • Support water utilities/companies in the implementation of **catchment protection measures**, cost-effective **'natural infrastructure' projects** (e.g. wetlands restoration), risk prevention and climate change adaptation measures • Enhance **water treatment, rainwater harvesting, water storage** (in natural or manufactured reservoirs), water recycling and re-use while implementing demand-side measures to maintain the overall sustainability of water resource use

A. INCREASING ACCESS TO SAFE DOMESTIC WATER SUPPLY

	WHAT THEY ARE	HOW TO ADDRESS/AVOID/MINIMISE
Potential impacts of sector development	• Enhanced access to piped water leading to increased water use and over-extraction (which can in turn lead to depletion of water resources, land subsidence, seawater intrusion, higher extraction costs, etc.) • Water pollution, environmental degradation and increased incidence of waterborne diseases resulting from the discharge of larger quantities of wastewater, if not matched by the simultaneous development of sanitation and wastewater treatment infrastructure • Increased GHG emissions resulting from reliance on fossil fuels for powering water supply and treatment infrastructure ~~[In this regard, freshwater production based on desalinisation (possibly needed in small island developing states and arid areas) is particularly unsustainable unless powered by renewable energy such as solar, wind or hydropower.]~~	• **Undertake systematic and high-quality EIAs** for major water infrastructure projects; **monitor compliance** with recommendations and EMPs • Promote **demand-side management and water use efficiency**, notably through the development of water metering and the enforcement of equitable water tariffs (see Table C for more details on demand-side management) as well as awareness raising on water-saving behaviours • **Reduce leakage in piped networks**, as leakage is a significant environmental problem in water basin management to the extent it contributes to return flows and aquifer recharge, as well as a cause of economic inefficiency for water utilities and results in wasteful energy use [edit ok?] • Systematically **match the development of water supply with the development of sanitation and wastewater treatment capacity**, integrating water and wastewater management in both urban and rural development planning • Implement **energy efficiency measures** and enhance the use of **renewable energy** in water supply and treatment operations
Opportunities	• **Reduce mortality and improve population health and productivity** through enhanced access to safe drinking water • **Reduce costs and increase the safety of water supplies** through effective regulation that prevents water resource depletion and the pollution of water sources • Support the **creation of green jobs** and the transition to a greener economy through the development and operation of sustainable water supply and treatment infrastructure and services	

B. INCREASING ACCESS TO SAFE SEWERAGE AND SANITATION

Areas of intervention

Supply-side measures:

- Extension and development of sewerage and on-site sanitation facilities to service un- and underserved urban, peri-urban and rural areas
- Extension and development of wastewater treatment systems
- Operation and maintenance of public sanitation and wastewater treatment infrastructure
- In some cases, supervision of deployment of private sanitation facilities

Demand-side measures:

- Improvements in policies, regulations and institutional framework to encourage and steer development of efficient sanitation infrastructure (e.g. sanitation standards for building and housing industry)
- Use of fiscal measures and economic instruments (e.g. effluent taxes, subsidies) to promote pollution prevention as well as effective sanitation and wastewater treatment
- Awareness raising and capacity building on effective sanitation approaches and technology for sanitation service providers and the general public
- Promotion of water, sanitation and hygiene (WASH) good practices in schools and as part of public health care programmes

	WHAT THEY ARE	HOW TO ADDRESS/AVOID/MINIMISE
Key risks and hazards	• Vulnerability of sanitation infrastructure to extreme weather events and other effects of climate change (e.g. storms, heavy rainfall episodes, floods, high temperatures, sea level rise, coastal erosion), including increased risk of catastrophic overload — exacerbating the risks already associated with environmental degradation (e.g. watershed degradation) and lack of maintenance ~~(The clogging of drainage channels and overflow of sewerage and storm water drainage systems is common in most urban centres of the developing world. This is typically caused by a combination of poor solid waste management, heavy rainfall and increased runoff associated with watershed degradation.)~~ • Decreasing capacity of degraded water bodies and natural ecosystems (particularly wetlands) ~~(Climate change can be one of the factors contributing to this degradation, through reduced freshwater replenishment of rivers and wetlands as a result of reduced precipitation, prolonged droughts and/or the shrinking of glaciers.)~~ to receive and decompose waste, increasing the need for manufactured wastewater treatment infrastructure and the associated costs ~~(A rise in costs should be avoided as it may both place a burden on the poor and lead to sanitation infrastructure failures as a result of insufficient maintenance.)~~	• Help governments, regulators and water utilities/companies **assess the wastewater-related risks and costs associated with climate change and environmental degradation**, and identify actions needed to address them • **Climate-proof** sanitation infrastructure against both extreme and slow-onset events (e.g. larger storm water drainage pipes and detention ponds) • Support water utilities/companies in the implementation of **cost-effective 'natural infrastructure' projects** (e.g. wetlands restoration) that enhance the capacity of ecosystems to contribute to water purification • Develop demand-side measures aimed at **minimising the size and required capacity of sanitation and wastewater treatment infrastructure** (e.g. separation of wastewater collection and storm water drainage systems, use of water-efficient sanitary devices, reduction in industrial and agricultural pollution load through adoption of cleaner, more sustainable production methods)

B. INCREASING ACCESS TO SAFE SEWERAGE AND SANITATION

	WHAT THEY ARE	HOW TO ADDRESS/AVOID/MINIMISE
Potential impacts of sector development	• Flaws in the design and/or maintenance of wastewater collection and treatment systems leading to the concentration of waste in some places (e.g. low-lying areas of urban settlements), with adverse impacts on environment and human health • Increased GHG emissions resulting from reliance on fossil fuels for powering sanitation and wastewater treatment infrastructure • GHG emissions linked to anaerobic digestion processes at wastewater treatment plants ~~(Wastewater treatment is a source of methane — but it is generally admitted that failure to collect and treat wastewater results in higher levels of emissions.)~~ • Pollution of underground water and GHG emissions by pit latrines • Pollution of underground water and GHG emissions resulting from inadequate disposal of sludge at wastewater treatment plants	• Undertake **systematic and high-quality EIAs** for major sanitation and wastewater treatment infrastructure; **monitor compliance** with recommendations and EMPs • **Regulate and monitor** waste disposal, sludge handling and the design and functioning of sanitation infrastructure and wastewater treatment facilities — promoting adoption of standards and techniques which reduce negative environmental impacts and GHG emissions in a cost-effective manner • Undertake **regular maintenance** of wastewater collection and treatment systems • Undertake frequent **environmental monitoring** of incoming and effluent water to assist in optimising and prioritising investment • Implement **energy efficiency measures** and enhance the use of **renewable energy** (e.g. biogas, solar, wind, hydropower) in wastewater treatment operations
Opportunities	• **Reduce mortality and improve population health and productivity** through enhanced access to sanitation services • **Reduce water pollution** and contribute to ecosystem improvement and biodiversity protection • **Reduce GHG emissions and the energy bill of wastewater treatment plants** by using waste-to-energy solutions (biogas from sludge) ~~(In certain conditions, the solid residues from biogas production can further be incinerated for generating electricity –which requires appropriate air emissions control (Stillwell et al. 2010), or used as fertiliser — which requires strict quality controls to ensure lack of contamination by metals, organic pollutants and pathogens (Al Seadi and Lukehurst, 2012).)~~ • Support the **creation of green jobs** and the transition to a greener economy through the development and operation of sustainable sanitation infrastructure and services • **Use treated wastewater as a resource**, supporting livelihoods (e.g. in agriculture, horticulture, aquaculture, small industry), aquifer recharge and/or the conservation of water-related ecosystems	

C. WATER RESOURCES MANAGEMENT AND DEVELOPMENT

Areas of intervention	Supply-side measures (development of water resources for multi-purpose use): • Development and management of infrastructure to store, divert or control water for agriculture, industry, mining, energy generation, navigation, recreational purposes and maintaining environmental and ecosystem flows	Demand-side measures (resources management): • Monitoring, regulation and management of water quality and water abstraction, use and discharge (as well as disposal of liquid and other wastes to water bodies) in different sectors • Catchment management • Use of fiscal measures and economic instruments (e.g. water tariffs, pollution charges, tradable water rights, payment for environmental services schemes) to encourage water resource sustainability • Awareness raising and capacity building on water quality and water use efficiency for water users and providers
Key risks and hazards	• Vulnerability of water supply infrastructure to extreme weather events and other effects of climate change, exacerbating the risks already associated with environmental degradation (see examples in Table A) • Limitations in availability and/or quality of water resources arising from climate change and ecosystem degradation (see examples in Table A), resulting in water scarcity, higher costs for procuring and treating water, and/or reduced value of water (e.g. salinity or presence of pathogens reducing value of water for irrigation) • Increased demand for water associated with warming trends concurrent with implementation of many climate change adaptation and mitigation measures [edit ok?] (e.g. irrigation development, evaporative cooling of buildings, afforestation and reforestation, bioenergy crops, hydropower development) • Emergence or aggravation of conflicts as a result of water scarcity arising from drought and pollution	• Help governments, regulators, water utilities and water users across sectors **assess risks to water security and quality** and the costs associated with climate change and environmental degradation; identify actions needed to address them (e.g. adaptation of water management systems, increased water efficiency in cropping and livestock systems, more rational [better? improved?] use of fertilisers and pesticides, cleaner industrial processes); and create an enabling legal, regulatory and institutional framework for ecosystem-based IWRM • Support improved **water governance**, notably through the establishment or strengthening of river basin and catchment management organisations • Improve the **monitoring of water resources** and the sharing of related information, notably by enhancing hydro-meteorological information systems; develop seasonal forecasting for agriculture, establish early warning systems for drought and floods • **Climate-proof** water infrastructure against both extreme and slow-onset events, using climate change and hydrology assessments and modelling to inform decision-making • Carry out **EIAs of major infrastructure and land development projects** to identify adverse impacts on water and mitigation measures; **monitor compliance** with recommendations and EMPs • Support water sector stakeholders in the implementation of **catchment protection and pollution reduction measures** (e.g. reforestation, improved agricultural and irrigation practices, cleaner production techniques in industry and mining) and climate change adaptation measures (e.g. water harvesting and storage, aquifer recharge, supplemental irrigation, farming techniques promoting soil moisture retention), possibly using economic instruments to create appropriate incentives • Use an **SEA combined with a water-energy-food security nexus approach** to inform policy and strategic decisions regarding allocation of water (as well as land) resources

C. WATER RESOURCES MANAGEMENT AND DEVELOPMENT

Potential impacts of sector development

- Enhanced access to water for irrigation and other productive uses (as well as climate change adaptation and mitigation measures, see above [where?]) leading to over-extraction and thus resource depletion, water quality deterioration, land subsidence and potentially severe impacts on downstream water availability
- Water pollution and land degradation resulting from poor farming and irrigation practices (e.g. eutrophication ~~(i.e. the accumulation of nutrients leading to excessive plant growth followed by oxygen depletion)~~, excessive use of water and poor draining, leading to waterlogging and soil and water salinisation), especially in large-scale irrigation systems
- Water pollution resulting from development and use of water resources for other productive purposes (e.g. contamination by acid mine drainage from mining operations, polluted effluents from industrial facilities, oil and waste from navigation and recreational uses)
- Deterioration in ecosystems, biodiversity and ecosystem-dependent livelihoods caused by water diversion from natural environmental flows towards productive purposes (e.g. destruction of fisheries and wetlands, salinisation of delta estuaries, coastal erosion from rivers' reduced sediment input)
- Enhancement of water supply for livestock in fragile environments without adequate regulation leading to unsustainable increases in livestock herds and overgrazing of common land
- Possible impacts of water storage in artificial water reservoirs ~~(The impacts of hydropower dams and reservoirs are described in the sector note on sustainable energy.)~~: consumptive [consumption?] water use through evaporation; changes in aquatic biodiversity (e.g. as a result of interrupted fish migration or proliferation of invasive species); reduction in water quality (e.g. as a result of eutrophication); increased incidence of vector-borne diseases through creation of mosquito breeding areas; GHG emissions from decay of flooded vegetation (in large reservoirs)
- Increased GHG emissions resulting from reliance on fossil fuels for pumping, distributing and treating water (for irrigation or other purposes)
- Negative socio-economic impacts (especially for the poor) frequently associated with the use of some economic instruments (especially introduction of metering systems; introduction of or increase in tariffs, taxes and charges; elimination of subsidies)

- Undertake **systematic and high-quality EIAs** for major irrigation and other water infrastructure projects ~~(For small-scale irrigation projects for which an ad-hoc EIA is not required, SEA may be justified if significant cumulative environmental impacts are expected to occur from multiple small investments.)~~; **monitor compliance** with recommendations and EMPs
- Promote **demand-side management, pollution prevention and water use efficiency** through the adoption of a clear and consistent policy framework supporting long-term water security; the creation of a favourable legal and regulatory framework (including provisions for water rights allocation and IWRM); the provision of economic incentives (e.g. phase-out of subsidies that encourage unsustainable water use; development of water metering, equitable water pricing and water trading) ~~(Ideally, economic incentives should be designed to support adjustments to both seasonal and long-term variations in water supply and demand (OECD, 2014)~~; and awareness-raising campaigns on the value of water and efficient water use
- Systematically match the development of irrigation with support for the **adoption of good farming and irrigation practices**
- Use regulation to **control pollution** from industry, mining, navigation, recreational and agricultural practices; and to secure the allocation of sufficient environmental flows
- Promote the use of **technologies** that support water use efficiency (e.g. drip irrigation), minimise pollution and allow water recycling
- Integrate the development of water points for livestock into **wider sustainable livestock management programmes**
- To **minimise the impacts of water reservoirs**, manage catchment areas to limit soil erosion and offset consumptive [consumption?] use (through increased low-flow runoff); define and discharge appropriate environmental flows to minimise impacts on downstream ecosystems; install fish ladders and take other actions to protect biodiversity and fishery-dependent livelihoods; clear vegetation from large reservoirs prior to impoundment
- Implement **energy efficiency measures** and enhance the use of **renewable energy** for water extraction, distribution and processing
- **Analyse socio-economic impacts** as part of analysing the feasibility of policy measures, based on wide and effective engagement of local communities; this can ~~notably~~ be done in the context of a SEA
- Use the **expertise and networks of civil society organisations** to facilitate awareness, information and transfer of knowledge and technologies on sustainable water resources management

C. WATER RESOURCES MANAGEMENT AND DEVELOPMENT	
Opportunities	• Support rural and urban economic development through **enhanced, sustainable and climate-resilient access to water** for farming, other income-generating activities, industry, energy generation, transport, tourism, etc. • **Reduce costs and increase water security** through effective regulation that prevents water resource depletion and pollution of water sources • Achieve greater food and energy security through **improved water security** • Achieve **productivity and efficiency gains** (e.g. from the use of sludge to generate renewable power at wastewater treatment plants, reduced use of irrigation water for a given level of agricultural or industrial output) • Reduce the incidence, severity and cost of **water-related disasters** • Secure the **long-term availability of ecosystem services** (including water purification, water flow regulation, erosion prevention, flood moderation) and contribute to biodiversity protection, the prevention and reversal of land degradation and climate change adaptation through measures aimed at sustainable water resources management (e.g. watershed rehabilitation and management, wetlands restoration) • **Reduce GHG emissions** by promoting water conservation (thus reducing energy consumption associated with water extraction, transportation and treatment), adopting energy efficiency practices, adequately treating wastewater, using renewable energy to power sector operations, increasing carbon sequestration in more sustainably managed watersheds, and generating clean energy through hydropower • Increase **cooperation among water users** and reduce conflicts (including trans-boundary ones) over water use through IWRM approaches that take into account the needs of all water users

Part 5: Resources

General guidance on mainstreaming

Integrating the environment and climate change into EU international cooperation and development: Towards sustainable development (EC, 2016). Practical guidelines for mainstreaming environment and climate change in EC cooperation and development. Provides model terms of reference for CEPs, SEAs and EIAs; and environmental and climate risk screening procedures.

Global Climate Change Alliance. EU initiative with training materials on climate change mainstreaming.

United Nations Development Programme–United Nations Environment Programme Poverty-Environment Initiative (UNDP-UNEP PEI). EU-supported programme on county-led environmental mainstreaming, which has developed a comprehensive methodology and toolbox on mainstreaming.

Sector-specific guidance and tools

'Environment, Water and Sanitation' (Irish Aid Key Sheet 11)

'Environmental Assessment Guidelines'; see Appendix 1: Rapid Environmental Assessment Checklists for water supply and sewage treatment projects (Asian Development Bank, 2003)

Climate Change, Water and Agriculture: Towards Resilient Systems (OECD, 2014).

Water project toolkit: Water resources management for sustainable development (EC, 2011).

Web-based resources

Capacity4Dev: EU Water Initiative Community Space

Capacity4Dev: Public Group on Water and Sanitation

Capacity4Dev: Public Group on Environment, Climate Change and Green Economy

Cap-Net: Capacity Development in Sustainable Water Management

Gender and Water Alliance

Global Water Partnership

International Water Management Institute (IWMI)

International Water Resources Association

The Economics of Ecosystems and Biodiversity (TEEB)

UN-Water

Water Aid

Water, Energy and Food Security Nexus Resource Platform

Water Resources Management (World Bank)

Water Supply and Sanitation Collaborative Council

World Water Council

Sector SEAs and related guidance [ok?]

Applying Strategic Environmental Assessment: Good Practice Guidance for Development Co-operation (OECD DAC, 2006). Guidelines prepared in response to commitments under the Paris Declaration for Harmonisation of Donor Approaches to Environmental Assessment. Provide an overview of different approaches to SEA used by donors and basic principles for SEA. Complementing the guidance, Advisory Notes have been prepared on SEA and biofuel development, climate change adaptation, ecosystem services, disaster risk reduction, and post-conflict development.

'Mainstreaming SEA in Water and Environmental Sanitation in Ghana', reviewed paper (L.Y. Salifu and E. Darko-Mensah, 2008)

'Strategic Environmental Assessment: Improving Water Resources Governance and Decision Making' (World Bank, 2009)

Country environment and climate change situation

Country environmental analyses (CEAs). Detailed state of the environment reports prepared by the World Bank for some countries; provide good overview of environmental issues.

Country environmental profiles (CEPs). Prepared in support of EU multiannual programming. Provide an overview of the state of the environment (including pressures and trends); expected impacts of climate change; the institutional, policy and regulatory framework for environment and climate change; donor activity in environment and climate change; and recommendations for EU programming.

Low-emission development strategies (LEDS). National development plans addresing low-emission and/or climate-resilient economic growth. Typically include a compilation of emissions data and projections; economy-wide, broad, long-term mitigation goals (15–30 years); a survey of cost-efficient mitigation options and their prioritisation; and stipulation of concrete short- and medium-term mitigation actions. [edit ok?]

National adaptation programmes of action (NAPAs). Produced by all least developed countries (LDCs) and submitted to the UNFCCC, NAPAs identify priority climate change adaptation projects. In many cases, NAPAs are outdated and/or have been replaced with national adaptation plans (NAPs) and/or LEDS.

Nationally appropriate mitigation actions (NAMAs). Prepared in the context of the UNFCCC by developing country parties to the convention, NAMAs identify priority climate change adaptation actions. Discussions are ongoing in climate negotiations to see if NAMAs could qualify for carbon credits under the New Market Mechanisms.

National communications to the UNFCCC. Submitted by all countries that are party to the convention and include an

overview of the country situation, expected impacts from climate change, an inventory of GHG emissions, an indication of climate change vulnerabilities in different sectors, and an indication of opportunities for GHG reductions and adaptation.

(Intended) nationally determined contributions (INDCs). INDCs, prepared ahead of or following the Paris Agreement, are to be communicated by all countries party to the UNFCCC. Present each country's ambition for reducing emissions, taking into account domestic circumstances and capabilities. Can also describe climate change impacts and adaptation needs and plans, and what support if any might be needed from the international community. Once a country ratifies the Paris Agreement, its INDC becomes an NDC. [edit ok?]

National environmental summaries (NESs). Prepared by the United Nations Environment Programme for some countries. Offer a good synthesis of a country's most important environmental issues.

Other country resources

- National state of the environment reports
- National reports to the Convention on Biological Diversity (CBD)
- National biodiversity strategies and action plans (NBSAPs)
- National reports to the United Nations Convention to Combat Desertification (UNCCD)
- National environment policy
- National climate change policy
- National energy policy
- Any SEA carried out in the sector [necessary to include, since it's already listed elsewhere?]
- Research, evaluations and analysis produced by other donors in the energy, environment and climate change sectors [customize this entry for water?]

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Acronyms

CEP	Country Environmental Profile
CRA	Climate Risk Assessment
CRMP	Climate Risk Management Plan
DAC	Development Assistance Committee
DEVCO	Directorate-General for International Cooperation and Development
EC	European Commission
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EU	European Union
GHG	Greenhouse Gas
INDC	Intended Nationally Determined Contribution
IWRM	Integrated Water Resources Management
MIP	Multiannual Indicative Programme
NDC	Nationally Determined Contribution

OECD	Organisation for Economic Co-operation and Development
SEA	Strategic Environmental Assessment
SDG	Sustainable Development Goal
UNFCCC	United Nations Framework Convention on Climate Change