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**Promoting an integrated and intersectoral approach to water management at
all levels: water-food-energy-ecosystems nexus in transboundary basins****Solutions and investments in the water-food-energy-
ecosystems nexus: preliminary findings from a synthesis of
experiences in transboundary basins****Submitted by the secretariat in cooperation with Finland***Summary*

The present document contains the preliminary findings from a synthesis of experiences of water-food-energy-ecosystems nexus solutions and investments in transboundary basins. A synthesis document on the experience of countries and basins in addressing nexus issues was requested by the eighth session of the Meeting of the Parties to the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention) (Nur-Sultan, 10–12 October 2018). The stocktaking of nexus solutions and investments of transboundary relevance was carried out in 2020 and 2021 by the United Nations Economic Commission for Europe in collaboration with the International Union for Conservation of Nature. The draft synthesis report (ECE/MP.WAT/WG.1/2021/INF.4–ECE/MP.WAT/WG.2/2021/INF.4) complements the findings contained in the present document.

After introducing the questionnaire and analytical framework (ECE/MP.WAT/WG.1/2020/INF.4–TFWFEEN/2020/3), the present document illustrates the preliminary findings from the synthesis in terms of: common challenges and their root causes; common typologies, trade-offs and synergies, challenges to implementation, enabling factors, added value and perceived benefits of nexus solutions; and sources of nexus

* Third joint meeting of the two working groups.



investments and financing delivery pathways. Regional considerations are also included. Lastly, the present document illustrates the main features of the synthesis report and proposes ways forward.

The Working Group on Integrated Water Resources Management and the Working Group on Monitoring and Assessment are invited at their joint meeting to review and comment on the preliminary findings contained in the present document, as well as on the draft synthesis report. The Working Groups are also invited to entrust the secretariat, in cooperation with the lead country, to edit into a publication the synthesis report, taking into account the comments made, and to prepare the final publication for the ninth session of the Meeting of the Parties to the Water Convention (Tallinn, 29 September–1 October 2021).

I. Background and introduction

A. Need for a synthesis report on nexus solutions and investments in transboundary basins

1. Transboundary water resources constitute more than 60 per cent of global freshwater resources. Water, energy, food and environmental security depend on these waters. Their sustainable management is crucial for development, peace and stability, as is effective cooperation among riparian countries and the different sectors of the economy that rely on those waters.

2. The “nexus” concept is rooted in the idea that there is an urgent need for sectoral and national policies to be made more coherent in order to reduce resource management trade-offs and reconcile multiple uses of resources, including transboundary waters. Policy coherence can be achieved through intersectoral exchange of communication, active coordination and due consideration of different interests, and negotiation of trade-offs, all the way to synergy and cooperation towards common objectives. Notably, policy coherence is a necessary condition for effective climate action, water and food security, ecosystem preservation and development in general, all of which requires acting across sectors (energy, food, biodiversity, etc.) and across scales (global to local, and transboundary). The 2030 Agenda for Sustainable Development itself requires coordination across sectors, coherent policies, and integrated planning – essentially a “nexus approach”.

3. Policy coherence could bring economic benefits by facilitating the development of synergies and partnerships, and in turn facilitate the co-financing of investments: public-private, multisectoral and multi-country. In transboundary settings, increased trust and cooperation among riparian countries is essential to reduce political risks for investors. Climate action, green economy and sustainable development provide valuable cross-sectoral policy frameworks for coordinated, integrated projects and can support water authorities in establishing strategic partnerships and finding financing.

4. Multiplying benefits from a single project (for example, multipurpose infrastructure; combining innovative solutions to attain the efficient use of different resources) is the most practical way of contributing to different objectives at the same time. However, without a coherent policy framework, consultative processes and planning frameworks that support integration, the upscaling or replication of this type of investments is difficult. Transboundary cooperation frameworks, such as transboundary water agreements and respective institutional arrangements, or strategic action plans for basins, could increasingly play a positive role, provided that they effectively provide a basis for engaging with relevant economic sectors (for example, industry, energy production, agriculture or tourism).

5. To date, various Governments and institutions have been involved in nexus dialogues and/or assessments carried out by the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention) and partner organizations around the world. One example is the International Union for Conservation of Nature (IUCN), which, with the United Nations Economic Commission for Europe (ECE), co-supervised the development of the synthesis report, bringing experience from the project “Building River Dialogue and Governance (BRIDGE)”. These efforts make up a significant body of knowledge and practical experience. Other major initiatives include the “Nexus Regional Dialogues Programme”, supported by the European Commission and the German Agency for International Cooperation (GIZ).

6. Yet, despite this experience, there is still a lack of convincing examples demonstrating the real added value of nexus approaches (to policymaking and investment planning) compared to traditional, sectoral approaches. The nexus approach should lead to “nexus solutions” that increase resource efficiency and reconcile different interests, while protecting the environment and maximizing the social value of investments. However, there is no blueprint for the design and implementation of nexus solutions, and experience of cross-sectoral cooperation may or may not be labelled as “nexus”. Taking stock of nexus solutions means considering a broad spectrum of experience and ultimately clarifying the following questions:

- What are the most common problems in transboundary basins that are being tackled with a “nexus”, i.e. cross-sectoral, approach?
- What are the most common categories/typologies of solutions and related investments?
- What are common trade-offs and synergies across sectors and countries?
- What are the benefits of cooperation that can motivate cooperation (and that can be used for communication and advocacy)?
- What are the enabling factors for the implementation of solutions, notably institutional arrangements and financing frameworks?

7. The Meeting of the Parties to the Water Convention at its eighth session (Nur-Sultan, 10–12 October 2018) requested the secretariat, as part of the programme of work for 2019–2021 under the Water Convention (ECE/MP.WAT/54/Add.1, item 3.2.1), to undertake the preparation of a synthesis document to fill these important gaps (ECE/MP.WAT/54, para. 70 (f)).

8. The synthesis of nexus solutions and investments is overseen by the Task Force on the Water-Food-Energy-Ecosystems Nexus under the Water Convention. The Task Force, with Finland as the lead Party, was established in 2013 to oversee a series of thematic “nexus” assessments in transboundary basins. It consists of representatives of Governments (mainly water, energy, agriculture and environment protection authorities) – notably from countries that have experience in nexus or integrated assessments – river basin organizations, specialized agencies and international, regional and non-governmental organizations, as well as experts/academics.

9. Previous nexus work under the Water Convention includes: the development of a transboundary basin nexus assessment methodology¹ (2013–2015) to carry out participatory assessments of nexus issues in transboundary contexts, its application so far in six river basins and on one shared aquifer (2013–2020); and the thematic work on the topic of sustainable renewable energy deployment considering water and the environment (2020).²

10. The present document presents the preliminary findings from the stocktaking of nexus solutions and investments for review by the Working Groups. The Working Groups are invited to:

(a) Review the summary and the draft synthesis report,³ provide any additional comments and entrust the secretariat, in cooperation with the lead country, with editing the synthesis report into a publication, taking into account the comments made and elaborating as necessary;

(b) Entrust the secretariat with submitting the publication “Solutions and investments in the water-food-energy-ecosystems nexus: a synthesis of experiences in transboundary basins”, in English, to the Meeting of the Parties at its ninth session (Tallinn, 29 September–1 October 2021), printing it and translating it into Arabic, French, Russian and Spanish.

¹ Subsequently published as *Methodology for assessing the water-food-energy-ecosystems nexus in transboundary basins and experiences from its application: synthesis* (United Nations publication, Sales No. E.18.II.31), complementing the initial methodology contained in the publication *Reconciling resource uses in transboundary basins: assessment of the water-food-energy-ecosystems nexus* (United Nations publication, ECE/MP.WAT/46).

² Additional information available at <https://unece.org/environment-policy/water/areas-work-convention/water-food-energy-ecosystem-nexus>.

³ Solutions and investments in the water-food-energy-ecosystems nexus: a synthesis of experiences in transboundary basins (draft report) (ECE/MP.WAT/WG.1/2021/INF.4–ECE/MP.WAT/WG.2/2021/INF.4).

B. Stocktaking exercise: the framework and the questionnaire

11. An exercise taking stock of experience from countries and basins of designing and implementing nexus solutions and investments of transboundary relevance was carried out in 2020.⁴ This was done using an ad hoc questionnaire, as well as an ad hoc analytical framework used to process the responses. The questionnaire was established online and disseminated by ECE, also on the occasion of the fifteenth meeting of the Working Group on Integrated Water Resources Management (Geneva, 30 September–2 October 2020) (see ECE/MP.WAT/WG.1/2020/INF.4-TFWFEEN/2020/3). To better understand the findings reported in the present document, the key features of the analytical framework can be found in document ECE/MP.WAT/WG.1/2020/INF.4-TFWFEEN/2020/3.

12. Each response to the questionnaire aimed to capture the experience of implementing a “nexus solution” and related “nexus investment” of transboundary relevance, where: “Nexus solutions and investments arise from silo-breaking action and directly or indirectly produce sustainable transboundary benefits in multiple, diverse water-using or water-dependent sectors in the riparian States.”⁵

13. Hence, the framework was built to allow for a process-oriented analysis aimed at capturing the characteristics of the implementation of nexus solutions. It is, therefore, a dual-axis framework, which links different categories of problems with different factors of success characterizing the solution implemented.

14. The first axis includes the most typical problems that affect transboundary basins in terms of water quantity, water quality or environmental aspects. These typical problems have been derived through literature, specifically from the experience of transboundary diagnostic analyses (TDA) carried out using Global Environmental Facility methodology around the world.⁶ The second axis includes the underlying factors of success for four large clusters of nexus solutions: international/transboundary cooperation; governance; economic and policy instruments; infrastructure (both grey and green); and innovation. These clusters of solutions were derived from the “five Is” framework developed in ECE.⁷

15. The questionnaire was developed to capture the links between the problems tackled, their root causes, the types of solutions, the types of investment and financing pathways. Moreover, the questionnaire aimed to gather the perceived benefits of applying a nexus approach (compared to conventional siloed sectoral planning).

16. It is important to note that nexus solutions typically address compound problems (for example, concerning both water quality and quantity) and/or combine two or more categories of solutions (for example, governance and infrastructure). Drawing conclusions from the experience collected requires unpacking these different elements and recombining them according to common characteristics.

17. The stocktaking exercise included 36 case studies submitted in response to the questionnaire (21), as well as from a review of the literature (15). The case studies come from the following regions:

- Africa (11) – Incomati, Kafue, Limpopo, Mekrou (tributary of Niger), Niger, North-Western Sahara Aquifer System (2), Orange-Senqu, Senegal, Zambezi (2).

⁴ Phil Riddell, Taking Stock of Nexus Solutions and Investments in Transboundary Basins: A Synthesis, Draft Final Report, December 2020.

⁵ Phil Riddell, Taking Stock of Nexus Solutions and Investments in Transboundary Basins: A Synthesis, Draft Final Report, December 2020.

⁶ The support of the Global Environmental Facility International Waters Learning Exchange and Resource Network (GEF IW:LEARN) for consolidating key management issues from transboundary diagnostic analyses and reaching out to Global Environmental Facility projects is gratefully acknowledged.

⁷ The five Is of nexus solutions are institutions, information, instruments, infrastructure and international coordination and cooperation (*Methodology for assessing the water-food-energy-ecosystems nexus*). The clusters were “unpacked” into factors of success based on the experience from United Nations Economic Commission for Europe nexus assessments and similar exercises.

- Americas (4) – Great Lakes, Lake Atitlán, Lake Titicaca, Paraná.
- Asia (9) – Sekong, Sesan, and Srepok (3S), Alazani/Ganykh, Aral Sea basin, Kura River basin, lower Syr Darya, Mekong (3), Teesta.
- Europe⁸ (12) – Danube (2), Drin, Drina, Elbe, Lake Geneva, Lake Peipsi, Pripyat, Rhine (2), Sava, Dniester.

18. Analysis of the above-mentioned case studies made it possible to establish the key factors of success in and the most common constraints to the implementation of nexus solutions, and also to appreciate the added value of the nexus approach, also in relation to the different regions. These factors of success and constraints are reported in section II below.

19. It is important to bear in mind that the pool of experience considered was limited. While it is noteworthy that the main trends emerging from the analysis correspond to the broad experience of ECE and IUCN, this limitation calls for a larger dissemination of the questionnaire (as well as a potential revision of the questionnaire itself based on the feedback from the first round of responses).

20. The dual-axis framework – illustrating the problems tackled and factors of success in the implementation of the solution – as well as the questionnaire,⁹ are well illustrated in the draft report “Solutions and investments in the water-food-energy-ecosystems nexus: a synthesis of experiences in transboundary basins” (ECE/MP.WAT/WG.1/2021/INF.4-ECE/MP.WAT/WG.2/2021/INF.4).

21. Preliminary results from the stocktaking exercise were presented at the sixth meeting of the Nexus Task Force on the Water-Food-Energy-Ecosystems Nexus (Geneva, 22 and 23 October 2020). Participants discussed not only the key factors of success but also the benefits and added value of implementing nexus solutions to solve the most typical problems affecting transboundary basins and to support cooperation, and how such solutions could be financed. The meeting enabled a discussion on experiences of applying and operationalizing the nexus approach in different regions of the world, including through regional dialogues and cooperation programmes. Regional partners of the Water Convention (the Economic and Social Commission for Western Asia, the Economic Commission for Latin America and the Caribbean, the Global Water Partnership–Mediterranean and the Regional Environmental Centre for Central Asia) reported on their experience on this topic and highlighted the fact that the practical implementation and benefits of nexus approaches are still vague, thus reinforcing the value of the stocktaking exercise.

II. Summary of the findings from the stocktaking exercise

A. Common challenges in transboundary basins and their root causes

22. The data and information emerging from the literature review and the survey were subjected to a range of quantitative and qualitative analyses. Simply stated, these analyses suggested that, at least as far as the case studies were concerned, the problems addressed by nexus-oriented factors of success were more concerned with environmental and qualitative issues than with quantitative issues of water variability, for example. This does not indicate that quantitative issues are not present, but that the majority of the solutions collected tackle qualitative and environmental problems, revealing that quantitative issues are more rarely tackled through a nexus approach.

23. Nonetheless, there is remarkable consistency between the case studies with respect to the fact that anthropogenic hydrological changes is the highest ranking root cause of the problems tackled, all around the world. Climate change is the second-ranking root cause outside the European region.

⁸ Europe region includes both Eastern and Western Europe.

⁹ Available at <https://unece.org/environmental-policy/events/task-force-water-food-energy-ecosystems-nexus>.

24. The data also indicate that, to a very significant level, institutional solutions predominated over infrastructural approaches (though this may have been influenced by the stakeholder constituency involved in the survey). As far as infrastructure was concerned, green infrastructure was slightly more prevalent than built infrastructure.

B. Nexus solutions: common typologies, trade-offs and synergies

25. A “nexus solution” can be defined broadly as: “an intervention that would benefit more than one sector, in this context including also interventions that reduce the pressure on ecosystems (or the environment at large)”.¹⁰

26. The typologies of solutions and underlying factors of success span a broad range. All of the 26 factors of success (see table 1 below) falling into the four big clusters of international cooperation, governance, economic and policy instruments, and infrastructure and innovation appeared in at least one case study. Two more factors of success were indicated in two of the case studies (marked as “other” in the table).

27. A clear conclusion is that the wide-ranging suite of “institutional” factors of success predominate over the others, i.e. there is very limited mobilization of green infrastructure approaches (green) and even less of built infrastructure (grey). In other words, the most common factors of success relate to the action of institutions and do not require the mobilization of resources for new infrastructural investments.

Table 1

Factors of success (institutional, green and grey infrastructure-related) ranked from the most to the least common

<i>Factor of success</i>	<i>Type</i>
1. Stronger transboundary cooperation	Institutional
2. Shared data and information	Institutional
3. Increased awareness of options for cross-sector, transboundary trade-offs, compromise and synergies	Institutional
4. Innovative infrastructure operating rules	Institutional
5. Increased awareness of the benefits accruable to cross-sector transboundary trade-offs, compromise and synergies	Institutional
6. Institutional arrangements	Institutional
7. Renewable energy	Infrastructural (green)
8. Natural infrastructure	Infrastructural (green)
9. Standardized social and environmental impact assessments between sectors and between riparians	Institutional
10. Legal arrangements	Institutional
11. Demand management policies	Institutional
12. Appropriate, well-enforced regulations	Institutional
13. Multipurpose use of existing infrastructure	Institutional

¹⁰ *Methodology for assessing the water-food-energy-ecosystems nexus*, p. 61.

<i>Factor of success</i>	<i>Type</i>
14. Innovative infrastructure	Infrastructural (grey)
15. Decentralized service delivery concepts	Institutional
16. Economically mobile water	Institutional
17. Functional, transparent incentive structure	Institutional
18. Small-scale conservation agriculture	Infrastructural (green)
19. Smart energy strategies	Institutional
20. New, multipurpose “basin”-level infrastructure and/or the planning thereof	Infrastructural (grey)
21. Large-scale conservation agribusiness	Infrastructural (green)
22. Innovative financing	Institutional
23. Common metrics	Institutional
24. Decentralized service infrastructure	Infrastructural (grey)
25. Transparent and equitable terms of transboundary trade between the riparians	Institutional
26. (Other) Investment prioritization based on hydrological and other analyses	Institutional
27. Awareness-raising	Institutional
28. (Other) Application and monitoring of measures to control erosion, creation of erosion maps	Institutional

28. The survey did not provide clear insights into the trade-offs and synergies associated with nexus solutions. However, looking at the factors of success, two conclusions can be tentatively drawn. Firstly, at least five of the factors imply a trade-off related to water resource allocation (new, multipurpose “basin”-level infrastructure; multipurpose use of existing infrastructure; demand management policies; innovative infrastructure; innovative infrastructure operating rules). Secondly, some of the “institutional” factors may involve other types of trade-off in terms of political economy or hegemony. It is hoped that follow-up interviews will shed light on the trade-offs and synergies.

C. Nexus solutions: constraints to implementation and enabling factors

29. The data set revealed a suite of eight constraints encountered by stakeholders when trying to implement nexus solutions. These are: politics; data and information shortcomings; inadequate institutions; financial constraints; persistent policy/sector silos; limited technical capacity; limited time frames; and limited options for benefit-sharing.

30. Fortunately, the data also identified three possible ways in which such constraints could be, and in some cases were, obviated. “Well-focused programme-based support”, “mainstreaming of national and sectoral plans into high-level development planning” and “common understanding and mutual trust” emerged as strategic enabling factors of nexus solutions in transboundary basins. A further enabler that clearly emerged during the sixth meeting of the Task Force on the Water-Food-Energy-Ecosystems Nexus, as well as at a recent virtual workshop on financing transboundary cooperation and basin development (16

and 17 December 2020), was the involvement of high-level decision-makers and ministries of finance in transboundary (nexus) dialogues. The lack of involvement of high-level decision-makers is often a major obstacle that prevents riparians from implementing concrete solutions (with or without a nexus approach). If transboundary dialogues lead to the identification of bankable projects, they can attract the attention of non-line ministries. Crucially, the cooperative nature of transboundary nexus dialogues has the potential to reduce political and financial risk for investors.

D. Perceived added value of nexus solutions

31. In this context, and due to the difficulty of drawing clear conclusions regarding trade-offs and synergies, the “added value” of nexus solutions corresponds to the benefits that they generate beyond the direct (sectoral) resolution of the problem in question, in qualitative terms. According to the survey (see table 2 below), perceptions of added value were predominantly institutional in nature, trending through resource and regional security, with economic and financial added value coming last.

Table 2
Elements of added value of nexus solutions

<i>Element</i>	<i>Percentage</i>
Enhanced intersectoral cooperation	65
Enhanced transboundary cooperation	65
Better resilience or reduced risks	58
Establishment of improved planning practices and paradigms	52
Improved ecosystem services	52
Greater transparency	48
Improved infrastructural functionality	42
Improved resource security (water, energy or food) (R)	42
Reduced tension	42
Increased returns on investment (F)	30
Regional peace or stability	28
Decentralized/devolved financing opportunities (F)	19
Increased returns on the factors of production (especially land and water) (R)	19
Reduced demands on line budgets (F)	16
Increased returns on sunk costs (F)	10

Abbreviations: R, resource and regional security added value; F, economic and financial added value.

32. The fact that, from the point of view of respondents (mostly coming from the fields of water and the environment) economic and financial types of added value ranked so low may be one important barrier to establishing a concrete dialogue between water and water-using sectors. In general, within water institutions there seems to be little understanding of how the financing of nexus/multisectoral projects works in practice and this is a major capacity gap that prevents them from finding (or coordinating) bankable cross-sectoral projects. The risk of polarization is high and, in the end, water-using sectors (for example,

energy, industry) find solutions to their water problems faster by themselves, thereby reinforcing silos.

E. Sources of nexus investments and financing delivery pathways

33. The analysis of investments and financing focused on the overall data emerging from the questionnaire survey (the literature review was effectively silent on the subject), also considering a data set provided by a complementary study into the financing of transboundary institutions.¹¹

34. The types/sources of financing considered were:

- By the State (including credits from development partners)
- By the State, with development partner grant support
- By development partner grants
- By blended finance
- By the private sector

35. The financing delivery pathways considered were:

- Project specific funding (funding for a single, discrete investment (infrastructural or institutional))
- Specific programme financing (for example, climate funds) (funding for a pre-determined suite of investments (infrastructural and/or institutional))
- Adaptable programme financing (funding for a suite of investments (infrastructural and/or institutional) that are not predetermined but have a common cascade of objectives and outputs)
- Sector budget support (funding made available to line ministries or their decentralized/devolved authorities to be disbursed at their discretion)
- Central budget support (funding made available to non-line ministries and/or decentralized/devolved authorities to be disbursed at their discretion)

36. Examination of the data available suggests that project-specific delivery pathways (financed by the State, with or without development partner support) were the most common. With minor exceptions, this trend appears even when the study data set is broken down by region, meaning that the trend applies almost equally to the entire world.

37. The analysis also included the search for a correlation between the financing delivery pathway and the type (and source) of investment. This is an interesting question, particularly when it comes to consideration of infrastructural solutions and private sector financing because programmatic funding is an efficient way to mobilize public finance and certain kinds of private financing (specifically bonds) for a series of infrastructural investments (especially if basket funding modalities are possible), circumventing the hazards cited by both the public and private sectors with respect to financing water sector infrastructure.¹²

38. Within the limits of the data available, it is reasonable to say that there is a correlation between infrastructural measures and adaptable programmatic financing. Programmatic financing means that funds are allocated to a cross-sectoral programme (for example, modernization of irrigations systems in a river basin) without connection to a specific project. Funds can come from public or private entities, or both. While in principle they are possible, there is a lack of examples of good transboundary programmatic financing schemes.

¹¹ International Union for Conservation of Nature, *Shared Waters for a Shared Future: Financial Sustainability in Transboundary Water Management* (forthcoming).

¹² As emerged, for example, at the Budapest Water Summit (28–30 November 2016) and the 2016 annual meeting of the Infrastructure Consortium for Africa (Abidjan, 21 November 2016).

39. One important limit of programmatic funding schemes is that they are typically designed by one sector and, in less-developed regions, with strict requirements from a donor. In order to be effectively “nexus”, they should be more adaptable and “smarter”, meaning that they should stimulate competition between eligible projects. In parallel, “basket funding” is typically associated with specific projects while it may be more effective in support of programmes and, in general, at a higher level of politics where countries have more leverage to decide and more “space” across sectors.

40. When it comes to private financing, the case studies show an important gap, as responses reveal an overwhelming preponderance of State financing of one form or another. This observation may be biased by the fact that most of the questionnaire responses came from public institutions and the fact that the solutions relate to water and environment issues. In fact, solutions in agriculture and energy (for example, landscape agriculture, improved agribusiness, sustainable agricultural value chains, renewable energy or energy efficiency) are more likely entry points for private investments that could directly or indirectly tackle water and environment issues, but these were not adequately represented in the set of case studies considered for the analysis.¹³

41. Going back to the relevance for high-level ministries and decision-makers, if nexus dialogues manage to align with multisectoral programmes (for example, climate- or green economy-oriented programmes), this may enable the necessary high-level support or decisions. Agreeable integrated packages of solutions, when supported by different sectors, should also better convince finance ministries. This might be an important step for water authorities in countries where water ranks low in national priorities for investment.

III. Regional differences

42. The first important question to ask when looking at the nexus in different regions is probably whether the most common challenges in transboundary basins (and their root causes) vary from one region to another. The only meaningful comparison allowed by the survey, due to the geographical distribution of cases, was between the root causes reported in the Europe region case studies and those reported in case studies from other regions.

43. Outside the Europe region, six root causes are encountered in more than 50 per cent of the case studies:

- Anthropogenic change in hydrology
- Climate change
- Data and information limitations
- Poor land use and management
- Poor intersectoral coordination
- Poor water resource management

44. In the Europe region case studies, there are four root causes encountered more than 50 per cent of the time, and only the first one is the same as those consistently quoted in the other regions:

- Anthropogenic change in hydrology
- Inadequate finances
- Inadequate institutional capacity
- Land use change

45. A surprising finding is that case studies from the Europe region cited “inadequate finances” as a challenge more consistently than case studies from other regions. This might

¹³ This is probably due to the questionnaire’s dissemination in the water and environment “community”, justified by the scope of the study that aimed to link nexus solutions to transboundary water cooperation.

be due to the fact that, in the other regions, cross-sectoral cooperation is increasingly supported by development partner support (even though it may be project-specific or limited to the basin region).

46. A further examination of root causes is needed to shed light on the type of cross-sectoral cooperation needed to tackle the issues. It should be noted that the solutions collected already have different cross-sectoral reaches. Some of them include some or all of the broad “sectors” of water, food energy and ecosystems, but others also extend beyond (notably industry, tourism, navigation), and the case studies with a “broader” nexus come from the Europe and Asia groups.

47. No region-specific considerations were drawn from the survey, with the possible exception that, in Asia, there is a high incidence of initiatives that have been implemented to solve or reduce a wide range of environmental problems arising from the water quality issue.

48. The role of river basin organizations in the various regions also needs to be clarified. Some regions more than others lack legal and/or institutional frameworks for transboundary cooperation among riparians. The question of how this affects the opportunity of countries to design and implement nexus solutions in these basins arises.

IV. Synthesis report

49. The synthesis report¹⁴ is due to be published in 2021, in time for the ninth session of the Meeting of the Parties (Tallinn, 29 September–1 October 2021). The report includes the preliminary findings from the stocktaking exercise (reported in the present document), giving more elements when it comes to the regional relevance of the findings, particularly regarding financing opportunities.

50. As mentioned, the stocktaking exercise included case studies with a broad geographical distribution, but was limited in terms of the number of case studies. It was concluded that regional specificities of nexus solutions and investments, as well as the open questions that emerged (see section III above), required further discussion with experts. For this reason, the synthesis report also includes findings from regional discussions and interviews.

V. Preliminary conclusions from the stocktaking exercise

51. In overall terms, looking at the stocktaking exercise, it can be concluded that, where the nexus concept is properly understood, or where constraints on its adoption are minor, a nexus approach is very useful with respect to institutional approaches to multisectoral problems.

52. According to the stocktaking exercise, the typical problems tackled with a nexus approach in the transboundary basins analysed relate to water quality and environment rather than to water quantity (for example, availability, variability), even though “anthropogenic change in hydrology” is the most common root cause reported.

53. This means that, in the basins analysed, problems ultimately arise from anthropogenic causes related to water and land management, with climate change adding pressure. Institutions often lack the resources and capacity to: tackle these issues; ensure appropriate cross-sectoral coordination, adequate data- and information-sharing; and attract and channel investments. Understanding how the financing of nexus/multisectoral projects works in practice within water institutions seems limited and this is a major capacity gap that prevents such institutions from identifying (or coordinating) bankable cross-sectoral projects.

¹⁴ The draft of the synthesis report will be made available for review in document ECE/MP.WAT/WG.1/2021/INF.4-ECE/MP.WAT/WG.2/2021/INF.4.

54. Nevertheless, there are examples of cross-sectoral cooperation with transboundary benefits from all regions. These “nexus solutions” are operationalized through international cooperation, governance, economic and policy instruments and infrastructure and innovation.

55. The highest-ranking enabling factors in the implementation of these solutions are stronger transboundary cooperation, shared data and information, increased awareness of options and benefits for cross-sector, transboundary trade-offs, compromise and synergies, and innovative infrastructure operating rules (though there are many others). These enabling factors largely depend on the institutions themselves.

56. Similarly, the main challenges to implementation seem to relate to institutions. These are politics, data and information shortcomings, inadequate institutions, financial constraints, persistent policy/sector silos, limited technical capacity, limited time frames and limited options for benefit-sharing.

57. The respondents to the survey perceive the “added value” of a nexus approach as relating to the effectiveness of institutions in managing the basin issues, rather than to the delivery of benefits in terms of resource and regional security and economic efficiency. This means that more needs to be done to catalyse the resources necessary to operationalize solutions into concrete multi-benefit projects.

58. For now, most of the financial resources used to implement “nexus solutions” come from the State (including donor financing), while the nexus approach opens up clear opportunities for more private and blended finance through “green” investments in agriculture, energy, tourism, etc. The delivery pathway is also important. Based on the study, for example, there seems to be a correlation between infrastructural measures and adaptable programmatic financing, where funds are allocated to a cross-sectoral programme (for example, modernization of irrigations systems in a river basin) without connection to a specific project.

59. Water- and environment-related problems need to be effectively tackled across sectors, and this may require significant financial efforts. Without effective cooperation, there is a high risk of economic sectors finding their own solutions to solve the immediate problems without a common vision of sustainable basin development, which is a missed opportunity for non-economic sectors to receive concrete benefits from these interventions. By designing solutions and planning investments together (across sectors), water institutions have the opportunity to catalyse the implementation of well-integrated solutions that are both environmentally sustainable and bankable.

60. The synthesis report on nexus solutions and investments complements the results of the desk review and the questionnaire survey with regional expert consultation and interviews, as well as with further analysis of the case studies submitted and the inclusion of further examples from partner organizations.

VI. Considerations for future work

61. The outcomes of the stocktaking exercise establish an important knowledge base that should be further improved. In fact, some important questions that would make the stocktaking a useful “guide” for countries and basins, remain open:

- Who should develop nexus solutions and how? What are the costs and benefits associated with them (and, in turn, their economic added value)?
- What type institutional frameworks (particularly in transboundary basins) are needed to support the implementation of nexus solutions?
- What financing sources are available to support multisectoral programmes or projects of transboundary relevance?

62. Looking beyond the synthesis report, a broader and more diverse stocktaking of nexus solutions and investments, concretely expanding the survey to include more basins and a wider range of stakeholders, would help in drawing conclusions regarding the types of

solutions and cross-sectoral cooperation that have effectively tackled basin issues. The greatest benefits lie in the extension of outreach in the following directions:

- Beyond the basin scale: unlike integrated water resources management, the nexus approach is not scale-specific, and looking “beyond the basin” can help in capturing relevant nexus solutions that indirectly provide transboundary benefits.
- More towards water-using economic sectors: despite its “nexus intention”, the study largely focused on watershed, rather than “cross-sectoral”, issues. Although the choice of deriving the most typical problems from the experience from transboundary diagnostic analyses ensured that the solutions were relevant for institutions concerned with water management, it also meant that important issues related to other sectors were only indirectly considered (among the “root causes” and among the “factors of success in the implementation”).
- Beyond the group of stakeholders concerned with institutional support: the findings so far indicate a surprising lack of case studies related to infrastructure, be it green or grey.

63. Further development of the questionnaire would help to capture more details about trade-offs, synergies and compromise and about the knowledge, attitude and perception of stakeholders with respect to nexus – especially the stakeholders among development partners, national Government and river basin organizations. The questionnaire could be further used, for example in different regions, for analysing in more detail how cross-sectoral solutions and investments help in addressing issues in transboundary basins. This could support identification of specific opportunities and operationalization of nexus solutions, in the framework of transboundary or regional intersectoral strategies. In some of the regions where nexus assessments have been carried out, such documents are being developed, in some cases complementing strategic action programmes (Global Environment Facility International Waters).¹⁵ In the framework of the Global Environment Facility International Waters, trade-offs in the “Water–Food–Energy–Ecosystem Security Nexus” have been recognized among challenges related to the implementation of strategic action programmes (SAPs). Identifying nexus investments, including to reinforce strategic action programmes, and broadening partnerships for joint action with other sectors and for investment, can consolidate and synergize efforts for a greater impact. Regional nexus dialogues supported by various organizations (for example, the European Commission, the German Agency for International Cooperation, the Global Water Partnership and the Organization for Economic Cooperation and Development), could also potentially benefit from building on the synthesis report, by considering possible application of the framework for nexus solutions and investments developed for the analysis described in the present document.

64. Determining root causes of the problems in transboundary basins is key and the nexus approach takes understanding them a step further, helping to acting upon them. Policies may need to be adjusted and this is admittedly challenging and requires time, and the revisiting of regulation. Clearly not enough investment in water is happening and unexplored or underexplored opportunities may come through coordination and partnering with other sectors, including across borders. To benefit from cross-sectoral financing opportunities, political will is crucial and non-line ministries need to be convinced. Some beneficial upgrading of capacities could come through learning by doing, twinning, exchange, sharing, and bridging the sectoral challenges. Review of existing programming frameworks to improve them, including in terms of jointly defined priorities, is possible and opportune. The pandemic and recovery process, with the changes in the use of natural resources and the economic outlook, as well as climate action commitments, have already prompted some

¹⁵ Through the Global Environment Facility: International Waters Learning Exchange and Resource Network (IW:LEARN, fourth phase), nexus work under the Water Convention supported training and the provision of programmatic support to the Global Environment Facility International Waters portfolio of projects. The International Waters: Learning Exchange and Resource Network also supported the synthesis of the methodological experience of nexus assessments, which provides indications about the added value of the nexus approach for the Global Environment Facility transboundary diagnostic analysis-strategic action programme process (see *Methodology for assessing the water-food-energy-ecosystems nexus*).

review of programming, although the space for transboundary and multisectoral actions and investments could be further enlarged.

65. The insights from the stocktaking exercise may help governmental authorities and other actors to better understand the potential of the nexus approach and to take the next steps where intersectoral solutions have been identified but their operationalization has turned out to be challenging or where they can unlock transboundary basin issues through water authorities engaging with economic sectors.
